RECKLI®

APPLICATION GUIDE LINE

FOR RECKLI-FORMLINERS

TABLE OF CONTENTS

01

TABLE 1

	FORMLINERS 1 / ..	FORMLINERS / ..
Depth of structure*	› 25 mm	1 - 25 mm
Maximum size*	approx. 1.00 m x 5.00 m	approx. 4.00 m x 10.00 m
Type of elastomer	light $\gamma = 0.9$	normal $\gamma = 1.4$
Re-uses	50 times	100 times
Packaging	Packed flat	Rolls

* The exact sizes you find in our catalogue under the photos of the pattern.

1. CLASSIFICATION

We distinguish our formliners with the prefix numbers 1/.. and 2/.. The most important distinguishing features are listed in table 1.

2. MATERIAL

The formliners consist of rubber-like Polyurethane Elastomers. The high flexibility and elasticity allow a damage-free release of the concrete and exact reproduction of the pattern.

3. DELIVERY

For the formliners with the index 1/.. we deliver them flat on pallets or in chipboard boxes.

The formliners 2/.. are rolled up on heavy duty cardboard rolls for transport and storage and wrapped in kraft paper and/or polyethylene for extra protection against dirt. Depending on the size and weight they are additionally strapped to non-returnable pallets or in chipboard boxes. (Picture 1)

4. DELIVERY CHECK

Upon delivery please check your consignment immediately for any damage sustained in transport. If you note any damage to your consignment you must describe it in detail on the delivery note and get the driver to countersign your comments. Before using the formliners first check the required dimensions as detailed on the package especially to the longitudinal direction (ld) of the pattern if there is one.

5. STORAGE

Before fixing all formliners must be stored dry and level to avoid deformation of the pattern. If using the 2/.. formliners loosely (not adhered) they can be rolled up tightly again onto the cardboard rolls after use. Make sure the formliners rolls do not have any heavy or sharp objects stored on top of them as this would lead to permanent deformation.

The formliners must be protected against intensive weathering such as UV light, rain, frost and any other aggressive conditions. This is best accomplished by covering with dark or black polyethylene or other waterproof sheets. (Picture 2)

6. TRANSPORT

6.1 Boxes and pallets

The boxes and pallets with the formliners 1/.. can usually be transported and moved by fork-lift or crane. The pallets with the formliner rolls can also be transported and moved by fork-lifts or cranes.

