

STRONGHOLD
GRP ROOFING SYSTEM

FLEX GRP ROOFING SYSTEM

INSTALLATION GUIDE



**20 YEAR
GUARANTEE**



**MULTISURFACE
APPLICATION**



**7.5-10 SQM
COVERAGE**



**450g/m²
C.S.M SYSTEM**

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SECTION 1: Materials & Tools Required

The following materials will be required:

PU Primer: *

STRONGHOLD PU Primer

Stronghold polyurethane primer is used to seal off porous, friable or reactionary substrates and to improve the bond of the Stronghold Flex GRP overlay system. Primer should be used before applying any Flex GRP overlay resin to Felt, Asphalt, GRP/ fibreglass, Concrete, or metal surfaces. Can be used to improve the bond to timber if required.

Resin: *

STRONGHOLD Flex Resin

When estimating quantities allow:
2-2.6 kg/m² for smooth to medium rough surfaces.
An extra 1 kg/m² may be required for very rough surfaces.

Glass (CSM): *

450g/m² Stronghold CSM (chopped strand mat) is manufactured to BS3496. Old, damp glass mat should never be used. CSM absorbs moisture and will become damp if left exposed to the air. Unused glass should be stored in a sealed polythene bag.

Catalyst: *

You will need catalyst to make the resin cure. This is methyl ethyl ketone peroxide (MEKP) liquid. The catalyst must be added to the resin between 1%-4%, depending on conditions.

*** Please note:** These materials are hazardous and MUST be handled with care as specified in the manufacturer's safety data provided in Section 2 of this Installation Guide. Material Safety Data Sheets are also available at: www.strongholdgrp.co.uk.

Decking Boards (if a new deck is required) Listed in order of preference:

OSB 3 T+G:

OSB 3 grade decking is recommended. Minimum 18mm, usually 2400mm x 600mm. Allows for an excellent finish, which can be less susceptible to stress fractures, than butt-jointed products. Can be laid with gaps to topside or underside. With all board types allow a 20mm expansion gap against any walls.

WBP PLY:

A good quality ply is also acceptable if specified by the architect although they should be considered a second-best option. Joints must be reinforced. Suitable for all applications. Use good side up.

OSB 3:

2400mm x 1200mm butt jointed boards may be used. Joints must be reinforced.

Fixings:

For decking and GRP edge trims:

All nails should be galvanised, 60–70mm long ring shank nails or better/equivalent for fixing deck sheets to the roof joists. The fixing should be at least 40mm into the joist. For high security applications use minimum 75mm ring shank nails or screws to achieve 55mm joist penetration.

Galvanised 20 mm long, large head clouts should be used for tacking the roofing trims to the deck. The deck sheets may be fixed to the roof joists with galvanised or sherardized screws. Screws or nails MUST be countersunk. Screwing or nail guns may help avoid ceiling damage.

Tape:

Packing tape or cello tape are good options to bridge board joints, 50mm.

Mastic (Adhesive Sealant):

Gun able polyurethane mastic is required to fix edge trims to fascia carried batten and to join or seal certain roof detail.
Polyurethane mastics bond well with polyester.
Two recommended grades are Soudaflex and Sikaflex.
Silicones and other mastics should NOT be used.

The following tools will generally be required to cut and fit the component parts correctly:
(Includes tools required for installing a new deck as well as overlay applications)

Tools Required:

- Power saw
- Stanley knife
- Hammer
- 10-20 litre buckets
- 2" - 4" Brushes
- Disposable gloves
- Heavy grade abrasive paper
- Sweeping brush
- Hand saw
- Hand grinder with stone cutting disc
- Mixing tool
- Mastic gun
- Stronghold application rollers
- Stronghold laminating rollers 75mm and 225mm.
(For small roofs a 150mm will suffice)
- Catalyst dispenser
(Or 1 litre Stronghold catalyst product with in built measuring dispenser)
- Hole Saw and Moisture Metre
- A suitable hand cleaner and solvent for brushes & rollers should also be at hand.

The best solvent for resin is acetone. It is extremely flammable NO SMOKING when handling these materials.

Important note: Dust masks should be used when handling all glass products. Suitable protective clothing should be worn. An eye bath should be at hand in the event that resin, catalyst or acetone makes contact with the eye. This list should not be considered definitive, and reference made to the material safety data sheets included in section 2 of this installation guide.

SECTION 1: Existing Surfaces Preparation & Priming

For existing timber surfaces, a hole saw should be used to remove plugs. Use a moisture metre to check for high moisture levels. High readings should be investigated. Pay attention to the condition of existing structural decking, joists, furring pieces and wall plates etc. Remedy any insufficiencies.

Important note: Stronghold PU Primer loses effectiveness once fully cured. It is important to apply the Stronghold Flex Resin system within 1 hour of the Primer application. If the primer is left for too long, then apply more primer and wait until tacky before applying the Stronghold Flex Resin system.

Felt:

Decayed or damaged areas should be removed.
Blisters and loose areas should be star cut. If wet, peel back and dry, then bond flat with a polyurethane mastic such as Soudaflex FC40.
All loose or embedded chippings must be mechanically removed by scraping and/or brushing. Clean entire area thoroughly.
Apply Stronghold PU primer.

Asphalt:

Remove blown areas and repair with a suitable compound such as Acrybond.
Clean and repair large cracks with a suitable mastic such as Soudaflex FC40.
Allow repairs to cure.
All loose or embedded chippings must be mechanically removed by scraping and/or brushing. Clean entire area thoroughly.
Apply Stronghold PU primer.

Concrete and Screed:

Remove any loose or friable material and repair cracks by cleaning out and filling with a polyurethane mastic such as Soudaflex FC40.
Holes or deep pitting should be repaired with a suitable compound.
Allow repairs to dry or cure.
Smooth concrete should be abraded to facilitate a better key.
Wet or damp areas must be allowed to dry.
Fresh concrete should be allowed to fully cure and dry for at least 21 days.
Remove any surface dust.
Apply Stronghold PU primer.

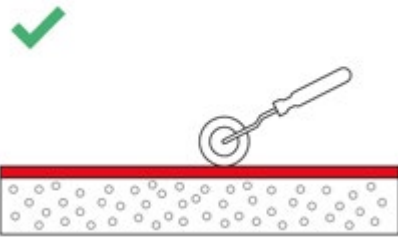
Metals:

Stronghold Flex GRP is not recommended for corrugated metal surfaces or any surfaces with up stood fixings.
Flat metal surfaces are suitable for covering provided they are clean and sound.
Remove any rust and treat with a rust converter.
Abrade surface to facilitate a better key.
Wipe with Acetone.
Apply Stronghold PU primer.

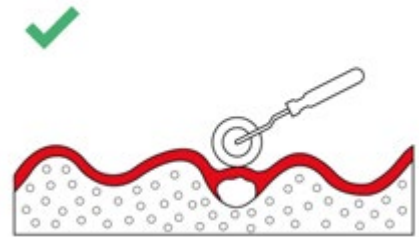
The following diagrams illustrate the application of PU Primer onto both smooth and rough surfaces:

Take care to apply Stronghold PU Primer correctly.

Correct PU Primer Application:

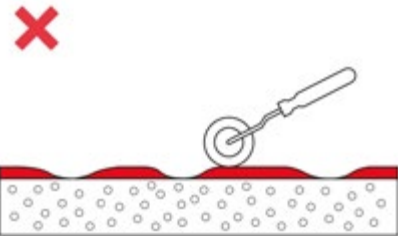


Primer applied evenly to flat surface.

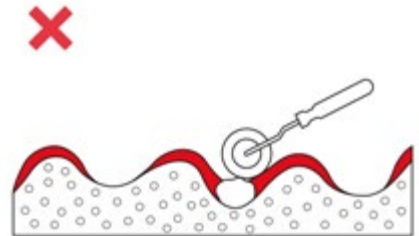


Primer applied evenly to rough surface.

Incorrect PU Primer Application:



Primer applied unevenly to flat surface.



Primer applied unevenly to rough surface.

GRP / Fibreglass:

Remove any cracked or flaking topcoat and abrade down to a sound surface.
Lightly sand entire surface including edge details and wipe with acetone.
Primer may not be required if prepared thoroughly but will improve the bond.

New Timber Decking:

18mm OSB3 T+G is recommended.
WBP ply is sufficient if joints are correctly reinforced (see new decking application section on page 6).
Ensure surface is clean and dust free.
Primer is not normally required but may improve the bond.

SECTION 1: New Decking & Joint Preparation (if required)

Fix the new decking boards on the joists by nailing or screwing. Boards should be fitted at 90 degrees to the roof joist. Boards will have to be jointed on the joists unless T+G boards are used. With butt jointed boards leave 3mm gaps between the boards to allow for expansion of the sheets. For all board types always stagger the board joints. Never use a board smaller than that which will fix to two joists. This will reduce the stresses in the roof, which are inevitably concentrated along the joints.

Care should be taken to fix boards neatly. It is a good idea to lay down 2 runs before fixing the first run. At the end of the first run use off cut to start the second run (if the off cut is long enough to cover 2 joists). If not, then start next run with complete board.

It is good practise to position next layer before fixing previous layer. Tighter joints will be easier to achieve. Boards should be 20mm away from walls. Boards should finish flush with fascia tops.

With T+G boards always fit the tongue into the groove not the grove onto the tongue.

Fixings should be applied at 300mm centres down the length of each joist covered by the boards. For butt jointed boards, the joints between the sheets must be taped with 50mm masking tape. This is vital since it seals the joint and stops resin draining through when the laminate is formed. Taping also forms a mini expansion joint along the edge of the sheets where the stresses accumulate and allows the laminate to release from the deck at that point. If butt jointed boards are to be used, a 75mm or 100mm bandage of GRP should be applied to reinforce the joints prior to laminating the roof area.

If it is not possible to complete the roof at this point either cover with a tarpaulin or "sheath" the roof area with a layer of catalysed resin. This is to stop any moisture uptake by the roof until the laminate is applied. Wet decking or sheathing should be mopped, and rag dried before allowing weather to remove any residual moisture prior to laminating.

Important note: DO NOT start a roof if a long period of rain is forecast. Never use a naked flame to dry a roof. Timber and resin are flammable. Remember that the biggest cause of flat roof failure is caused by laying GRP onto damp decking or surfaces.

SECTION 1: GRP Edge & Detail Trims (if required)

Trims are available to suit most applications and configurations

All trims have both a matt finish and a gloss finish. Always bond to the matt side. (It is a good idea to study all trims and become familiar with the matt and gloss finishes, in order to easily distinguish when applying) If a bond is ever required to the gloss side, then it should be lightly sanded to achieve a matt finish and wiped with acetone to facilitate a good bond.

Gutter or A trims:

Where it is required that water drains into a gutter, an A detail or gutter trim should be used.

This trim needs to be 35-50mm off the fascia when dressed into a standard domestic gutter. To achieve this fix two 19mm battens onto fascia. Battens should be about 10mm lower than roof surface to allow for the radius of the "A" trim.

Parapet or B trims :

B trims are fixed in the same manner except only a 19mm off stand is required to allow for the return on the bottom of the trim. A single 19mm batten fixed to the fascia or board edge is sufficient.

Fixing A or B trims :

To fix edge trims A or B first apply small beads of polyurethane mastic at 300mm centres to the batten so that when the trim is offered up to it, it will adhere to the back of the trim. Always rub trims into place to ensure a good bond.

Fix the trim to the roof by nailing the horizontal flange with 20mm Large Head Clout nails. DO NOT nail through the front of the trim.

Where a joint must be made, simply overlap the trim ends by about 100mm and sandwich a bead of polyurethane adhesive in the joint before clipping the two together. Wipe off excess sealant.

Fixing D wall fillet trims:

When sealing the roof edge to an abutting wall, a fillet or D trim should be used. This should be snugged into the corner formed by the wall and roof deck and fixed to the decking with 20mm galvanised Clout nails. The vertical flange of the trim should NOT be fixed to the wall as this is a point of movement between the roof and the adjoining wall. Any fixing here may stress the roof.

The flat roof is also able to vent air behind the D trim. Joints can be made simply by overlapping and must be sealed with polyurethane adhesive in the overlap. It is better to use too much adhesive and wipe off the excess, than not enough resulting in a weak joint. Reinforce D trim joints.

Important note: Decking should NOT be fitted tight against an abutting wall. A gap of 20-50mm is sufficient to allow the roof to vent behind the D trim underneath the lead flashing. This gap also allows for expansion of the roof area in hot periods.

Fixing F trim or flat flashing:

When joining to an adjacent pitched roof, the flat flashing Section F should be used.

Important note: Always fold back existing felt before fitting. It is advisable to change the first course of felt if a little old or perished as this will always fail before the new GRP roof and becomes the reason for costly "call backs" later. DO NOT nail the flashing to the pitched roof structure. The flashing should be allowed to move when expansion/contraction occurs. Nail the flashing to the new deck with most of it curving up onto the existing roof rafters. Reinforce any joints with bandage and take the main GRP layer up the flashing past the point where the bottom of the tiles / slates sit to reinforce any possible wearing areas. After the GRP roof is completed and cured, redress the felt and tiles etc. over the flashing.