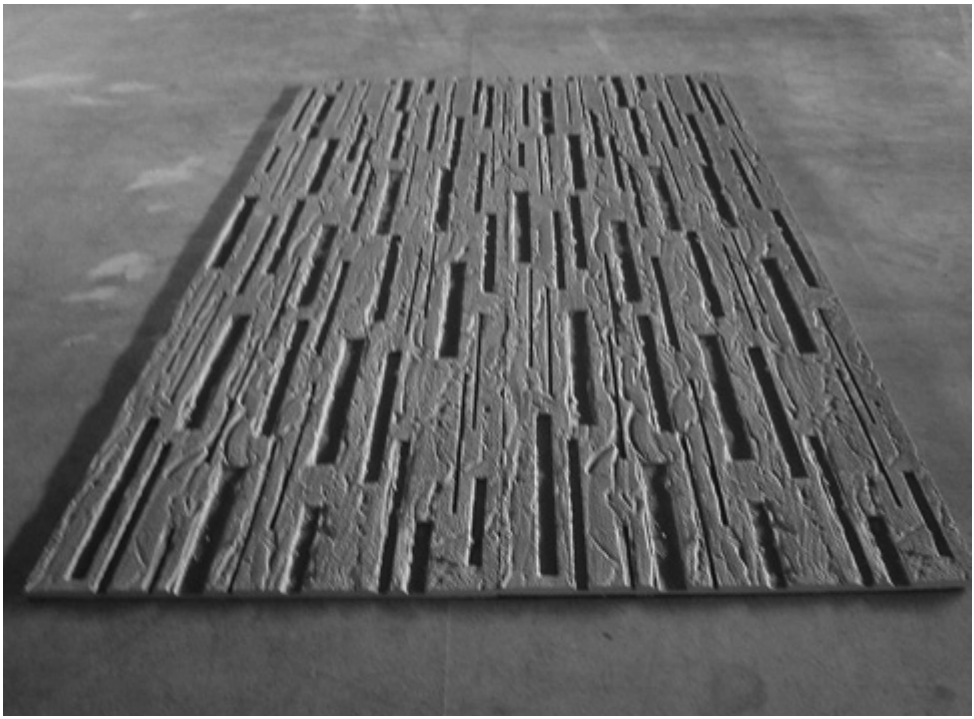
6.2 Single formliner rolls

Up to a length of approx. 1.50 m the cardboard rolls can be lifted by placing the fork or forks of the fork-lift into the cardboard tube. For rolls of formliner in excess of 1.5 m it is necessary to use extension forks or a carpet 'spike' as otherwise the forks would pierce the cardboard roll and probably the liner as well. If using a crane for lifting make sure you use wide nylon lifting straps evenly distributed along the length of the roll. Do not use wires ropes or chains. For large size formliners it can be useful to place a steel tube through the cardboard roll, make sure you use separate lifting straps from each pole end to crane hook to ensure even lifting. (Picture 3)

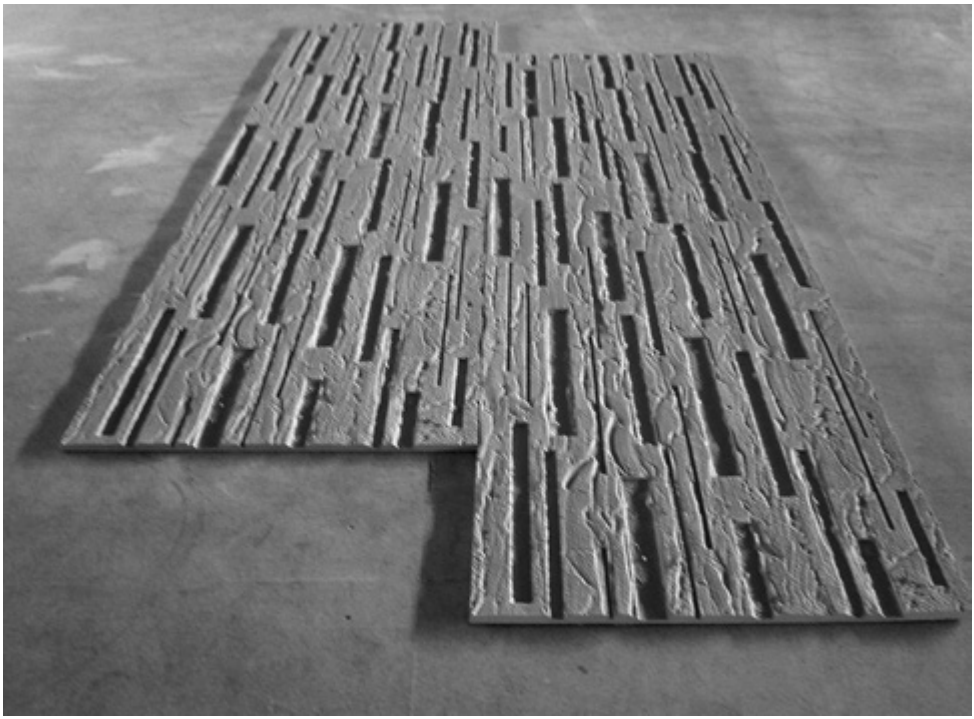
02

03

04



05



7. HEAT RESISTANCE

The formliners can be used in temperatures up to + 65° C. Temperatures which exceed this value will damage the material. Should you expect a concrete temperature on the interface to the formliner of more than + 65° C due to the concrete mass or other circumstances the mix design or other suitable actions should be adjusted to allow for the safe use of the formliner within its temperature constraints.

8. PATTERN DESIGN

There is no intended repeatability in the formliner patterns within the maximum mould size as compared to wallpapers. A number of patterns are designed in a way that they can be placed together side by side continuously. With a little care the joints in the patterns can be made almost invisible. (Picture 4+5)

For the building of our master moulds we use a combination of natural and man made materials of commercial grade quality which are formed using current standard working practices. Unavoidable tolerances, discrepancies and imperfections caused by the use of these materials can and will be reflected in the patterns of the formliners. The measurements shown in the sectional drawings under and beside the pattern photos in our pattern book are average values and nominal dimensions which have the stated tolerances. In using these sizes for the calculation of your requirements you should not expect that there is an equal repetition of measurements within the same formliner. The same criteria will apply whether you place two full sizes sheet formliners together or two or more 'made to measure' (smaller) formliners.

Therefore it is possible that you will have to stretch or compress the formliners to adapt them to the required pattern format or shutter/mould measurements. This may be required especially for patterns and textures for formliners of bricks, blocks, boards, ribs etc.

It is essential that attention be paid to both pattern sequence and direction of all designs; especially when concrete elements are to be arranged side by side or one upon another and are to appear seamless. Unintentional rotation of the formliners by 180° for example can lead to conflicting pattern effects.

9. CUTTING

9.1 Oversize and tolerances

Due to their high elasticity the formliners will be stretched or compressed during packing and transport which can lead to dimensional tolerances. Therefore, to protect the liner edges against damage we always supply the formliners oversized. They must be cut to their final dimension on site. It is always advisable to cut formliners a couple of millimetres longer than required for a tight fit against the formwork guide battens. (see 10.1)

The formliners should be cut to their final size directly before adhering to avoid size changes by stretching or shrinking due to temperature differences (thermal expansion). As with all highly elastic rubber-like materials the formliners are subjected to stretching after a long period of use. Therefore it may be necessary to re-cut the formliners to their original dimension from time to time. This of course will only apply if the formliners are not fixed by gluing.

Despite the most carefully controlled production process, dimensional tolerances of some mm in the rear wall thickness of the formliners is unavoidable. This is due to material and production factors which we are unable to negate. These dimensional differences are unavoidable whether you have a formliner produced in its maximum size or a smaller 'made to measure' formliner within the maximum size of the same formliner. Therefore it may be necessary to grind the formliners edges to even and level them or to thicken the seam area with RECKLI-Formliner Adhesive SO or RECKLI-Elasto Filler when required to place them horizontally next to another formliner. (see 20.2)

9.2 Formliners with prefix number 1/..

These formliners are normally supplied in fixed widths whereas the length/height (ld) is variable. If you have to put 2 or more formliners together (side by side) to reach a total area for the shutter or mould, cutting will probably be necessary. To make perfect cuts lay the formliners onto a flat, clean even surface and cut them using a suitable hand panel or circular power saw. (Picture 6) If using a power saw it is most important to allow the saw blade to rotate freely into the cut and during the cut. Keep the sawn material (waste part) pulled away from the blade to avoid it flapping against the rotating saw blade, otherwise heat will be generated and the formliner can burn. On

06

07

08

09

long cuts it is a good idea to pull the power saw away from the cut and let the saw spin under power to dissipate any build-up of heat.

9.3 Formliners with prefix number 2/..

Roll out these formliners onto a flat, clean even surface and cut them with the RECKLI-Formliner Knife. For a straight cut line please use a metal or timber straight edge. (Picture 7)

When cutting thicker pattern formliners do not try and make the cut 'in one'. Place the knife in the first cut and draw through the formliner gently as many times as required, do not use excessive force as this will lead to crooked cuts. We do not advise cutting these formliners with a circular power saw.

Note: It is very difficult to make mitred, bevel cuts with a knife to an unfixed formliner. When such bevels are required we can suggest two methods: a) place the area to be mitred onto a board, place another board above the formliner and fix thereby compressing the formliner. Set the power saw to the required angle and depth and cut the board and the formliner together. (Picture 8+9) b) Perform this task with a power saw min. 24 hours after the formliner has been adhered. Cutting the fixed formliner and the plywood will give a more precise finish. We also advise the 24 hour delay for the drilling of any 'tie-bolt' holes.

10. APPLICATION IN PRE-CAST CONCRETE

10.1 Fitting the formliner to the formwork or mould

After cutting the liner lay it loose into the formwork/mould frame. The formliners with prefix number 1/.. should have been cut with an over-size of 1-2 mm. So that you can compress them into the dimension frame for getting a tight compressive fit all round. The liners with prefix number 2/.. should also be cut to an oversize of 1-2 mm. It is easy to compress them so that they will be a tight fit around the edges of the formwork/mould.

Please Note: When you allow too much oversize, the formliner will 'bow up' at the edge and form an 'air cushion' which even the pressure of the concrete will not flatten. These 'air cushions' will lead to indentations in the concrete surface.

10.2 Fixing by adhering

Loose formliners have to be refitted into the mould after every cast. To avoid this you can glue the formliner on to the 'tilt-up' or vibrating tables (see 12.) This is always an advantage when you have to produce a series of elements of the same size. Loose formliners will also be more prone to stretching from their constant handling.