Tips For Fitting Trims:

- Pull A and B trims slowly onto the batten until their outside face comes vertical.
- Nail trims close to inner edge of trim as this makes it easier to cover nails with bandage without getting resin runs on the face of the trim.
- DO NOT use silicone to join or fix trims as it will eventually lose its bond. Polyurethane products bond far better to GRP which is why they are specified.
- When overlapping A or B trims a bigger overlap (about 100-150mm) helps the "line" of the roof stay truer.
- When fitting A trims, it is strongly advised to fit the guttering first. It is very difficult to fix later. Use a short off cut of A trim to guide the fitting of the highest and lowest fitting and use a string line to fit the rest of the gutter brackets. Pay attention to falls.
- Always use a polyurethane mastic behind A or B type trims. Not doing so will result in the trim warping in hot weather and the "line" of the trim will be difficult to reinstate later. The trim may also pull up when the resin contracts during the curing stage.
- It is good practise to nail trims at each end and in the middle before finally nailing at 150mm centres along entire length.
- All roof edges require trims.

Corners:

Corners may be achieved by mitring on site and laminating over the joint formed with two layers of mat. Preformed corners can also be used.

Once the trims are fitted, the roof is ready to be laminated. The roof at this stage should have trims fitted to each edge so that the area to laminate is edged by the horizontal flanges of the trims around the perimeter.

Important note: All trims should be bandaged to the deck using glass bandage prior to applying the main layer.

SECTION 1: Applying Stronghold Flex GRP

For Stronghold Flex Resin allow 2-2.6 kg/m² for smooth to medium rough surfaces.
An extra 1kg/m² may be required for very rough surfaces.

For catalyst allow 1% in hot weather, 2% in mild weather, 3% in cold weather and 4% in very cold weather.
For longer curing times in very hot weather ½% can be used but be sure to stir in thoroughly. (see Catalyst addition Page. 13)
Use graduated buckets and catalyst dispensers to achieve correct ratios.
Always wear eye protection and gloves when handling catalyst. CATALYST IS HARMFUL.

Stronghold Flex Resin contains additives that settle when stored. ALWAYS STIR BEFORE DECANTING.

Ensure colour uniformity by mixing batches together.

n.b. Flex has the appearance of a Topcoat. It is not, and by necessity possess a lower viscosity. Settling is to be expected.

Stage 1 - Preperation:

Ensure that the entire area is clean, dry.

Stage 2 - Cutting Glass to Size:

Unroll the glass chopped stand mat carefully and cut to size the pieces required to cover the entire area to be worked using a sharp Stanley knife or scissors.
Each piece should overlap the next by about 75mm (never less than 50mm).
The pieces should also overlap any edge trims by about 50mm.

Place pieces to one side, in order, so that you know where each piece goes.

Next cut some "patches" of glass mat approximately 200mm square to reinforce any corners or joins, allowing 2 per detail.

Have ready glass bandage to reinforce all edge trims and any butt joints.
(only if applying to new decking).

Stage 3 - Sweep Area:

With the the glass mat now cut to size, thoroughly sweep the roof area clean.

Stage 4 - Gathering Tools & Materials:

Before starting the application stage make sure you have an adequate amount of; resin, chopped strand mat, catalyst, application rollers, laminating rollers, buckets, gloves, and paint brushes all to hand.
Once the Stronghold Flex resin is "open" it is detrimental to get on and off the roof as this invariably introduces dirt to a prepared area.

Stage 5 - Adding Catalyst:

Add catalyst, as specified, to a small amount of resin and mix thoroughly.
If mechanical stirrers are used be careful to not introduce air bubbles into the resin.

Stage 6 - Laminating Corners:

Always laminate any corners or joints first.

On a clean area of roof or board offcut first wet two at a time the glass mat patches cut earlier and dress over any corner or joint to reinforce. Hang the glass mat over the corner until level with the bottom trim return, then pull over the corner.
Apply the second piece and work the glass mat to shape by stippling with a 2" brush and/ or a 3" laminating roller.

Repeat until all corners are reinforced.

Joints on D or fillet wall trims should also be reinforced.

For edge trims such as A or B trims it is sufficient to apply plenty of polyurethane sealant into the joint such that it squeezes out and the excess can be wiped off.
For area detail trims such as gutters or expansion joints remember that the main laminate should also cover them to add strength.

Stage 7 - Edge Bandage:

Now apply bandage to any edge trims.
(*approx. half on the roof and half on the tail of the trim*)
Apply enough resin to wet the edge of the trim.
Unroll the bandage on to this and apply more resin to the top of the bandage.

Note: Be careful to cover the nail heads and not to get resin running down the face of any "A" trims.

This bond is very important and should be consolidated with a laminating roller or with the stippling action of a paintbrush.

Stage 8 - Only Applies if Installing to a New Deck:

If applying to a new deck, butt jointed boards will now require reinforcing.

Use glass bandage and resin to cover all board joints, which should by now already be masked with adhesive tape. Consolidate with a laminating roller.

If T+G boards are used some of the joints may not be tight or you may have some butt joints. These should also be taped and bandaged as resin drainage may occur and cause porosity and failure.

Stage 9 - Preparing the Resin:

Stronghold Flex resin should be applied to edges and details as you proceed with covering the main area.

Pour enough resin for one roll into a clean, empty bucket (never more than 20kg at once). Add catalyst as specified and mix thoroughly.
(*Inexperienced installers should start the roof using small resin batches.*)
Catalyst ratios can then be adjusted accurately. This can save resin loss through too fast a cure or time lost due to a slow cure. If the roof takes too long to cure it may not be cured and resistant to water damage by the end of the day / dry period.

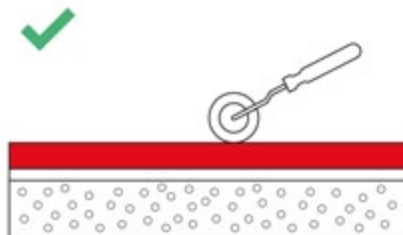
Stage 10 - Applying the Resin:

Using an application roller, apply the Stronghold Flex resin liberally at a rate of 1.5-2.1 kg/m² depending on surface texture. Allowing for full immersion of the glass mat. If the surface is rough more resin up to 3.1 kg/m² may be applied.

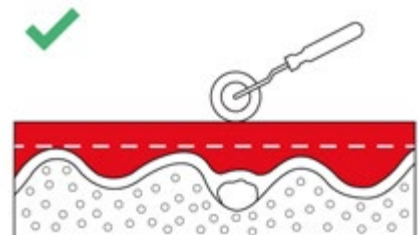
The following diagrams illustrate the application of Flex GRP onto both smooth and rough surfaces:

Take care to apply the Stronghold Flex GRP Overlay Resin correctly.

Correct Flex GRP Application:

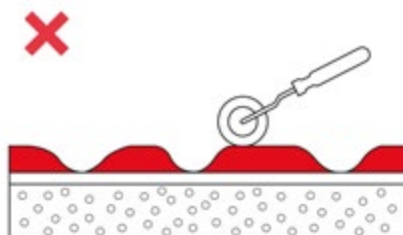


Resin applied evenly to flat surface.

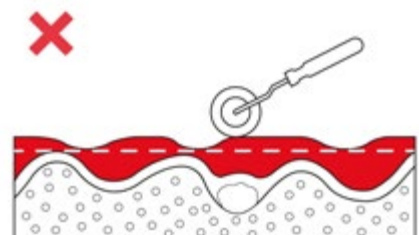


Resin applied evenly to rough surface.

Incorrect Flex GRP Application:



Resin applied unevenly to flat surface.



Resin applied unevenly to rough surface.

Stage 11 - Applying Glass Mat:

Roll out the glass mat ensuring that there are no folds or kinks.
Go over the whole area with a laminating roller.

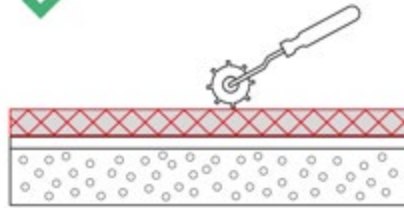
You must fully submerge the glass into the Stronghold Flex resin and make sure to get any trapped air bubbles out with the laminating roller.

Note: Areas staying white are too dry, in which case apply more resin, and work again with the laminating roller.

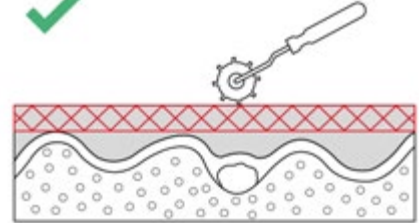
The following diagrams illustrate the application of the glass mat into Stronghold Flex Resin:

Take care to fully embed the glass mat into Stronghold Flex Resin.

Correct Glass Mat Application:

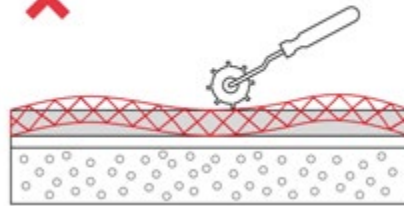


CSM firmly embedded into resin.

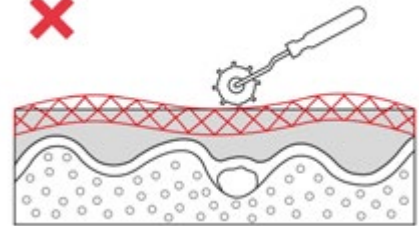


CSM firmly embedded into resin.

Incorrect Glass Mat Application:



CSM not fully embedded into resin.



CSM not fully embedded into resin.

Stage 12 - Second Coat of Resin:

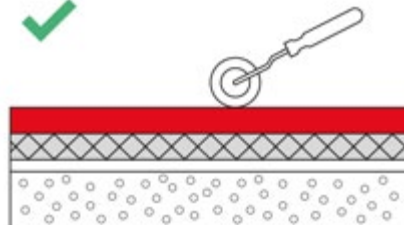
Now apply a second coat of resin 0.5 kg/m² over the glass mat, except for any edges that will be overlapped by the next piece.

Note: Pay attention to 75mm overlaps and only apply second coat of Stronghold Flex GRP after overlap is made.

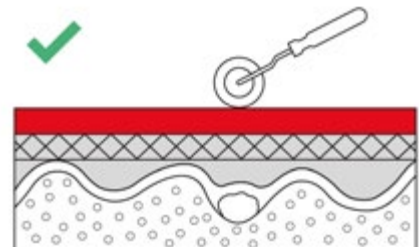
The following diagrams illustrate the application of Stronghold Flex GRP Resin for the second coat:

Take care to apply the second coat of Stronghold Flex GRP Overlay Resin correctly.

Correct Flex GRP Application:

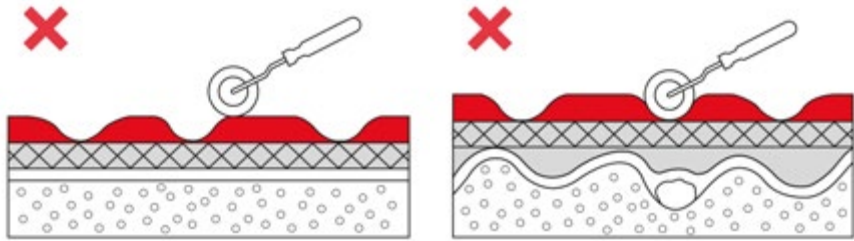


Second coat applied evenly (flat).



Second coat applied evenly (rough).

Incorrect Flex GRP Application:



Second coat applied unevenly (flat).

Second coat applied unevenly (rough).

Stage 13 - Continuing the Process:

Continue this operation with the next piece of glass mat, overlapping the first piece by about 75mm.

Stage 14 - Completion:

Now leave the roof to cure. This will take 1 hour or less, dependant on temperature. (The colder it is the longer the cure will take).

Upon completion inspect for pin holes.

Apply another coat to affected areas within 24 hours.

If left for longer wipe the area with acetone before applying.

Note: In cold weather it is advisable to start application early and to stop before sunset. Evening dew can spoil the finish if the resin is not fully cured due to plummeting evening temperatures.

Note: You will find that the resin thickens up at low temperature and takes longer to soak up through the glass. DO NOT be tempted to add more resin because of this. It is necessary to achieve an even and correct glass to resin ratio.

Note: Never work over 30°C as it is detrimental to the resin cure. Never work below 5°C as resin will not cure no matter how much catalyst is added. Catalyst levels over 4% will not speed up the cure but will make the resin brittle.

Note: Do not use laminating rollers aggressively as they tend to spray resin. Resin is difficult to remove from brickwork, motorcars etc. and should always be applied with care.

IMPORTANT! NEVER put catalysed, uncured resin into your vehicle or out of sight. Always ensure that any catalysed containers are kept separate from other materials on site and allowed to cure. Pour a small amount of water on any unused resin if you have mixed too much and have some left in the bucket.

RESIN AND CATALYST ARE HAZARDOUS. When mixed and in their solid state they are inert and can therefore be disposed of safely. When stored they should be kept separately in a cool dark environment. Never store or transport resins and catalyst close together. Curing resin produces heat and can therefore be hazardous if inadvertently mixed with catalyst. If a container of resin starts to smoke due to excessive heat build up, then it is advisable to pour some water onto it to ensure that it does not self-ignite. This is very rare, but it does happen. Be aware.

SECTION 1: Repairing & Jointing Procedure

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

- Step 1:** Clean off the damaged area with solvent and abrade the GRP surface with a hand grinder for 100mm from the damaged area. Wash area with acetone.
- Step 2:** Cut the glass mat to the correct (patch) size to cover the damaged area and mix sufficient Flex GRP resin with catalyst as previously described.
- Step 3:** Brush Flex GRP resin evenly onto the affected area. Place the glass mat over the applied resin, then apply more Flex GRP resin. Stipple well with the brush or use a laminating roller for larger areas.
- Step 4:** Ensure that the laminate is air free and completely consolidated.
- Step 5:** Allow to cure.

This procedure will ensure that the patch or joining piece applied will bond to the original laminate and form a weatherproof repair over the damaged or cut laminate.

SECTION 1: Summer & Winter Practises

Summer: Check weather forecast for suitability.
DO NOT use Flex GRP if temperature exceeds 30°C.
Apply glass mat in shorter runs, in order to allow enough time to laminate bonds and edges correctly.
Use small batches and low catalyst levels. Less than 1% catalyst may be used but extra attention should be given to ensure mixture is stirred through thoroughly.

Winter: Check weather forecast for suitability.
If wet period is forecast, it is better to wait than to start work.
Always carry a new polythene (Visqueen DPC) sheet. In event of rain then stop work and cover the roof immediately to protect unfinished roof area.
DO NOT continue working until remaining roof area is dried thoroughly.
Often this means coming back to job on a dry day and allowing surface to dry.

If the roof surface is wet then sweeping, mopping and dry ragging followed by sunshine are the best methods for drying the area.
(Remember it is often better to start the GRP process early in the day if you are unsure how long the process will take.) If unsure; prepare roof surface, cover with (Vis queen) sheet, then start the GRP work early on the next dry day.

DO NOT use Stronghold Flex GRP resin if temperature is under 5°C.
Resin contains water and at 0°C or at freezing point, the curing process stops completely. Be careful when applying Flex GRP resin after 2pm as the sun contributes considerable amounts of energy required to cure.
Be aware that shaded areas will cure slower than those in direct sunlight.

Uncured areas left overnight are to be avoided as dew, rain, leaves, debris etc. can contaminate or become embedded into the GRP and leave an unsatisfactory finish.

Stronghold Flex GRP overlay resin can be kept indoors overnight to ensure that it is not too cold when the time comes to use the product.

SECTION 1: Catalyst Addition Information

General Note to the Art of Catalyst Addition:

Catalyst addition charts are reasonably accurate when used in closed (indoor) environments. When used in open (outdoor) environments the accuracy decreases.

Factors that affect catalyst performance are many and varied.

Examples include: resin temperature, deck temperature, air temperature, wind speed, shade temperature, sunlight temperature, time in bucket, household heating, sun rising, sun setting etc.

General rule of thumb: If it is very hot weather (sun trap, no wind, hot decking etc.) then use 1% catalyst or less. If it's very cold weather (overcast, windy, cold garage roof etc.) then 4% catalyst is usually required.

(Always remember that the most experienced roofer will sometimes mix a batch that cures too quickly in the summer and will sometimes mix a batch that is too slow in the winter.) Make sure to carefully think about each batch and consider the results.

If you feel cold, then so does the resin and if you feel hot then the same applies.

Hot weather 1% or less

Warm weather 2% or less

Cold weather 3%

Very cold weather 4%.

Freezing? Go home!

Stronghold Flex resin is designed to give a 20/20/2 cure. This means 20 minutes cure time at 20°C if 2% catalyst is used. *(For this to work the resin and the deck need to be at 20°C and ALL the Flex GRP resin leaves the bucket at the same time.)*

Note: Resin contained in a bucket rises in temperature due to exothermic reaction, but resin that is on the deck spreads out, so this heat dissipates.

A Catalyst Addition Chart will always be available on the reverse side of every Stronghold Flex GRP Overlay Resin product. It will appear as shown below:

CATALYST ADDITION CHART				
	5-13 °C	13-16 °C	16-20 °C	20-35 °C
RESIN	CATALYST	CATALYST	CATALYST	CATALYST
1kg	40ml	30ml	20ml	10ml
2kg	80ml	60ml	40ml	20ml
3kg	120ml	90ml	60ml	30ml
4kg	160ml	120ml	80ml	40ml
5kg	200ml	150ml	100ml	50ml
6kg	240ml	180ml	120ml	60ml
7kg	280ml	210ml	140ml	70ml
8kg	320ml	240ml	160ml	80ml
9kg	360ml	270ml	180ml	90ml
10kg	400ml	300ml	200ml	100ml
11kg	440ml	330ml	220ml	110ml
12kg	480ml	360ml	240ml	120ml
13kg	520ml	390ml	260ml	130ml
14kg	560ml	420ml	280ml	140ml
15kg	600ml	450ml	300ml	150ml
16kg	640ml	480ml	320ml	160ml
17kg	680ml	510ml	340ml	170ml
18kg	720ml	540ml	360ml	180ml
19kg	760ml	570ml	380ml	190ml
20kg	800ml	600ml	400ml	200ml

Based on Stronghold catalyst.

Disclaimer

The information provided in this procedure document offers guidance in order to ensure correct and proper installation of the Stronghold Flex GRP Overlay Roofing System. The information relates ONLY to the Stronghold Flex GRP Overlay Roofing System and is NOT valid for Stronghold GRP Flat Roofing System.

STRONGHOLD
GRP ROOFING SYSTEM

STRONGHOLD
PU PRIMER
SAFETY DATA SHEET

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier

Product name: PU Primer
Proper shipping name: FLAMMABLE LIQUID, N.O.S.
Other means of identification: UFI:MT85-QNX2-CXA3-FNS6

1.2 Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses: Adhesive / Primer
Contact the manufacturer for any other application.

1.3 Details of the Supplier of the safety data sheet

Manufacturer/Supplier: The Glass Fibre Roofing Company Ltd.
Address: Unit 33 Pontygwindy Industrial Estate, Caerphilly CF83 3HU
Telephone number: 02920 888020
E-mail: sales@strongholdgrp.co.uk
Website: <http://www.strongholdgrp.co.uk>

1.4 Emergency telephone numbers

UK Telephone number: 02920 888020 (Office hours only)
UK Urgent medical problem: 111 (NHS Direct)
UK Life-threatening emergency: 999

SECTION 2: Hazards identification

2.1 Classification according to GB-CLP Regulation, UK SI 2019/720 and UK SI 2020/1567

Flammable liquids:	Category 3
Sensitisation (Respiratory):	Category 1
Acute Toxicity (Dermal):	Category 4
Specific Target Organ Toxicity - Repeated Exposure:	Category 2
Acute toxicity (inhalation: dust, mist):	Category 4
Specific Target Organ Toxicity - Single Exposure (Respiratory Tract Irritation):	Category 3
Skin corrosion/irritation:	Category 2
Serious eye damage/eye irritation:	Category 2
Sensitisation (Skin):	Category 1
Carcinogenicity:	Category 2

2.2 Label elements

Labelling according to Regulation (EC) No 1272/2008 [CLP]

Hazard pictograms:



Signal word:

Danger

Hazard statements:

Flammable liquid and vapour	H226
Harmful in contact with skin	H312
Causes skin irritation	H315
May cause an allergic skin reaction	H317
Causes serious eye irritation	H319
Harmful if inhaled	H332
May cause allergy or asthma symptoms or breathing difficulties if inhaled	H334
May cause respiratory irritation	H335
Suspected of causing cancer	H351
May cause damage to organs through prolonged or repeated exposure	H373

Supplementary statements:

Contains isocyanates. May produce an allergic reaction	EUH204
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Precautionary statements - Prevention:

Obtain special instructions before use	P201
Keep away from heat/sparks/open flames/ hot surfaces – no smoking	P210
Ground and bond container and receiving equipment	P240
Use explosion proof electrical equipment	P241
Use non-sparking tools	P242
Take action to prevent static discharges	P243
Do not breathe mist/vapours/spray	P260
Wash hands thoroughly after handling	P264
Use only outdoors in a well ventilated area	P271
Contaminated work clothing should not be allowed out of the workplace	P272
Wear protective gloves/protective clothing/eye protection/face protection	P280
[In case of inadequate ventilation] wear respiratory protection	P284

Precautionary statements - Response:

IF ON SKIN: Wash with plenty of water.	P302+P352
IF ON SKIN (or hair): Take off immediately all contaminated clothing.	P303+P361+P353
Rinse skin with water [or shower].	
IF INHALED: Remove person to fresh air and keep comfortable for breathing.	P304+P340
IF IN EYES: Rinse cautiously with water for several minutes.	P305+P351+P338
Remove contact lenses, if present and easy to do. Continue rinsing.	
IF exposed or concerned: Get medical advice/ attention.	P308+P313
Call a POISON CENTRE/doctor/physician/first aider/if you feel unwell.	P312
If skin irritation or rash occurs: Get medical advice/attention.	P333+P313
If eye irritation persists: Get medical advice/attention.	P337+P313
If experiencing respiratory symptoms: Call a POISON CENTRE/doctor/physician.	P342+P311
Take off contaminated clothing and wash it before reuse.	P362+P364
In case of fire: Use alcohol resistant foam or normal protein foam to extinguish.	P370+P378

Precautionary statements - Storage:

Store in a well-ventilated place. Keep cool.	P403+P235
Store locked up.	P405

Precautionary statements - Disposal:

Dispose of contents/container to authorised hazardous or special waste collection point in accordance with any local regulation.	P501
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Other hazards:

Listed in the Europe Regulation (EC) No 1907/2006 - Annex XVII (Restrictions may apply)	xylene
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SECTION 3: Composition/information on ingredients

3.1 Substances

Chemical name	CAS-No. EC-No. Index No. REACH Registration No.	% Weight	GHS Classification
Xylene	1330-20-7 215-535-7 601-022-00-9 Not Available	60 – 90	Flam. Liq. 3 (H226) Acute Tox. (Dermal) 4 (H312) Skin Irrit. 2 (H315) Acute Tox. (Inhalation) 4 (H332)
Polymeric Diphenylmethane Diisocyanate	9016-87-9 Not Available Not Available Not Available	10 – 30	Acute Tox. (Inhalation) 4 (H332) Skin Irrit. 2 (H315) Eye Irrit. 2 (H319) Sensitisation (Skin) 1 (H317) Sensitisation (Respiratory) 1 (H334) Carcinogenicity 2 (H351) STOT SE 3 (H335) STOT RE 1 (H373)

SECTION 4: First aid measures

4.1 Description of first aid measures

Eye Contact:

- Wash out immediately with fresh running water.
- Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.
- Seek medical attention without delay; if pain persists or recurs.
- Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

Skin contact:

- Immediately remove all contaminated clothing, including footwear.
- Flush skin and hair with running water (and soap if available).
- Seek medical attention in event of irritation.

Inhalation:

- If fumes or combustion products are inhaled remove from contaminated area.
 - Lay patient down. Keep warm and rested.
 - Prosthesis such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.
 - Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained.
- Perform CPR if necessary.
- Transport to hospital, or doctor, without delay.
- Following uptake by inhalation, move person to an area free from risk of further exposure. Oxygen or artificial respiration should be administered as needed. Asthmatic-type symptoms may develop and may be immediate or delayed up to several hours. Treatment is essentially symptomatic. A physician should be consulted.

Ingestion:

- If spontaneous vomiting appears imminent or occurs, hold patient's head down, lower than their hips to help avoid possible aspiration of vomitus.
- **If swallowed do NOT induce vomiting.**
- If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.
- Observe the patient carefully.
- Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious.

Ingestion (continued.):

- Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink.
- Seek medical advice.
- Avoid giving milk or oils.
- Avoid giving alcohol.

4.2 Most important symptoms and effects, both acute and delayed

See Section 11.

4.3 Indication of any immediate medical attention and special treatment needed

Any material aspirated during vomiting may produce lung injury. Therefore emesis should not be induced mechanically or pharmacologically. Mechanical means should be used if it is considered necessary to evacuate the stomach contents; these include gastric lavage after endotracheal intubation. If spontaneous vomiting has occurred after ingestion, the patient should be monitored for difficult breathing, as adverse effects of aspiration into the lungs may be delayed up to 48 hours.

For sub-chronic and chronic exposures to isocyanates:

- This material may be a potent pulmonary sensitiser which causes bronchospasm even in patients without prior airway hyperreactivity.
- Clinical symptoms of exposure involve mucosal irritation of respiratory and gastrointestinal tracts.
- Conjunctival irritation, skin inflammation (erythema, pain vesiculation) and gastrointestinal disturbances occur soon after expo.
- Pulmonary symptoms include cough, burning, substernal pain and dyspnoea.
- Some cross-sensitivity occurs between different isocyanates.
- Noncardiogenic pulmonary oedema and bronchospasm are the most serious consequences of exposure. Markedly symptomatic patients should receive oxygen, ventilatory support and an intravenous line.
- Treatment for asthma includes inhaled sympathomimetics (epinephrine [adrenalin], terbutaline) and steroids.
- Activated charcoal (1 g/kg) and a cathartic (sorbitol, magnesium citrate) may be useful for ingestion.
- Mydriatics, systemic analgesics and topical antibiotics (Sulamyd) may be used for corneal abrasions.
- There is no effective therapy for sensitised workers.

[Ellenhorn and Barceloux; Medical Toxicology]

NOTE: Isocyanates cause airway restriction in naive individuals with the degree of response dependant on the concentration and duration of exposure. They induce smooth muscle contraction which leads to bronchoconstrictive episodes. Acute changes in lung function, such as decreased FEV₁, may not represent sensitivity.

[Karol & Jin, Frontiers in Molecular Toxicology, pp 56-61, 1992]

Personnel who work with isocyanates, isocyanate prepolymers or polyisocyanates should have a pre-placement medical examination and periodic examinations thereafter, including a pulmonary function test. Anyone with a medical history of chronic respiratory disease, asthmatic or bronchial attacks, indications of allergic responses, recurrent eczema or sensitisation conditions of the skin should not handle or work with isocyanates. Anyone who develops chronic respiratory distress when working with isocyanates should be removed from exposure and examined by a physician. Further exposure must be avoided if a sensitivity to isocyanates or polyisocyanates has developed.