10.3 Setting & Placing the formwork/mould edges

You can of course place your formwork/mould dimension frame directly on to the formliners which have shallow patterns or textures of approx. 1-2 mm. Patterns with a depth of up to 5 mm can be sealed sufficiently by a compression band. For deeper patterns we suggest you make 'pattern stop-offs' (see 19.2) or in symmetrical patterns (ribs or waves) you can use the same formliner piece inverted. (Picture 10)

Please Note: If the frame is pressed too firmly on to the formliner for too long, there will be a permanent depression in the formliner giving a noticeable difference to the pattern if and when the frame has to be moved to a different part of the formliner.

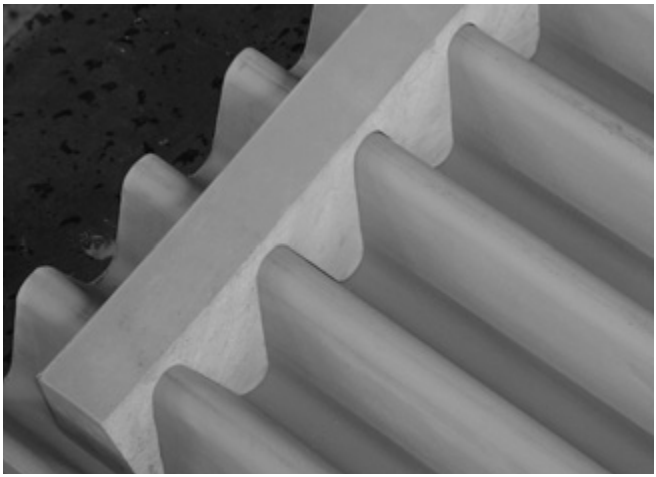
10.4 Vibration

It is possible that the frequencies of an external vibrator can make the formliner 'flutter' and draw air under the formliner. This can result in air 'cushions' or 'bubbles' in the formliner which can lead to indentations in the concrete surface. Therefore the vibrator and its vibration frequency must be checked and adjusted correctly.

10.5 Stripping/Striking

Formliners that are laid loose in the mould are generally removed from the concrete elements and replaced back into the moulds ready for reuse. Care should be taken during the stripping/striking process that the formliner will not fall off the concrete element when the tilting table is in the vertical. The formliner would almost certainly be damaged and presents a risk for the workers. (Picture 11-13) To avoid this happening you can glue the liners onto the formwork/tilting table. (see 12.)

10



11

12

13

14

11. APPLICATION FOR IN-SITU CONCRETE

11.1. Fixing by adhering

When used for in-situ concrete the formliners must be glued down. (see 12.)

11.2 Fixing by nails

For minimum use or the immediate change of shutter sizes after the first pour, the formliners with prefix number 1/.. can be nailed onto the formwork. The nail centres should be approx. 20-25 cm. Use ‘lost heads’ or ‘ovals’ nails so that it is possible to pull the nail heads through the formliner during stripping/striking. Depending on the pattern or texture always nail through the high points of the pattern. This will ensure that nail holes are in the negative part of the concrete and not so easily noticed.

The formliners with prefix number 2/.. should not be nailed to the formwork. Due to the weight of the formliners there would be too much weight placed on the nails when lifted into the vertical position and this can result in the formliner tearing.

12. ADHERING

Please Note: It can be to your advantage to glue the formliners onto plywood sheets and use these sheets as auxiliary/’slave’ formwork which you can then fix onto your load bearing formwork or casting table. The plywood can be fixed from the rear using wood screws. The plywood can easily be removed from the load bearing formwork after use. It will also be easier to store and dispose of the formliners when they are glued to plywood.

12.1 Principles of fixing

RECKLI-Formliners must be adhered completely. Point or spot gluing will lead to stretching of the formliners during stripping/striking. This type of stretching will lead to raised round areas in the formliner which will show itself as dents in the concrete.

It is possible to glue onto steel as well as on timber.

The easiest surface to glue on to is the horizontal surface. Other shutter/mould applications which you might encounter might be inclined, (Picture 14) half or quarter columns etc. On vertical or rounded surfaces the adhesive would flow down to the

lowest point leaving insufficient adhesive for a complete fixing. In these applications the Formliner Adhesive should be thickened with our RECKLI-Standardiser 100 to make it more 'pasty'. Please ask for our special advice.