For acute or short term repeated exposures to xylene:

- Gastro-intestinal absorption is significant with ingestions. For ingestions exceeding 1-2 ml (xylene)/kg, intubation and lavage with cuffed endotracheal tube is recommended. The use of charcoal and cathartics is equivocal.
- Pulmonary absorption is rapid with about 60-65% retained at rest.
- Primary threat to life from ingestion and/or inhalation, is respiratory failure.
- Patients should be quickly evaluated for signs of respiratory distress (e.g. cyanosis, tachypnoea, intercostal retraction, obtundation) and given oxygen. Patients with inadequate tidal volumes or poor arterial blood gases (pO₂ < 50 mm Hg or pCO₂ > 50 mm Hg) should be intubated.
- Arrhythmias complicate some hydrocarbon ingestion and/or inhalation and electrocardiographic evidence of myocardial injury has been reported; intravenous lines and cardiac monitors should be established in obviously symptomatic patients. The lungs excrete inhaled solvents, so that hyperventilation improves clearance.
- A chest x-ray should be taken immediately after stabilisation of breathing and circulation to document aspiration and detect the presence of pneumothorax.
- Epinephrine (adrenalin) is not recommended for treatment of bronchospasm because of potential myocardial sensitisation to catecholamines. Inhaled cardioselective bronchodilators (e.g. Alupent, Salbutamol) are the preferred agents, with aminophylline a second choice.

BIOLOGICAL EXPOSURE INDEX - BEI

These represent the determinants observed in specimens collected from a healthy worker exposed at the Exposure Standard (ES or TLV):

Determinant	Index	Sampling Time	Comments
Methylhippu-ric acids in urine	1.5 gm/gm creatinine 2 mg/min	End of shift Last 4 hrs of shift	

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media:

- Small quantities of water in contact with hot liquid may react violently with generation of a large volume of rapidly expanding hot sticky semi-solid foam.
- Presents additional hazard when fire fighting in a confined space.
- Cooling with flooding quantities of water reduces this risk.
- Foam.
- Dry chemical powder.
- BCF (where regulations permit)

5.2 Special hazards arising from the substance or mixture

Fire Incompatibility:

Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result

5.3 Advice for firefighters

Fire Fighting:

- Alert Fire Brigade and tell them location and nature of hazard.
- May be violently or explosively reactive.
- Wear breathing apparatus plus protective gloves.

Fire/Explosion Hazard:

- Liquid and vapour are flammable.
- Moderate fire hazard when exposed to heat or flame.
- Vapour forms an explosive mixture with air.

Combustion products include:

carbon dioxide (CO₂), carbon monoxide (CO), isocyanates, hydrogen cyanide and minor amounts of nitrogen oxides (NO_x), other pyrolysis products typical of burning organic material.

Contains low boiling substance:

Closed containers may rupture due to pressure buildup under fire conditions. When heated at high temperatures many isocyanates decompose rapidly generating a vapour which pressurises containers, possibly to the point of rupture. Release of toxic and/or flammable isocyanate vapours may then occur

- Burns with acrid black smoke.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

See Section 8.

6.2 Environmental precautions

See Section 12.

6.3 Methods and material for containment and cleaning up

- Minor Spills:
- Remove all ignition sources.
 - Clean up all spills immediately.
 - Avoid breathing vapours and contact with skin and eyes.
- Major Spills:
- Liquid Isocyanates and high isocyanate vapour concentrations will penetrate seals on self contained breathing apparatus - SCBA should be used inside encapsulating suit where this exposure may occur.

For isocyanate spills of less than 40 litres (2 m²):

- Evacuate area from everybody not dealing with the emergency, keep them upwind and prevent further access, remove ignition sources and, if inside building, ventilate area as well as possible.
- Notify supervision and others as necessary.
- Put on personal protective equipment (suitable respiratory protection, face and eye protection, protective suit, gloves and impermeable boots).
- Avoid contamination with water, alkalies and detergent solutions.
- Material reacts with water and generates gas, pressurises containers with even drum rupture resulting.
- **DO NOT reseal container if contamination is suspected.**
- Clear area of personnel and move upwind.
- Alert Fire Brigade and tell them location and nature of hazard.
- May be violently or explosively reactive.

6.4 Reference to other sections

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

- Precautions for safe handling:
- Containers, even those that have been emptied, may contain explosive vapours.
 - Do NOT cut, drill, grind, weld or perform similar operations on /near containers.
 - Electrostatic discharge may be generated during pumping - this may result in fire.
 - Ensure electrical continuity by bonding and grounding (earthing) all equipment.
 - Restrict line velocity during pumping in order to avoid generation of electrostatic discharge (≤ 1 m/sec until fill pipe submerged to twice its diameter, then ≤ 7 m/sec).

Contains low boiling substance:

Storage in sealed containers may result in pressure buildup causing violent rupture of containers not rated appropriately.

- Check for bulging containers.
- Vent periodically
- Always release caps or seals slowly to ensure slow dissipation of vapours
- Avoid all personal contact, including inhalation.
- Wear protective clothing when risk of overexposure occurs.
- Use in a well-ventilated area.

Prevention of fire and explosion: See section 5

Other information: Consider storage under inert gas.

- Store in original containers in approved flammable liquid storage area.
- Store away from incompatible materials in a cool, dry, well-ventilated area.
- **DO NOT store in pits, depressions, basements or areas where vapours may be trapped.**

For commercial quantities of isocyanates:

- Isocyanates should be stored in adequately banded areas. Nothing else should be kept within the same bunding. Pre-polymers need not be segregated.

7.2 Conditions for safe storage, 3 including any incompatibilities

Suitable container:

- Packing as supplied by manufacturer.
- Plastic containers may only be used if approved for flammable liquid.
- Check that containers are clearly labelled and free from leaks.
- For low viscosity materials (i) : Drums and jerry cans must be of the non removable head type. (ii) : Where a can is to be used as an inner package, the can must have a screwed enclosure.
- For materials with a viscosity of at least 2680 cSt.

Storage incompatibility:

Xylenes:

- may ignite or explode in contact with strong oxidisers, 1,3-dichloro-5,5 dimethylhydantoin, uranium fluoride
- attack some plastics, rubber and coatings
- may generate electrostatic charges on flow or agitation due to low conductivity.
- Vigorous reactions, sometimes amounting to explosions, can result from the contact between aromatic rings and strong oxidising agents.
- Aromatics can react exothermically with bases and with diazo compounds.

For alkyl aromatics:

The alkyl side chain of aromatic rings can undergo oxidation by several mechanisms. The most common and dominant one is the attack by oxidation at benzylic carbon as the intermediate formed is stabilised by resonance structure of the ring.

- Following reaction with oxygen and under the influence of sunlight, a hydroperoxide at the alpha-position to the aromatic ring, is the primary oxidation product formed (provided a hydrogen atom is initially available at this position) - this product is often short-lived but may be stable dependent on the nature of the aromatic substitution; a secondary C-H bond is more easily attacked than a primary C-H bond whilst a tertiary C-H bond is even more susceptible to attack by oxygen
- Monoalkylbenzenes may subsequently form monocarboxylic acids; alkyl naphthalenes mainly produce the corresponding naphthalene carboxylic acids.
- Avoid reaction with water, alcohols and detergent solutions. Isocyanates are electrophiles, and as such they are reactive toward a variety of nucleophiles including alcohols, amines, and even water. Upon treatment with an alcohol, an isocyanate forms a urethane linkage.
- A range of exothermic decomposition energies for isocyanates is given as 20-30 kJ/mol.
- The relationship between energy of decomposition and processing hazards has been the subject of discussion; it is suggested that values of energy released per unit of mass, rather than on a molar basis (J/g) be used in the assessment.
- For example, in "open vessel processes" (with man-hole size openings, in an industrial setting), substances with exothermic decomposition energies below 500 J/g are unlikely to present a danger, whilst those in "closed vessel processes" (opening is a safety valve or bursting disk) present some danger where the decomposition energy exceeds 150 J/g.

Note: Depending on other risk factors, compatibility assessment based on the table above may not be relevant to storage situations, particularly where large volumes of dangerous goods are stored and handled. Reference should be made to the Safety Data Sheets for each substance or article and risks assessed accordingly.

7.3 Specific end use(s)

See section 1.2

SECTION 8: Exposure controls / personal protection

8.1 Control parameters

Ingredient	DNELs Exposure Pattern Worker	PNECs Compartment
xylene	Dermal 212 mg/kg bw/day (Systemic, Chronic) Inhalation 221 mg/m ³ (Systemic, Chronic) Inhalation 221 mg/m ³ (Local, Chronic) Inhalation 442 mg/m ³ (Systemic, Acute) Inhalation 442 mg/m ³ (Local, Acute) Dermal 125 mg/kg bw/day (Systemic, Chronic)* Inhalation 65.3 mg/m ³ (Systemic, Chronic)* Oral 12.5 mg/kg bw/day (Systemic, Chronic)* Inhalation 65.3 mg/m ³ (Local, Chronic)* Inhalation 260 mg/m ³ (Systemic, Acute)* Inhalation 260 mg/m ³ (Local, Acute)*	0.327 mg/L (Water (Fresh)) 0.327 mg/L (Water - Intermittent release) 0.327 mg/L (Water (Marine)) 12.46 mg/kg sediment dw (Sedi. (Fresh Water)) 12.46 mg/kg sediment dw (Sedi. (Marine)) 2.31 mg/kg soil dw (Soil) 6.58 mg/L (STP)

* Values for General Population

Occupational exposure limits INGREDIENT DATA

Source	Ingredient	Material name	TWA	STEL	Notes
EU Consolidated List of Indicative Occupational Exposure Limit Values (IOELVs)	xylene	Xylene (mixed isomers, pure)	50 ppm / 221 mg/m ³	442 mg/m ³ /100 ppm	Skin
UK Workplace Exposure Limits (WELs)	xylene	Xylene, o-,m-,p- or mixed isomers	50 ppm / 220 mg/m ³	441 mg/m ³ /100 ppm	Sk, BMGV
Europe ECHA Occupational exposure limits - Activity list	polymeric diphenylmethane diisocyanate	Not Available	Not Available	Not Available	Not Available
UK Workplace Exposure Limits (WELs)	polymeric diphenylmethane diisocyanate	Isocyanates, all (as -NCO) Except methyl isocyanate	0.02 mg/m ³	0.07 mg/m ³	Sen

Emergency limits

Ingredient	TEEL-1	TEEL-2	TEEL-3
xylene	Not Available	Not Available	Not Available
polymeric diphenylmethane diisocyanate	0.15 mg/m ³	3.6 mg/m ³	22 mg/m ³

Ingredient	Original IDLH	Revised IDLH
xylene	900 ppm	Not Available
polymeric diphenylmethane diisocyanate	Not Available	Not Available

8.2 Exposure controls

Engineering measures:

CARE: Use of a quantity of this material in confined space or poorly ventilated area, where rapid build up of concentrated atmosphere may occur, could require increased ventilation and/or protective gear. Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection.

The basic types of engineering controls are:

Process controls which involve changing the way a job activity or process is done to reduce the risk.

- All processes in which isocyanates are used should be enclosed wherever possible.
- Total enclosure, accompanied by good general ventilation, should be used to keep atmospheric concentrations below the relevant exposure standards.
- If total enclosure of the process is not feasible, exhaust ventilation may be necessary.

Personal protective equipment

Eye and face protection:

- Safety glasses with side shields.
- Chemical goggles.
- Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants.

Skin and body protection:

See below.

Hand and feet protection:

- The material may produce skin sensitisation in predisposed individuals. Care must be taken, when removing gloves and other protective equipment, to avoid all possible skin contact.
- Contaminated leather items, such as shoes, belts and watch-bands should be removed and destroyed.
- DO NOT wear natural rubber (latex gloves).
- Isocyanate resistant materials include Teflon, Viton, nitrile rubber and PVA gloves.
- Protective gloves and overalls should be worn as specified in the appropriate national standard.
- Contaminated garments should be removed promptly and should not be re-used until they have been decontaminated.
- DO NOT use skin cream unless necessary and then use only minimum amount.
- Isocyanate vapour may be absorbed into skin cream and this increases hazard.

Other protection

All employees working with isocyanates must be informed of the hazards from exposure to the contaminant and the precautions necessary to prevent damage to their health. They should be made aware of the need to carry out their work so that as little contamination as possible is produced, and of the importance of the proper use of all safeguards against exposure to themselves and their fellow workers. Adequate training, both in the proper execution of the task and in the use of all associated engineering controls, as well as of any personal protective equipment, is essential.

- Overalls.
- PVC Apron.
- PVC protective suit may be required if exposure severe.
- Some plastic personal protective equipment (PPE) (e.g. gloves, aprons, overshoes) are not recommended as they may produce static electricity.
- For large scale or continuous use wear tight-weave non-static clothing (no metallic fasteners, cuffs or pockets).
- Non sparking safety or conductive footwear should be considered.