On inclined or vaulted surfaces the formliners can slide on the adhesive because of their weight and the adhesive is not a contact adhesive. Therefore the formliner must be clamped, propped or pinned with laths to the formwork/mould until the adhesive has cured. It is easier to add the clamps and laths incrementally as you work round the curve or radius.

You should not walk on or kneel on a freshly adhered formliner as this will push away the adhesive under the formliner and can result in dents in the formliner and show itself as circular raised areas in the concrete.

Do not move the formliner until full curing of the adhesive.

12.2 Adhesive

RECKLI-Formliner Adhesive SO is not a contact adhesive. It is a 2-component adhesive. The mixing ratio is 4:1 by weight. If it is necessary to weigh out smaller quantities of adhesive this must be done by weight. For mixing the adhesive a slow speed electric drill with the correct mixing paddle should be used. (Picture 15) The base solution must be mixed first. The hardener is then added to the base solution and mixed thoroughly. To avoid any 'soft spots' or uncured material the adhesive must be placed into another empty, clean container and mixed again. (Picture 16+17) You should use only as much adhesive as you can work with within the pot-life. The pot-life depends on the ambient temperature but as a rough guide you will have approximately 30-40 minutes at 18-20° C. Adhesive consumption is approx. 750-1000 g/m². After 24 hours the adhesive is cured. You should give a longer curing time during winter periods with lower temperatures. The formwork, mould or the tilting table can now be used.

12.3 Surface/Formliner rears

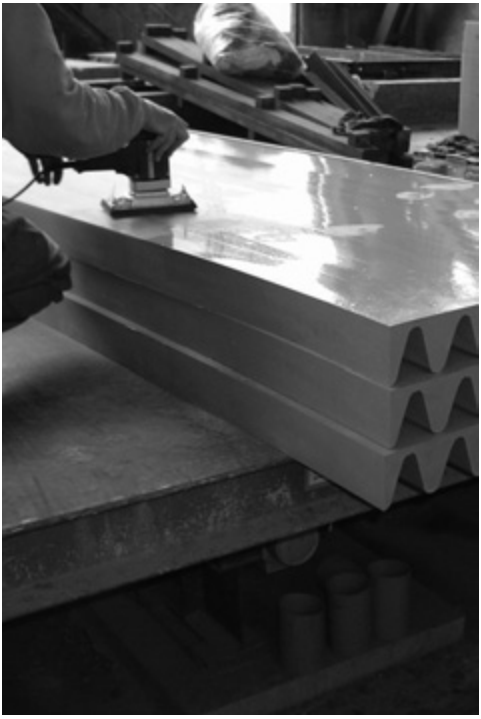
All surfaces that you wish to adhere to must be even, clean and dry. Any grease, oil or mud should be sanded off the shutter not washed off. A superior bonding of the formliner to the shutter will be achieved if you sand the rear of the formliners. (Picture 18) A light sanding which will roughen the rear will be sufficient. (12.4.1.1 or 12.4.2.1)

15

16

17

18



19

20

12.3.1 Timber

The most suitable foundation for RECKLI-Formliners are new clean untreated plywood sheets designated as suitable for shuttering. (Picture 19) Resin coated plywood plates must be ground off to the rough timber surface.

12.3.2 Steel

Steel must be rust free and the work will benefit from a light sand-blast. If this is not possible the minimum should be the use of an angle grinder to the surface. When using RECKLI Formliner Adhesive SO no primer is required.

12.4 Adhering

12.4.1 Formliners with prefix number 1/..

12.4.1.1 Roughening of the formliner rear

Lay the formliners onto their patterned surface for roughening the rear by using a grinding machine. Circular grinding machines or belt sanders are better suitable for this work than vibratory grinders. The grinding dust must be removed completely by sweeping or rubbing off or by blowing off with compressed air.

12.4.1.2 Checking dimensions with a 'Dry run'

Lay the liners loosely onto the surface to be adhered, adjust them and check against your measurements. Lay out a temporary right angle on to your shutter/mould and lay the liners against this frame. Remove and stack the formliners onto a clean surface.

12.4.1.3 Adhering/Gluing

After mixing the RECKLI-Formliner Adhesive SO (see 12.2) pour it onto the surface to be glued and spread the adhesive evenly over the surface using the supplied serrated trowel. (Picture 19+20) Take care that you spread the adhesive equally. Spread only so much adhesive over the formwork surface as you need for the gluing of one formliner or that you can work with within the adhesive's pot life. Make sure that the edges of the formliner have sufficient adhesive as this is the most critical area of stress when stripping and concrete will always try to enter at the edge of the glue line and get behind the formliners.

Lay the formliner onto the fresh adhesive along the temporary right angle. (Picture 21) Please take care that there are no air bubbles under the liner. The best way to avoid this is by sliding the formliner backwards and forwards on the adhesive. Then apply the adhesive for the next liner. Press the liner against the first one making sure you coat the vertical surface of the first formliner with adhesive to give a grout free join. (Picture 22) Any surplus that has been squeezed out can be wiped off after fixing or left to dry and sanded down. Carry on in this order until you reach your total shutter requirement. When fixing the formliner onto the shutter check that the formliners will reach the required point on the shutter/mould. Use rips of plywood/wood and pin down edges of liner to prevent them from lifting. You need gentle pressure on the edges for 24 hrs. minimum. Nail through the liner into the plywood.

Note: Do not drive the nails home, excessive pressure will raise the edge of the formliner and take it out of contact with the shutter. If using steel shutters use weight on the timber/ply rips.

12.4.1.4 Gluing onto vaulted or curved surfaces

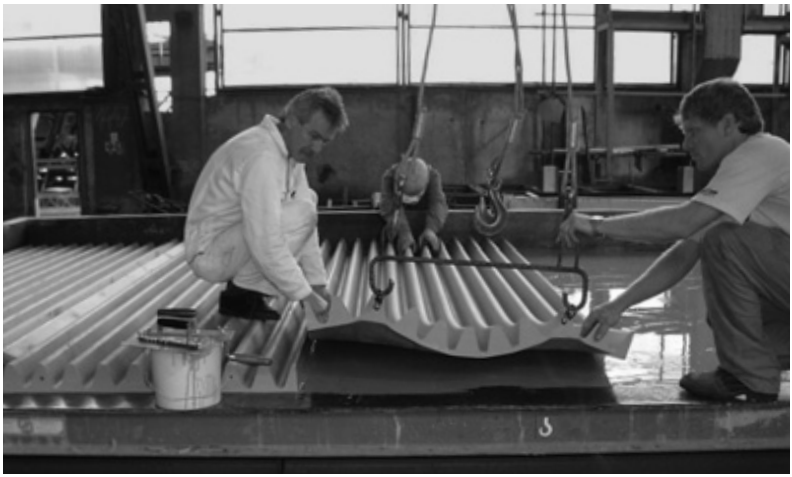
The formliners 1/.. are flexible and can be deformed to various degrees to accommodate shutter and mould shapes but because they are flexible and have a 'spring' value you will have to support/contain the formliners to the shutter/mould profile until the adhesive cures. To reduce the 'spring' in the formliner you can cut kerfs in the rear of the formliner which makes curving the formliner easier, on extreme curves you can cut V's in the back of the liner. The depth of these cuts will depend on the thickness of the formliner. Cut only into the rear thickness of the formliner do not cut near the pattern thickness. (Picture 23+24)

12.4.2 Formliners with prefix number 2/..

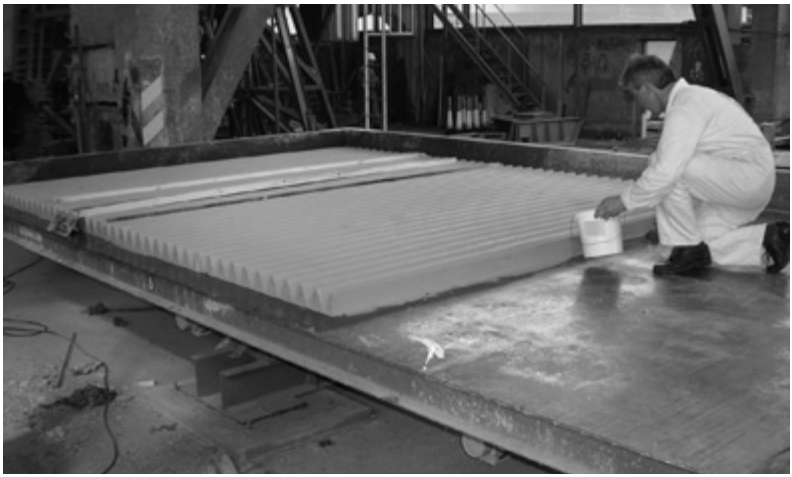
12.4.2.1 Roughening of the formliner rear