Environmental exposure controls

See section 12.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Property	Values	Remark
Appearance	Brown	Moisture sensitive
Physical state	Liquid	
Particle size	Not Available	No data available
Odour	Characteristic	
Odour threshold	Not Available	No data available
pH	Not Available	No data available
Melting point/range	Not Available	No data available
Freezing point	Not Available	No data available
Boiling point	>35 °C	
Flash point	>30 °C	
Evaporation rate	Not Available	No data available
Flammability limits in air		
Upper	Not Available	No data available
Lower	Not Available	No data available
Vapour pressure	Not Available	No data available
Vapour density	Not Available	No data available
Density	Not Available	No data available
Water solubility	0.9-1.0	Relative density (Water = 1)
Partition coefficient	Not Available	No data available
n-octanol/water	Not Available	No data available
Solubility in other solvents	Not Available	No data available
Auto ignition temperature	Not Available	No data available
Decomposition temperature	Not Available	No data available
Viscosity	105.263-526.316 @ 20	No data available
Explosive properties	Not Available	No data available
Oxidizing properties	Not Available	No data available

SECTION 10: Stability and reactivity

10.1 Reactivity

See section 7.2

10.2 Chemical stability

Unstable in the presence of incompatible materials.

Product is considered stable.

Hazardous polymerisation will not occur.

10.3 Possibility of hazardous reactions

See section 7.2

10.4 Conditions to avoid

See section 7.2

10.5 Incompatible materials

See section 7.2

10.6 Hazardous decomposition products

See section 5.3

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity

Inhalation:

The material can cause respiratory irritation in some persons. The body's response to such irritation can cause further lung damage.

Inhalation of vapours may cause drowsiness and dizziness. This may be accompanied by sleepiness, reduced alertness, loss of reflexes, lack of co-ordination, and vertigo.

The material has NOT been classified by EC Directives or other classification systems as "harmful by inhalation". Due to a lack of corroborating animal or human evidence.

Inhalation hazard is increased at higher temperatures.

The vapour/mist may be highly irritating to the upper respiratory tract and lungs; the response may be severe enough to produce bronchitis and pulmonary oedema.

Possible neurological symptoms arising from isocyanate exposure include headache, insomnia, euphoria, ataxia, anxiety neurosis, depression and paranoia. Gastrointestinal disturbances are characterised by nausea and vomiting.

Inhalation of high concentrations of gas/vapour causes lung irritation with coughing and nausea, central nervous depression with headache and dizziness, slowing of reflexes, fatigue and inco-ordination.

Material is highly volatile and may quickly form a concentrated atmosphere in confined or unventilated areas. The vapour may displace and replace air in breathing zone, acting as a simple asphyxiant. This may happen with little warning of overexposure.

The use of a quantity of material in an unventilated or confined space may result in increased exposure and an irritating atmosphere developing.

Before starting consider control of exposure by mechanical ventilation.

Headache, fatigue, tiredness, irritability and digestive disturbances (nausea, loss of appetite and bloating) are the most common symptoms of xylene overexposure. Injury to the heart, liver, kidneys and nervous system has also been noted amongst workers.

Xylene is a central nervous system depressant

Inhalation of aerosols (mists, fumes), generated by the material during the course of normal handling, may be harmful.

Ingestion:	<p>Swallowing of the liquid may cause aspiration into the lungs with the risk of chemical pneumonitis; serious consequences may result. (ICSC13733)</p> <p>The material has NOT been classified by EC Directives or other classification systems as "harmful by ingestion". Due to the lack of corroborating animal or human evidence. Accidental ingestion of the material may be seriously damaging to the health of the individual; animal experiments indicate that ingestion of less than 40 gram may be fatal. Not a likely route of entry into the body in commercial or industrial environments. The liquid may produce considerable gastrointestinal discomfort, harmful/toxic if swallowed</p>
Skin Contact:	<p>The material may accentuate any pre-existing dermatitis condition</p> <p>Skin contact is not thought to have harmful health effects (as classified under EC Directives); the material may still produce health damage following entry through wounds, lesions or abrasions.</p> <p>Open cuts, abraded or irritated skin should not be exposed to this material</p> <p>Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.</p> <p>Skin contact may be harmful; systemic effects may result following absorption.</p> <p>The material may cause moderate inflammation of the skin either following direct contact or after a delay of some time. Repeated exposure can cause contact dermatitis which is characterised by redness, swelling and blistering.</p>
Eye:	<p>The liquid produces a high level of eye discomfort and is capable of causing pain and severe conjunctivitis. Corneal injury may develop, with possible permanent impairment of vision, if not promptly and adequately treated.</p> <p>There is evidence that material may produce eye irritation in some persons and produce eye damage 24 hours or more after instillation. Severe inflammation may be expected with pain.</p>
Chronic:	<p>There has been concern that this material can cause cancer or mutations, but there is not enough data to make an assessment.</p> <p>Long-term exposure to respiratory irritants may result in airways disease, involving difficulty breathing and related whole-body problems.</p> <p>Inhaling this product is more likely to cause a sensitisation reaction in some persons compared to the general population.</p> <p>Skin contact with the material is more likely to cause a sensitisation reaction in some persons compared to the general population.</p> <p>Toxic: danger of serious damage to health by prolonged exposure through inhalation, in contact with skin and if swallowed.</p> <p>This material can cause serious damage if one is exposed to it for long periods. It can be assumed that it contains a substance which can produce severe defects.</p> <p>Ample evidence exists from experimentation that reduced human fertility is directly caused by exposure to the material.</p> <p>Substance accumulation, in the human body, may occur and may cause some concern following repeated or long-term occupational exposure.</p> <p>This product contains a polymer with a functional group considered to be of high concern. Isothiocyanates may cause hypersensitivity of the skin and airways.</p> <p>Persons with a history of asthma or other respiratory problems or are known to be sensitised, should not be engaged in any work involving the handling of isocyanates.</p> <p>The chemistry of reaction of isocyanates, as evidenced by MDI, in biological milieu is such that in the event of a true exposure of small MDI doses to the mouth, reactions will commence at once with biological macromolecules in the buccal region and will continue along the digestive tract prior to reaching the stomach. Reaction products will be a variety of polyureas and macromolecular conjugates with for example mucus, proteins and cell components.</p> <p>Animal testing shows that polymeric MDI can damage the nasal cavities and lungs, causing inflammation and increased cell growth.</p> <p>Women exposed to xylene in the first 3 months of pregnancy showed a slightly increased risk of miscarriage and birth defects. Evaluation of workers chronically exposed to xylene has demonstrated lack of genetic toxicity.</p> <p>Chronic solvent inhalation exposures may result in nervous system impairment and liver and blood changes. [PATTYS]</p>

Chemical name	LD50 Oral	LD50 Dermal	LC50 Inhalation
xylene	2119 mg/kg	>1700 mg/kg	5000 ppm4h
polymeric diphenylmethane diisocyanate	>9400 mg/kg	>9400 mg/kg	0.49 mg/L4h

Skin corrosion/irritant:	Data available to make classification
Serious Eye Damage/Eye Irritation:	Data available to make classification
Respiratory or skin sensitisation:	Data available to make classification
Mutagenic effects:	Data either not available or does not fill the criteria for classification
Carcinogenicity:	Data available to make classification
Reproductive toxicity:	Data either not available or does not fill the criteria for classification
Specific target organ toxicity (single exposure):	Data available to make classification
Specific target organ toxicity (repeated exposure):	Data available to make classification
Aspiration hazard:	Data either not available or does not fill the criteria for classification
Other information:	None

SECTION 12: Ecological Information

12.1 Toxicity

Acute aquatic toxicity – component information

Chemical name	Toxicity to algae and other aquatic plants	Toxicity to crustacea	Toxicity to fish
xylene	EC50 (72h) = 4.6 mg/L	EC50 (48h) = 1.8 mg/L	LC50 (96h) = 2.6 mg/L

Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. DO NOT allow product to come in contact with surface waters or to intertidal areas below the mean high water mark. DO NOT contaminate water when cleaning equipment or disposing of equipment wash-waters. Wastes resulting from use of the product must be disposed of on site or at approved waste sites.

For Aromatic Substances Series:

Environmental Fate: Large, molecularly complex polycyclic aromatic hydrocarbons, or PAHs, are persistent in the environment longer than smaller PAHs.

Atmospheric Fate: PAHs are 'semi-volatile substances' which can move between the atmosphere and the Earth's surface in repeated, temperature-driven cycles of deposition and volatilization. Terrestrial Fate: BTEX compounds have the potential to move through soil and contaminate ground water, and their vapors are highly flammable and explosive.

For polyisocyanates:

Polyisocyanates are not readily biodegradable. However, due to other elimination mechanisms (hydrolysis, adsorption), long retention times in water are not to be expected. The resulting polyurea is more or less inert and, due to its molecular size, not bioavailable.

For Isocyanate Monomers:

Environmental Fate: Isocyanates, (di- and polyfunctional isocyanates), are commonly used to make various polymers, such as polyurethanes. Polyurethanes find significant application in the manufacture of rigid and flexible foams. They are also used in the production of adhesives, elastomers, and coatings.

For Xylenes:

log K_{oc} : 2.05-3.08; K_{oc} : 25.4-204; Half-life (hr) air : 0.24-42; Half-life (hr) H₂O surface water : 24-672; Half-life (hr) H₂O ground : 336-8640; Half-life (hr) soil : 52-672; Henry's Pa m³/mol : 637-879; Henry's atm m³ /mol - 7.68E-03; BOD 5 if unstated - 1.4,1%; COD - 2.56,13% ThOD - 3.125 : BCF : 23; log BCF : 1.17-2.41.

Environmental Fate: Most xylenes released to the environment will occur in the atmosphere and volatilisation is the dominant environmental fate process. Soil - Xylenes are expected to have moderate mobility in soil evaporating rapidly from soil surfaces.

DO NOT discharge into sewer or waterways.

12.2 Persistence and degradability

xylene

Persistence (Water/Soil): HIGH (Half-life = 360 days)

Persistence (Air): LOW (Half-life = 1.83 days)

12.3 Bio accumulative potential

xylene

Bioaccumulation: MEDIUM (BCF = 740)

12.4 Mobility in soil

No Data available for all ingredients

12.5 Results of PBT and vPvB assessment

Not Available

12.6 Other adverse effects

Not Available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

- Product / Packaging disposal:
- Containers may still present a chemical hazard/ danger when empty.
 - Return to supplier for reuse/ recycling if possible.
- Otherwise:
- If container can not be cleaned sufficiently well to ensure that residuals do not remain or if the container cannot be used to store the same product, then puncture containers, to prevent re-use, and bury at an authorised landfill.
 - **DO NOT allow wash water from cleaning or process equipment to enter drains.**
 - It may be necessary to collect all wash water for treatment before disposal.
 - In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first.
 - Recycle wherever possible.
 - Consult manufacturer for recycling options or consult local or regional waste management authority for disposal if no suitable treatment or disposal facility can be identified.
 - Dispose of by: burial in a land-fill specifically licensed to accept chemical and / or pharmaceutical wastes or Incineration in a licensed apparatus (after admixture with suitable combustible material).

Waste treatment options: Not Available

Sewage disposal options: Not Available

SECTION 14: Transport information

ADR/RID	ICAO-IATA / DGR	IMDG-Code / GGVSee	ADN
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14.1 UN Number

UN1993	UN1993	UN1993	UN1993
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14.2 UN proper shipping name

FLAMMABLE LIQUID, N.O.S.	FLAMMABLE LIQUID, N.O.S.	FLAMMABLE LIQUID, N.O.S.	FLAMMABLE LIQUID, N.O.S.
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14.3 Transport hazard class

Hazard class 3	Hazard class 3	Hazard class 3	Hazard class 3
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14.4 Packing group

III	III	III	III
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14.5 Environmental hazards

Not Applicable	Not Applicable	Not Applicable	Not Applicable
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14.6 Special precautions for user

ADR/RID	Hazard identification (Kemler):	30
	Classification code:	F1
	Hazard Label :	3
	Special provisions	274 601
	Tunnel restriction code:	5L
	Limited quantity:	(D/E)
ICAO-IATA / DGR	Special provisions:	A3
	Cargo Only Packing Instructions:	366
	Cargo Only Maximum Qty / Pack:	220 L
	Passenger and Cargo Packing Instructions:	355
	Passenger and Cargo Maximum Qty/Pack:	60 L
	Passenger and Cargo Limited	
	Quantity Packing Instructions:	Y344
	Passenger and Cargo Limited	
	Maximum Qty / Pack:	10 L
IMDG-Code / GGVSee	EMS Number:	F-E , S-E
	Special provisions:	223 274 955
	Limited Quantities:	5 L
ADN	Classification code:	F1
	Special provisions:	274; 601
	Limited quantity:	5 L
	Equipment required :	PP, EX, A
	Fire cones number:	0

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable.

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

xylene is found on the following regulatory lists

EU Consolidated List of Indicative Occupational Exposure Limit Values (IOELVs)

EU European Chemicals Agency (ECHA) Community Rolling Action Plan (CoRAP) List of Substances

EU REACH Regulation (EC) No 1907/2006 - Annex XVII - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles

Europe EC Inventory

European Union - European Inventory of Existing Commercial Chemical Substances (EINECS)

European Union (EU) Regulation (EC) No 1272/2008 on Classification, Labelling and Packaging of Substances and Mixtures - Annex VI

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs

polymeric diphenylmethane diisocyanate is found on the following regulatory lists

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs

15.2. Chemical safety assessment

No Chemical Safety Assessment has been carried out for this substance/mixture by the supplier.

ECHA SUMMARY

Ingredient	CAS number	Index No	ECHA Dossier
xylene	1330-20-7	601-022-00-9	Not Available

Harmonisation (C&L Inventory)	Hazard Class and Category Code(s)	Pictograms Signal Word Code(s)	Hazard Statement Code(s)
1	Flam. Liq. 3; Acute Tox. 4; Skin Irrit. 2; Acute Tox. 4	GHS02; GHS07; Wng	H226; H312; H315; H332
2	Acute Tox. 4; Skin Irrit. 2; Acute Tox. 4; Asp. Tox. 1; Eye Irrit. 2; STOT SE 3; STOT SE 3; STOT SE 3; STOT SE 3; STOT SE 3; STOT SE 3; STOT SE 3; STOT SE 3; STOT SE 3; STOT SE 3; Aquatic Chronic 2; STOT SE 3; STOT SE 3; STOT SE 3; STOT SE 3; STOT SE 1; STOT RE 1; Flam. Liq. 2; Acute Tox. 4; STOT SE 3; Repr. 2; STOT SE 3; STOT SE 3; STOT SE 3; STOT SE 3; STOT SE 3; STOT SE 3; Repr. 2; Lact.; STOT SE 1; STOT RE 1; Aquatic Acute 1; STOT SE 3; Asp. Tox. 2; STOT SE 3; STOT SE 3; STOT SE 3	GHS08; Dgr; GHS01; GHS09	H312; H315; H332; H304; H335; H336; H360; H411; H370; H372; H225; H302; H318; H361; H362; H400

Ingredient	CAS number	Index No	ECHA Dossier
polymeric diphenylmethane diisocyanate	9016-87-9	Not Available	Not Available

Harmonisation (C&L Inventory)	Hazard Class and Category Code(s)	Pictograms Signal Word Code(s)	Hazard Statement Code(s)
1	Skin Irrit. 2; Eye Irrit. 2; Acute Tox. 2; Resp. Sens. 1; STOT SE 3; STOT RE 2	GHS08; GHS06; Dgr	H315; H319; H330; H334; H335; H373
2	Eye Irrit. 2; STOT SE 3; STOT RE 2; STOT SE 3; Carc. 2; STOT RE 2; STOT RE 2; STOT SE 3; STOT SE 3; STOT RE 2; STOT SE 3; STOT RE 2; STOT SE 3; STOT RE 2; Acute Tox. 4; Acute Tox. 4; Aquatic Chronic 1; STOT SE 3; STOT RE 2; STOT SE 3; STOT RE 2; Muta. 2; STOT SE 3; STOT SE 3; STOT RE 2; STOT SE 3; STOT SE 3; STOT SE 3; STOT RE 2; STOT SE 3; STOT RE 2; STOT RE 2; STOT SE 3; STOT SE 3; STOT RE 2; STOT SE 3; STOT RE 2; STOT SE 3; STOT RE 2; STOT SE 3; STOT RE 2; STOT SE 3; Carc. 2; STOT RE 2	GHS08; GHS06; Dgr; GHS05; GHS09	H319; H330; H334; H335; H373; H317; H351; H302; H312; H314; H341; H410

SECTION 16: Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios.

For detailed advice on Personal Protective Equipment, refer to the following EU CEN Standards:

EN 166 Personal eye-protection

EN 340 Protective clothing

EN 374 Protective gloves against chemicals and micro-organisms

EN 13832 Footwear protecting against chemicals

EN 133 Respiratory protective devices

End of PU Primer Material Safety Data Sheet

STRONGHOLD
GRP ROOFING SYSTEM

**FLEX GRP
OVERLAY RESIN
SAFETY DATA SHEET**

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier

Product name: Flex GRP Overlay Resin 210
Chemical name: Unsaturated polyester resin
Product form: Mixture

1.2 Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses: Flexible Overlay Resin for Glass Reinforced Plastic (GRP) Roofing.
Contact the manufacturer for any other application.

1.3 Details of the Supplier of the safety data sheet

Manufacturer/Supplier: The Glass Fibre Roofing Company Ltd.
Address: Unit 33 Pontygwindy Industrial Estate, Caerphilly CF83 3HU
Telephone number: 02920 888020
E-mail: sales@strongholdgrp.co.uk

This document is available online at <http://www.strongholdgrp.co.uk>

1.4 Emergency telephone numbers

UK Telephone number: 02920 888020 (Office hours only)
UK Urgent medical problem: 111 (NHS Direct)
UK Life-threatening emergency: 999

SECTION 2: Hazards identification

2.1 Classification according to Regulation (EC) No 1272/2008 (CLP)

Skin corrosion/irritation:	Category 2
Serious eye damage/eye irritation:	Category 2
Acute toxicity (inhalation: dust, mist):	Category 4
Reproductive Toxicity:	Category 2
Specific Target Organ Toxicity (repeated exposure):	Category 1
Flammable liquids:	Category 3

2.2 Label elements

Labelling according to Regulation (EC) No 1272/2008 [CLP]

Hazard pictograms:



Signal word:

Danger

Hazard statements:

Flammable liquid and vapour	H226
Causes skin irritation	H315
Causes serious eye irritation	H319
Suspected of damaging the unborn child	H361d
Causes damage to organs through prolonged or repeated exposure if inhaled	H372

Precautionary statements - Prevention:

Keep away from heat/sparks/open flames/ hot surfaces – no smoking	P210
Use explosion proof electrical equipment	P241
Wash hands thoroughly after handling	P264
Use only outdoors in a well ventilated area	P271
Avoid release to the environment	P273
Wear protective gloves/protective clothing/eye protection/face protection	P280

Precautionary statements - Response:

In case of fire: Use Water fog, foam, extinguishing powder, carbon dioxide (CO2) for extinction	P370+P378
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Other hazards: No information available.

SECTION 3: Composition/information on ingredients**3.1 Substances**

Chemical name	CAS-No. EC-No. REACH Registration No.	% Weight	GHS Classification
Styrene	100-42-5 202-851-5 01-2119457861-32	25 – 50	Flam. Liq. 3 (H226) Repr. 2 (H361d) Acute Tox. 4 (Inhalation) (H332) Skin Irrit. 2 (H315) Eye Irrit. 2 (H319) Asp. Tox. 1 (H304) STOT SE 3 (H335) STOT RE 1 (H372) Aquatic Chronic 3 (H412)

SECTION 4: First aid measures**4.1 Description of first aid measures**

General advice:	Show this safety data sheet to the doctor in attendance. DO NOT breathe dust/fume/gas/mist/ vapours/spray.
Eye Contact:	Rinse thoroughly with plenty of water, also under the eyelids. Keep eye wide open while rinsing. If symptoms persist, call a physician.
Skin contact:	Wash off immediately with soap and plenty of water removing all contaminated clothes and shoes. If skin irritation persists, call a physician.
Inhalation:	Move to fresh air. If not breathing, give artificial respiration. Consult a physician.
Ingestion:	DO NOT induce vomiting. Rinse mouth. Consult a physician.

Protection of first-aiders: Use personal protective equipment. See section 8 for more info.

4.2 Most important symptoms and effects, both acute and delayed

Eye Contact: Irritating to eyes.

Skin contact: Irritating to skin.
May cause sensitisation by skin contact.

Inhalation: Danger of serious damage to health by prolonged exposure through inhalation.
Irritating to respiratory system.

Ingestion: Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhoea.

4.3 Indication of any immediate medical attention and special treatment needed

Notes to physician: No information available.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media: Dry chemical, Foam, Carbon dioxide (CO₂), (closed systems).

Unsuitable extinguishing media: DO NOT use a solid water stream as it may scatter and spread fire.

5.2 Special hazards arising from the substance or mixture

Fire hazard: Special exposure hazards arising from the substance or preparation itself, combustion products, resulting gases

Explosion hazard: Vapours may form explosive mixtures with air. Most vapours are heavier than air. They will spread along ground and collect in low or confined areas (sewers, basements, tanks).
Heating or fire can release toxic gas: Carbon monoxide.

5.3 Advice for firefighters

Protective equipment for firefighters: Wear self-contained breathing apparatus and protective suit.

Other information: Cool containers/ tanks with water spray.
Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

For non-emergency personnel: Remove all sources of ignition, heat, flames and sparks.
Take precautionary measures against static charges. Ensure adequate ventilation.
Use personal protective equipment.

For emergency responders: Avoid breathing vapours or mists. In the event of fire and/or explosion DO NOT breathe fumes. Use personal protective equipment.

6.2 Environmental precautions

Environmental precautions: The product should not be allowed to enter drains, water courses or the soil.
DO NOT flush into surface water or sanitary sewer system.

6.3 Methods and material for containment and cleaning up

Methods for cleaning up: Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13).
Use clean non-sparking tools to collect absorbed material.

6.4 Reference to other sections

See section 8 and section 12 for more information.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Precautions for safe handling: Avoid static electricity build up with connection to earth.
Use only in area provided with appropriate exhaust ventilation.
In case of insufficient ventilation, wear suitable respiratory equipment.
For personal protection see section 8.

Prevention of fire and explosion: Keep away from open flames, hot surfaces and sources of ignition.
Empty containers may contain flammable or explosive vapours.

Hygiene measures: When using, DO NOT eat, drink or smoke. Wash hands before breaks and at the end of the workday. Provide regular cleaning of equipment, work area and clothing.

7.2 Conditions for safe storage, 3 including any incompatibilities

Technical measures & Storage conditions: Keep in a dry, cool and well-ventilated place.
Keep at temperature not exceeding 30°C.
Keep away from heat and sources of ignition.

Materials to avoid: Strong oxidizing agents, peroxides, reducing agents.

Packaging material: Metallic GRP (Glass Reinforced Plastic) containers.

7.3 Specific end use(s)

The identified uses for this product are detailed in Section 1.2.

SECTION 8: Exposure controls / personal protection

8.1 Control parameters

Occupational exposure limits

Chemical name	TWA – 8 hours	STEL – 15 mins
Styrene 100-42-5	100 ppm – 430 mg/m ³	250 ppm 1080 mg/m ³

8.2 Exposure controls

Occupational exposure limits

Engineering measures: Apply technical measures to comply with the occupational exposure limits.
When working in confined spaces (tanks, containers, etc.), ensure that there is a supply of air suitable for breathing and wear the recommended equipment.

Personal protective equipment

General Information:	Use personal protective equipment.
Respiratory protection:	Provide a good standard of ventilation (not less than 3 to 5 air changes per hour) If exposure limits are likely to be exceeded (in case of insufficient ventilation) wear suitable respiratory equipment: Breathing apparatus with filter Type A (Organic gases and vapours filler conforming to EN 14387, APF40 < 1 hour. APF 200 > 1 hour) I Type A(2)/P3 in combination with Particulates filler conforming to EN 143, if exposed to dust.
Eye protection:	Safety glasses with side-shields. DO NOT wear contact lenses.
Skin and body protection:	Wear fire flame resistant/retardant clothing. Antistatic/ protective shoes or boots.
Hand protection:	Wear chemically resistant gloves (tested to EN 374) in combination with "basic" employee training.

Environmental exposure controls

Environmental exposure controls:	DO NOT allow material to contaminate ground water system.
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SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Property	Values	Remark
Appearance	Grey	Dependent on pigment
Physical state	Liquid	
Particle size		No data available
Odour	Styrene	
Odour threshold	0.15 ppm	Values related to styrene
pH		No data available
Melting point/range	-30°C	Values related to styrene
Freezing point		No data available
Boiling point	145°C	Values related to styrene
Flash point	32°C	Values related to styrene
Evaporation rate		No data available
Flammability limits in air		
Upper	6.1 – 6.8 %	Values related to styrene
Lower	0.9 – 1.1 %	Values related to styrene
Vapour pressure	1 kPa @ 25°C	Values related to styrene
Vapour density	3.6	Values related to styrene
Density	1.03 – 1.10 g/cm ³ @ 20°C	Values related to styrene

Water solubility	Insoluble in water	No data available
Partition coefficient	3	Values related to styrene
n-octanol/water		
Solubility in other solvents	Medium – Organic solvents Medium – Phthalates	Values related to styrene
Auto ignition temperature	490 °C	Values related to styrene
Decomposition temperature		No data available
Viscosity, kinematic	xxx – xxx mm ² /s @ 25°C	
Viscosity, dynamic	800 - 1,000 mPa s @ 25°C	
Explosive properties		No data available
Oxidizing properties		No data available

Other safety information

Property	Values	Remark
Solubility in other solvents	Soluble in most organic solvents	Values related to styrene

SECTION 10: Stability and reactivity

10.1 Reactivity

Product may ignite and burn at temperatures exceeding the flash point.

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

In use, may form flammable/explosive vapour-air mixture.

10.4 Conditions to avoid

Heat, flames and sparks. Exposure to light. Take precautionary measures against static charges.

10.5 Incompatible materials

Strong oxidizing agents, peroxides, reducing agents.

10.6 Hazardous decomposition products

Incomplete combustion and thermolysis produces potentially toxic gases such as carbon monoxide and carbon dioxide.

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity

Inhalation: Danger of serious damage to health by prolonged exposure through inhalation. Irritating to respiratory system.

Ingestion: Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhoea.

Chemical name	LD50 Oral	LD50 Dermal	ATE CLP (dust, mist)
Styrene 100-42-5	> 5000 mg/kg	> 5000 mg/kg	3,000 mg/L 4h

Skin corrosion/irritant: Causes skin irritation.

Serious Eye Damage/Eye Irritation: Causes serious eye irritation.

Respiratory or skin sensitisation: Not classified

Mutagenic effects: Not classified

Carcinogenicity: Suspected of causing cancer.

Reproductive toxicity: Suspected of damaging fertility or the unborn child.