Before gluing/adhering the rear of the formliner must be roughened. Lay the formliners onto their patterned surface for roughening the rear by using a grinding machine. Circular grinding machines or belt sanders are better suitable for this work than vibratory grinders. The grinding dust must be removed completely by sweeping or rub-bing off or blowing off with compressed air. Then turn the formliner back onto its rear side

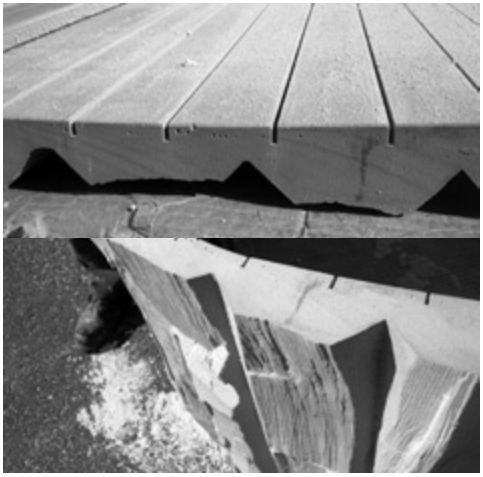
21



22



23



24

25

26

and roll it up again on to the 'transport jacket' (cardboard roll) making sure that formliner is in the right position to be rolled out onto the Formliner Adhesive and shutter. The use of the stripping jackets will make it easier to move the formliners around the working area.

12.4.2.2 Checking dimensions with a 'Dry run'

Roll the liner loosely onto the surface to be adhered, adjust and check against your measurements. If necessary mark reference points on the shutter/mould. Lay out a temporary right angle on to your shutter/mould and lay the liner against this frame. Roll the liner loose onto the surface to be adhered and straight and fit it exactly. Take note of any pattern that has parallel ribs or grid details.

12.4.2.3 Adhering/Gluing

Mix the adhesive (see 12.2) pour it onto the shutter/mould surface, spread the adhesive with a serrated trowel. Lifting the formliner by its stripping jacket, place it next to the start of the vertical part of the right angle 'setting out' frame roll the liner slowly onto the fresh adhesive.

Make sure that the edges of the formliner have sufficient adhesive as this is the most critical area of stress when stripping and concrete will always try to enter at the edge of the glue line and get behind the formliners. Please take care that there are no air bubbles under the formliner.

For the fixing of large formliners or when there is a shortage of manpower an alternative method of fixing you might employ could be this. After the 'Dry-run' roll up the formliner again with the cardboard roll until in the middle of the shutter. Then mix the formliner adhesive (see 12.2) and pour it in front of the rolled up half of the formliner and spread it equally over a strip of approx. 75-100 cm along the length of the liner. (Picture 25+26) An even and uniform thickness of the adhesive is most important. Check against excess adhesive which can lay in pools. In moving the adhesive with the serrated trowel you should look for the distinctive 'tram-line' effect on the adhesive the shutter/mould surface should be clearly visible. Now roll the liner onto the fresh adhesive and repeat the pouring, spreading and rolling the liner along the shutter/mould strip by strip until you reach the end of the first liner half. Make sure that

there are no air bubbles under the formliner. Press out the air to the front and the sides. During fixing check that you are reaching your datum/pattern points on the formliner or the parallel running of ribs or joints if there are any in the patterns.

Now roll up the second half of the liner to its middle until you reach where you have started spreading the adhesive for the first half and repeat the first half procedure until you reach the end of the second formliner half.

12.5 Removal of glued formliners

When the formliner adhesive has been mixed and applied correctly the fixing should be considered permanent. The removal of glued formliners should be considered a major task and would be very difficult to remove them from the shutter/mould without damage to the formliner. Therefore it can be an advantage not to glue the formliner directly onto the structural formwork but onto separate plywood sheets as 'slave' formwork and then to fix these to the structural formwork.

If it is absolutely necessary to remove formliners from the shutter/mould you can use the peel-off method. Cut in at the glue line on one corner pulling the formliner up and cutting away at the glue line carry on until you have a large enough piece of formliner to attach a clamp to which can be attached to a crane, fork lift etc. to apply more force while cutting away at the glue line. Any residue can be sanded off the shutter and formliner with a belt sander.