Specific target organ toxicity (single exposure): Not classified

Specific target organ toxicity (repeated exposure): Causes damage to organs through prolonged or repeated exposure.

Aspiration hazard: Due to the viscosity, this product does not present an aspiration hazard.

Other information: None

SECTION 12: Ecological Information

12.1 Toxicity

Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment. DO NOT flush into surface water or sanitary system.

Acute aquatic toxicity – component information

Chemical name	Toxicity to algae	Toxicity to daphnia and other aquatic invertebrates	Toxicity to fish
Styrene 100-42-5	EC50 (72h) = 4.9 mg/L	EC50 (48h) = 4.7 mg/L	LC50 (96h) = 4.02 mg/L

12.2 Persistence and degradability

No additional information available

12.3 Bio accumulative potential

No additional information available

12.4 Mobility in soil

No additional information available

12.5 Results of PBT and vPvB assessment

No additional information available

12.6 Other adverse effects

None known

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Waste from residues / unused:	Dispose in accordance with the European Directives on waste and hazardous waste.
Products:	DO NOT flush into surface water or sanitary sewer system.
Contaminated packaging:	Empty containers should be taken to an approved hazardous or special waste handling site for recycling and disposal.
Other information:	According to the European Waste Catalogue, Waste Codes are not product specific, but application specific. Waste Codes should be assigned by the user based on the application for which the product was used.

SECTION 14: Transport information

ADR/RID	IMDG/IMO	ICAO/IATA	ADN
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14.1 UN Number

UN1866	UN1866	UN1866	UN1866
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14.2 UN proper shipping name

UN1866, RESIN SOLUTION, 3, PG III, (D/E)	UN1866, RESIN SOLUTION, 3, PG III, (31 °C c.c.)	UN1866, RESIN SOLUTION, 3, PG III	UN1866, RESIN SOLUTION, 3, PG III
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14.3 Transport hazard class

Hazard class 3	Hazard class 3	Hazard class 3	Hazard class 3
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14.4 Packing group

III	III	III	III
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14.5 Environmental hazards

No	No	No	No
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Marine pollutant: No

14.6 Special precautions for user

ADR/RID	Classification code:	F1
	Tunnel restriction code:	(D/E)
	Limited quantity:	5L
IMDG/IMO	EmS:	F-E, S-E
	Limited quantity:	5L
ICAO/IATA	ERG Code:	3L
	Limited quantity:	10L
ADN	Classification code:	F1
	Limited quantity:	5L
	Ventilation:	VE01

Special precautions for users: No information available

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable.

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

Regulation (EC) No. 1907/2006 (REACH)

Regulation (EC) No. 1272/2008 (CLP)

Regulation (EU) No. 830/2015

Directive 88/642/EEC

Directive 98/24/EC

Directive 1999/92/EC

Directive 2012/18/EU

Contains no substances with REACH Annex XVII restrictions

Contains no substances on the REACH candidate list

SECTION 16: Other information

None.

Disclaimer

The information provided in this Material Safety Data Sheet is correct to the best of our knowledge, in formation and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

End of Flex GRP Overlay Resin Material Safety Data Sheet

STRONGHOLD
GRP ROOFING SYSTEM

STRONGHOLD CATALYST

SAFETY DATA SHEET

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier

Product name: Stronghold Catalyst 601
Chemical name: Organic Peroxide
Product form: Mixture

1.2 Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses: Catalyst for Glass Reinforced Plastic (GRP) Roofing.
Contact the manufacturer for any other application.

1.3 Details of the Supplier of the safety data sheet

Manufacturer/Supplier: The Glass Fibre Roofing Company Ltd.
Address: Unit 33 Pontygwindy Industrial Estate, Caerphilly CF83 3HU
Telephone number: 02920 888020
E-mail: sales@strongholdgrp.co.uk

This document is available online at <http://www.strongholdgrp.co.uk>

1.4 Emergency telephone numbers

UK Telephone number: 02920 888020 (Office hours only)
UK Urgent medical problem: 111 (NHS Direct)
UK Life-threatening emergency: 999

SECTION 2: Hazards identification

2.1 Classification according to Regulation (EC) No 1272/2008 (CLP)

Flammable liquids:	Category 2	H226 Flammable liquid and vapour.
Skin corrosion:	Category 1B	H314: Causes severe skin/eye damage.
Acute toxicity:	Category 4	H302 Harmful if swallowed.
Organic peroxides:	Type D	H242 Heating may cause a fire.

Oxidising:	R 7: May cause fire.
Corrosive:	R10: Flammable.
Harmful:	R34: Causes burns.
	R22: Harmful if swallowed.

2.2 Label elements

Labelling according to Regulation (EC) No 1272/2008 [CLP]

Hazard pictograms:



Signal word:

Danger

Hazard statements:

Flammable liquid and vapour	H226
Heating may cause a fire	H242
Harmful if swallowed	H302
Causes severe skin burns and eye damage	H314

Precautionary statements - Prevention:

Keep away from heat/sparks/open flames/ hot surfaces – no smoking	P210
Keep/store away from clothing/ strong acids, bases, heavy metal salts and other reducing substances /combustible materials	P220
Keep cool	P235
Do not get in eyes, on skin, or on clothing	P262
Wear protective gloves/protective clothing/eye protection/face protection	P280

Precautionary statements - Response:

IF IN EYES: Rinse cautiously with water for several minutes.	P305+P351+P338
Remove contact lenses, if present and easy to do. Continue rinsing	
Get immediate medical advice/ attention	P315
Use dry sand, dry chemical or alcohol-resistant foam for extinction	P378

Precautionary statements - Storage:

Store in a well-ventilated place. Keep container tightly closed	P403 + P233
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Precautionary statements - Disposal:

Dispose of contents/ container to an approved waste disposal plant	P501
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Other hazards: No information available.

SECTION 3: Composition/information on ingredients

3.1 Substances

Chemical name	CAS-No. EC-No. REACH Registration No.	% Weight	GHS Classification
Methyl Ethyl Ketone Peroxide	1338-23-4 215-661-2 01-211951469143-0000	>=25 - <35	Org. Perox. C (H242) Acute Tox. 4 (H302) Skin Corr. 1B (H314)
4-Hydroxy-4-Methylpentan-2-one	123-42-2 204-626-7	>=12.5 - <15	Flam. Liq. 2 (H225) Eye Irrit. 2 (H319) STOT SE 3 (H336)
Butanone	78-93-3 201-159-0	>= 3 - < 5	Flam. Liq. 2 (H225) Eye Irrit. 2 (H319) STOT SE 3 (H336)
Hydrogen Peroxide Solution	7722-84-1 231-765-0	>= 3 - < 5	Ox. Liq. 1 (H271) Acute Tox. 4 (H332) Acute Tox. 4 (H302) Skin Corr. 1A (H314)

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice: Take off all contaminated clothing immediately.
Never give anything by mouth to an unconscious person.

General advice (cont.):	Remove from exposure, and lie down. In the case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
Eye Contact:	In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
Skin contact:	Wash off immediately with soap and plenty of water.
Inhalation:	Move to fresh air. Consult a physician immediately.
Ingestion:	Clean mouth with water and drink afterwards plenty of water. If a person vomits when lying on his back, place him in the recovery position. DO NOT induce vomiting. If swallowed, seek medical advice immediately and show this container or label.

4.2 Most important symptoms and effects, both acute and delayed

No data available.

4.3 Indication of any immediate medical attention and special treatment needed

No data available.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media:	Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.
Unsuitable extinguishing media:	DO NOT use a solid water stream as it may scatter and spread fire.

5.2 Special hazards arising from the substance or mixture

Fire hazard:	Special exposure hazards arising from the substance or preparation itself, combustion products, resulting gases Cool closed containers exposed to fire with water spray. DO NOT allow run-off from fire-fighting to enter drains or water courses.
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5.3 Advice for firefighters

Protective equipment for firefighters:	Use personal protective equipment.
Other information:	Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Wear respiratory protection. Wear personal protective equipment.

6.2 Environmental precautions

Environmental precautions:	Avoid subsoil penetration. DO NOT allow material to contaminate ground water system. DO NOT contaminate water. If the product contaminates rivers and lakes or drains inform respective authorities. DO NOT let product enter drains.
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6.3 Methods and material for containment and cleaning up

Methods for cleaning up: Remove mechanically and with care (e.g. with clean polyethylene plastic shovel). Contain and collect spillage with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations.

6.4 Reference to other sections

See sections 7, 8, 11, 12 and 13 for more information.

6.5 Other information

Never add other substances or waste material to product residue. Move product residue to a safe place and dispose of properly.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Precautions for safe handling: For personal protection see section 8.

Dust explosion class: No data available

7.2 Conditions for safe storage, 3 including any incompatibilities

Technical measures & Storage conditions: Electrical installations / working materials and containers must comply with the technological safety standards. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Keep containers tightly closed. No smoking.

Materials to avoid: Avoid impurities (e.g. rust, dust, ash), risk of decomposition.

Storage temperature: < 30 °C

Other data: Storing temperature for reasons of quality. Liquid up to -25 °C.

7.3 Specific end use(s)

The identified uses for this product are detailed in Section 1.2.

SECTION 8: Exposure controls / personal protection

8.1 Control parameters

Chemical name	CAS-No.	Control parameters	Basis	Update
4-hydroxy-4-methylpentan-2-one (diacetone alcohol)	123-42-2	AGW: 96 mg/m ³ , 20 ppm	DE TRGS 900	01-2006
Methylethylketone	78-93-3	AGW: 600 mg/m ³ , 200 ppm	DE TRGS 900	01-2006
4-hydroxy-4-methylpentan-2-one	123-42-2	AGW: 96 mg/m ³ , 20 ppm DFG, H,	DE TRGS 900	2006-01-01
Butanone	78-93-3	AGW: 600 mg/m ³ , 200 ppm DFG, H, Y,	DE TRGS 900	2006-01-01

Other information on limit values: see chapter 16

Biological occupational exposure limits - TRGS903

Chemical name	CAS-No.	Control parameters	Sampling time	Update
Butanone	78-93-3	2-butanon: 5 mg/l (U)	a	2004-08-01

Remarks:

- a No time limit
- b Immediately after exposition or after working hours
- c In case of long-term exposition: after more than one shift
- d Before the next shift

8.2 Exposure controls

Occupational exposure limits

Engineering measures: Provide adequate ventilation.

Personal protective equipment

Remarks: Skin should be washed after contact.

Respiratory protection: Short duration filter unit: Filter A

Eye protection: Tightly fitting safety goggles
Face protection.

Skin and body protection: Protective suit
Remove and wash contaminated clothing before re-use.

Hand protection: Material: butyl-rubber
Glove thickness: 0,5 mm
Break through time: >= 8 h

Hygiene measures: Wash hands before breaks and immediately after handling the product.
Keep away from food, drink and animal feeding stuffs.

Environmental exposure controls

Environmental exposure controls: Avoid subsoil penetration.
Do not allow material to contaminate ground water system.
Do not contaminate water.
If the product contaminates rivers and lakes or drains inform respective authorities.
Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Property	Values	Remark
Appearance	Colourless	
Physical state	Liquid	
Particle size	No data available	No data available
Odour	Characteristic	
Odour threshold	No data available	No data available
pH	No data available	No data available
Melting point/range	<-25°C	
Freezing point	<-25°C	
Boiling point	145°C	
Flash point	57°C	
Evaporation rate	Not relevant	No data available
Flammability limits in air		
Upper	Not applicable	No data available
Lower	Not applicable	No data available
Vapour pressure	0.184 Pa @ 25°C	
Vapour density	No data available	No data available
Density	1.01 g/cm ³ @ 20°C	
Water solubility	Ca. 6.5 g/l at 20°C	
Partition coefficient	Log Pow: <0.3 at 25°C	
n-octanol/water		
Solubility in other solvents	Mixable Medium – Phthalates	
Auto ignition temperature	Not applicable	Decomposes on heating
Decomposition temperature	ca. 60 °C, SADT (UN test H.4),	SADT possible at temperatures above approximately 60 °C.
Viscosity, kinematic	No data available	No data available
Viscosity, dynamic	13 mPa.s at 20 °C	
Explosive properties	No data available	No data available
Oxidizing properties	Organic peroxide	

Other safety information

Property	Values	Remark
Refractive index	1,431 at 20 °C	

SECTION 10: Stability and reactivity

10.1 Reactivity

Stable under recommended storage conditions.

10.2 Chemical stability

Contact with incompatible substances can cause disintegration at or below SADT.

10.3 Possibility of hazardous reactions

Vapours may form explosive mixture with air.

10.4 Conditions to avoid

Keep away from heat and sources of ignition.

10.5 Incompatible materials

Accelerators, strong acids and bases, heavy metals and heavy metal salts, reducing agents, Avoid impurities (e.g. rust, dust, ash), risk of decomposition.

10.6 Hazardous decomposition products

Irritant, caustic, flammable, noxious/toxic gases and vapours can develop in the case of fire and decomposition. Thermal decomposition: ca. 60 °C Method: SADT (UN test H.4)

Note: SADT possible at temperatures above approximately 60 °C.

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity

Butanone - Inhalation: Inhalation of high vapour concentrations can cause CNS-depression and narcosis. Inhalation of vapours in high concentration may cause shortness of breath (lung oedema).

Chemical name	LD50 Oral	LD50 Dermal	Inhalation
Methyl Ethyl Ketone Peroxide (40% in dimethylphthalate)	1.017 mg/kg	4.000 mg/kg	17(4h)mg/l *

* **Note:** Aerosol, Nominal concentration

Skin corrosion/irritant: Causes burns.

Serious Eye Damage/Eye Irritation: Causes burns.

Respiratory or skin sensitisation:	Method: Maximisation Test Test substance: Methyl Ethyl Ketone Peroxide (60% in dimethylphthalate/diacetone alcohol) Did not cause sensitization on laboratory animals. Germ cell mutagenicity Genotoxicity in vitro: Not mutagenic in Ames Test.
Carcinogenicity:	No data available
Reproductive toxicity:	No data available
Teratogenicity:	Not classified
Specific target organ toxicity (single exposure):	No data available
Specific target organ toxicity (repeated exposure):	No data available
Aspiration hazard:	No data available

SECTION 12: Ecological Information

12.1 Toxicity

Chemical name	Toxicity to algae	Toxicity to daphnia and other aquatic invertebrates	Toxicity to fish	Toxicity to bacteria
Methyl Ethyl Ketone Peroxide (33% in dimethylphthalate)			LC50 (96h) = 44.2 mg/L	EC50 (30m) = 48 mg/L
Methyl Ethyl Ketone Peroxide (40% in dimethylphthalate)	EC50 (72h) = 5.6 mg/L	EC50 (48h) = 39 mg/L		

12.2 Persistence and degradability

Biodegradability:	Readily biodegradable.
Method:	Closed Bottle Test
Test substance:	Methyl Ethyl Ketone Peroxide (MEKP)

12.3 Bio accumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

This mixture contains no substance considered to be persistent, bioaccumulating nor toxic (PBT).

12.6 Other adverse effects

No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Disposal: Dispose of in conjunction with appropriate waste disposal authorities and in accordance with disposal regulations.
Waste codes should be assigned by the user based on the application for which the product was used.

SECTION 14: Transport information

ADR	RID	IATA	IMDG
-----	-----	------	------

14.1 UN Number

UN3105	UN3105	UN3105	UN3105
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14.2 UN proper shipping name

ORGANIC PEROXIDE TYPE D, LIQUID (Methyl Ethyl Ketone Peroxide)	ORGANIC PEROXIDE TYPE D, LIQUID (Methyl Ethyl Ketone Peroxide)	ORGANIC PEROXIDE TYPE D, LIQUID (Methyl Ethyl Ketone Peroxide)	ORGANIC PEROXIDE TYPE D, LIQUID (Methyl Ethyl Ketone Peroxide)
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14.3 Transport hazard class

5.2	5.2	5.2	5.2
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14.4 Packing group

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14.5 Environmental hazards

No	No	No	No
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Marine pollutant: No

14.6 Special precautions for user

ADR	Classification code:	P1
	Tunnel restriction code:	(D)
	Limited quantity:	LQ16
RID	Classification code:	P1
	Hazard identification No.:	539
	Limited quantity:	LQ16
IATA	Labels:	5.2 (HEAT)
	Packing instruction:	570
IMDG	EmS:	F-J, S-R
Marine pollutant:	No	
Special precautions for users:	See chapter 6, 7 and 8.	

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable.

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

Regulation (EC) No. 1907/2006 (REACH)

Regulation (EC) No. 1272/2008 (CLP)

Regulation (EU) No. 830/2015

Directive 88/642/EEC

Directive 98/24/EC

Directive 1999/92/EC

Directive 2012/18/EU

SECTION 16: Other information

None.

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End of Catalyst Material Safety Data Sheet

STRONGHOLD
GRP ROOFING SYSTEM

CHOPPED STRAND MAT

SAFETY DATA SHEET

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier

Product name: Stronghold Continuous Filament Glass Fibre (CFGF) 901
Chemical name: Fibre Glass
Product form: Substance (Technically an article)

1.2 Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses: Reinforcement for Glass Reinforced Plastic GRP Roofing.
Contact the manufacturer for any other application.

1.3 Details of the Supplier of the safety data sheet

Manufacturer/Supplier: The Glass Fibre Roofing Company Ltd.
Address: Unit 33 Pontygwindy Industrial Estate, Caerphilly CF83 3HU
Telephone number: 02920 888020
E-mail: sales@strongholdgrp.co.uk

This document is available online at <http://www.strongholdgrp.co.uk>

1.4 Emergency telephone numbers

UK Telephone number: 02920 888020 (Office hours only)
UK Urgent medical problem: 111 (NHS Direct)
UK Life-threatening emergency: 999

SECTION 2: Hazards identification

2.1 Classification according to Regulation (EC) No 1272/2008 (CLP)

Continuous Filament Glass Fibre (CFGF) Products are not classified as a dangerous substance in accordance with regulations. They are not subject to notification under chemical regulations such as REACH, are not subject to classification and labelling according to GHS and do not technically require a Safety Data Sheet (SDS). An SDS is provided to ensure safe use and handling and use of CFGF products.

This substance does not have a workplace exposure limit.
This substance is not identified as a PBT substance.

Health Hazards

Irritating to skin:	Category 3
Eye irritation:	Category 2B
Acute toxicity:	Category 5

2.2 Label elements

Labelling according to Regulation (EC) No 1272/2008 [CLP]

Hazard pictograms:



Signal word: Warning

Hazard statements:

May be harmful if swallowed.	H303
Causes mild skin irritation.	H316
Causes eye irritation.	H320
May be harmful if inhaled.	H333

Precautionary statements - Prevention:

Wash contaminated skin thoroughly after handling.	P264
Wear protective gloves/protective clothing/eye protection/face protection.	P280

Other hazards: No information available.

SECTION 3: Composition/information on ingredients**3.1 Substances**

Product name	Glass %	Size %	Binder %	Water %
Woven roving	98.8 – 99.85	0.15 – 1.00	Nil	0 – 0.20
Emulsion chopped strand mat	93.5 - 96.65	0.35 – 1.35		0 – 0.20

Fibre glass: CAS No 65997-17-3

Size: Size is a mixture of chemicals applied to the glass strands. Most of this mixture is made up of basically non-reactive high molecular weight polymers, often natural ingredients (starches) with no reactive sites, which are not listed as substances in the EINECS nor in the ELINCS appendices.

Sometimes size also contains substances of organosilane family or other substances. The manufacturer considers this risk as negligible as, even though listed as dangerous products, the concentration is extremely low (under 0.1% of total weight) and they are polymerised during the production of glass fibres production.

SECTION 4: First aid measures**4.1 Description of first aid measures**

Eye Contact:	Immediately flush eyes with clean water for at least 15 minutes. If irritation persists, get medical help.
Skin contact:	If irritation occurs to the skin, rinse with soap and water. Make sure to refrain from rinsing with warm water since warm water will make the skin pores open to allow fiberglass to penetrate more deeply. If fiberglass penetrates the skin, use a wash cloth to help pull out the fiberglass. To avoid further irritation, do not rub or scratch affected skin. If irritation persists, get medical help. Make sure to refrain from using compressed air to remove fiberglass from the skin.
Inhalation:	If inhaled, immediately remove the affected person to fresh air. If irritation persists, get medical help.
Ingestion:	Normally, ingestion of this material is unlikely. If it does occur, watch the person for several days to make sure that gastrointestinal disturbance does not occur. Do not let the person vomit unless required by medical personnel. If disturbance persists, get medical help.

4.2 Most important symptoms and effects, both acute and delayed

Inhalation:	Ingestion of the material is unlikely. However, ingestion of the material may cause gastrointestinal disturbance.
Ingestion:	Breathing fiberglass dusts and particulates may cause irritation of the nose, throat and respiratory tract.
Skin contact:	Fiberglass dusts and particulates may cause temporary irritation.
Eye Contact:	Fiberglass dusts and particulates may cause temporary irritation to the eyes.

4.3 Indication of any immediate medical attention and special treatment needed

Notes to physician:	No information available.
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SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media:	Non-flammable. But the size and packing material may burn. Use dry chemical, foam, carbon dioxide and water as extinguishing media.
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5.2 Special hazards arising from the substance or mixture

Hazardous combustion products:	Primary combustion products are carbon monoxide, hydrogen, carbon dioxide and water. Other undetermined compounds can be released in small quantities.
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5.3 Advice for firefighters

Protective equipment for firefighters:	Fire fighters must use self-contained breathing apparatus and wear full protective gear.
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SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

For non-emergency personnel:	Remove all sources of ignition, heat, flames and sparks. Take precautionary measures against static charges. Ensure adequate ventilation. Use personal protective equipment.
For emergency responders:	Avoid breathing vapours or mists. In the event of fire and/or explosion DO NOT breathe fumes. Use personal protective equipment.

6.2 Environmental precautions

Environmental precautions:	The product should not be allowed to enter drains, water courses or the soil. DO NOT flush into surface water or sanitary sewer system.
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6.3 Methods and material for containment and cleaning up

Methods for cleaning up:	In case of release to land, the material should be scooped up as waste and put into a special container and stored in a designated area. In case of release of water, the material will sink and disperse along the bottom of waterways or ponds and cannot be easily removed after it is waterborne. However, the material is non-hazardous in water.
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SECTION 7: Handling and storage

7.1 Precautions for safe handling

Precautions for safe handling: Try to prevent the packing material from be damaged and keep the product inside the packing material to minimize the generation of dusts.
Maintain a clean work environment and avoid generation of fiberglass fragments from improper handling.

7.2 Conditions for safe storage, 3 including any incompatibilities

Storage conditions: Keep product in its packaging until use to minimize potential dust generation.

7.3 Specific end use(s)

The identified uses for this product are detailed in Section 1.2.

SECTION 8: Exposure controls / personal protection

8.1 Control parameters

National and international hygiene standards are as follows:

Component	Permissible Exposure Limit of OSHA (8-hr Average Weight)	Permissible Exposure Limit of ACGIH (8 hr Average Weight)
Total Dust	15 mg/m ³	10 mg/m ³
Respirable particulates	5 mg/m ³	3 mg/m ³
Respirable Fibre	Not available	1 fibre/ml

8.2 Exposure controls

Occupational exposure limits

Engineering measures: Production areas are closed off and a required relative humidity is maintained.

Personal protective equipment

General Information: Use personal protective equipment.

Respiratory protection: Wear a suitable mask when working in an environment where dust concentration is high.

Eye protection: Wear safety glasses and face shield.

Skin and body protection: Normal loose working clothing (long-sleeved shirts and long pants) is recommended. Skin irritation occurs primarily at the contact areas such as around the neck and waist.

Hand protection: Wear gloves. Skin irritation occurs primarily at the contact areas such as wrists and between the fingers.

Environmental exposure controls

Environmental exposure controls: DO NOT allow material to contaminate ground water system.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Property	Values	Remark
Appearance	White / off white	
Physical state	Solid	
Particle size	No data available	No data available
Odour	No odour	
Odour threshold	No data available	No data available
pH	No data available	No data available
Melting point/range	No data available	No data available
Freezing point	No data available	No data available
Boiling point	No data available	No data available
Flash point	No data available	No data available
Evaporation rate	No data available	No data available
Flammability limits in air		
Upper	>800°C	
Lower	No data available	No data available
Vapour pressure	No data available	No data available
Vapour density	No data available	No data available
Density	No data available	No data available
Water solubility	No data available	No data available
Partition coefficient	No data available	No data available
n-octanol/water	No data available	No data available
Solubility in other solvents	No data available	No data available
Auto ignition temperature	No data available	No data available
Decomposition temperature	No data available	No data available
Viscosity, kinematic	No data available	No data available
Viscosity, dynamic	No data available	No data available
Explosive properties	No data available	No data available
Oxidizing properties	No data available	No data available

SECTION 10: Stability and reactivity

10.1 Reactivity

This is a non-reactive material.

10.2 Chemical stability

This is a stable material.

10.3 Possibility of hazardous reactions

None.

10.4 Conditions to avoid

None.

10.5 Incompatible materials

None.

10.6 Hazardous decomposition products

Hazardous polymerisation will not occur.

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity:	None.
Irritability:	Fiberglass dusts may cause irritation to skin and eye. Ingestion of fiberglass may cause irritation to the throat, stomach and gastrointestinal tract. Inhalation may cause coughing, sneezing and nose and throat irritation. Experience indicates that inhalation of a large amount of fiberglass may cause difficulty in breathing, congestion and chest tightness.
Carcinogenicity:	The International Agency for Research on Cancer (IARC), agency of the World Health Organization (WHO), has determined that fiberglass is a non-carcinogenic material because the evidence is inadequate to prove that fiberglass can cause humans and experimental animals to develop cancer.

SECTION 12: Ecological Information

12.1 Toxicity

No data available for this product. Fiberglass products are not listed as a material harmful to animals, plants and fish.

The product contains a substance or substances that will contribute to global warming (greenhouse effect). Not expected to have ozone depletion potential.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

RCRA Hazard Class:	Non-hazardous.
Disposal Instructions:	Dispose waste material according to local environmental regulations.

SECTION 14: Transport information

Transport instructions:

Rolling and moisture should be avoided in transit.

14.1 UN Number

None.

14.2 UN proper shipping name

None.

14.3 Transport hazard class

None.

14.4 Packing group

None.

14.5 Environmental hazards

None.

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

Continuous Filament Glass Fibre (CFGF) Products are not classified as a dangerous substance in accordance with regulations. They are not subject to notification under chemical regulations such as REACH, are not subject to classification and labelling according to GHS and do not technically require a Safety Data Sheet (SDS). An SDS is provided to ensure safe use and handling and use of CFGF products.

SECTION 16: Other information

None.

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End of Continuous Filament Glass Fibre Material Safety Data Sheet