TABLE 2

APPLICATION	TYPE	CONSUMPTION PER COAT
Pre-cast concrete	RECKLI-Stripping Wax TL contains solvents	50 -100 g/m² 2 coats required
In-situ concrete	RECKLI-Stripping Wax TL-SO contains solvents	50 -100 g/m² 2 coats required
Pre-cast concrete/In-situ concrete	RECKLI-Stripping Wax TL-W water-based	50 -100 g/m² 2 coats required

13. RELEASE AGENTS

13.1 Choice of release agent

The choice and application of the correct release agent is most important to obtain an efficient release and high a quality concrete finish. We supply three different release agents depending on the application. RECKLI-Stripping Wax TL contains solvents. RECKLI-Stripping Wax TL-W is water-based. These two release agents are more suited to pre-cast concrete. RECKLI-Stripping Wax TL-SO also contains solvents and is especially designed for in-situ concrete. (Table 2)

13.2. Application

The stripping wax must be brushed or sprayed on a minimum two times. (Picture 27) The release agent should be applied laterally and longitudinally. It is most important that in any rib patterns the vertical part of the ribs should be sprayed at 45° from both sides of the formliner to ensure correct coverage. Surplus wax must be removed by a brush or clean cloth. You can also blow it off with compressed air.

Attention: Do not wipe off all wax.

13.3 Protection of the wax film against weathering

After evaporation of the solvents in Stripping Wax TL and TL-SO or the drying of the water-based Wax TL-W you can use the formliner/mould. To avoid any damage by rain and weather to the wax film you should protect the liners with polyethylene or any light plastic covers. (Picture 28) If the wax film has been reduced or damaged it should be reapplied.

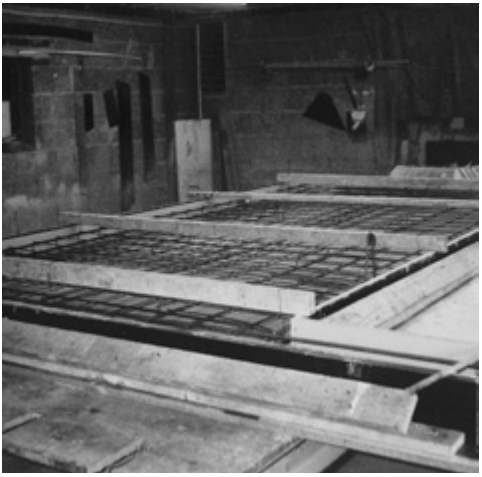
Note: You will find that a 'fan' spray will give the best and most even application of the Stripping Wax's TL and TL-SO. Make sure that your sprayer has solvent resistant gaskets.

27

28

29

30



14. SPACERS

Bar spacers that offer the largest contact areas should be used. Chair type spacers give a point loading and will press into the formliner (Picture 29) and will therefore show through the concrete. The minimum concrete covering over the reinforcement is always measured from the deepest point in the concrete surface. Therefore the bar spacers must be set onto the highest points of the formliner pattern.

It is of great advantage to hang up the reinforcement for avoiding a loading of the liners. (Picture 30)

15. CONCRETE CASTING

RECKLI-Formliners allow the use of all types of cement based concrete. When using external vibrators you should note that some of the vibration frequencies will be absorbed by the elasticity of the formliner. This can be compensated for by a longer vibration time.

16. STRIKING | STRIPPING

16.1 Striking/Stripping timing

It is easier to release RECKLI-Formliners within 24 hrs of casting. Specification and striking times for your particular application should overrule RECKLI`s suggestion.

16.2 Unfixed formliners

Formliners that are laid loosely in the mould will peel off of the concrete during stripping due to their weight. (Picture 11-13) If this should not happen due to the depth of pattern, peel off the liners carefully starting from a corner. Do not tear at the formliner, doing so could exceed its stretching capacity.

16.3. Adhered formliners

Release the pre-cast concrete elements from their moulds or the shutter from the concrete. The releasing of the element from the mould or the shutters from the concrete should be done slowly and carefully. You must allow the formliners time to stretch and release themselves from the concrete. They should need the minimum effort from you. (Picture 31-35) In every instance avoid the use of sharp or edged tools to hasten the stripping process as damage will be done to the formliners.

17. CLEANING

17.1 Formliner surfaces

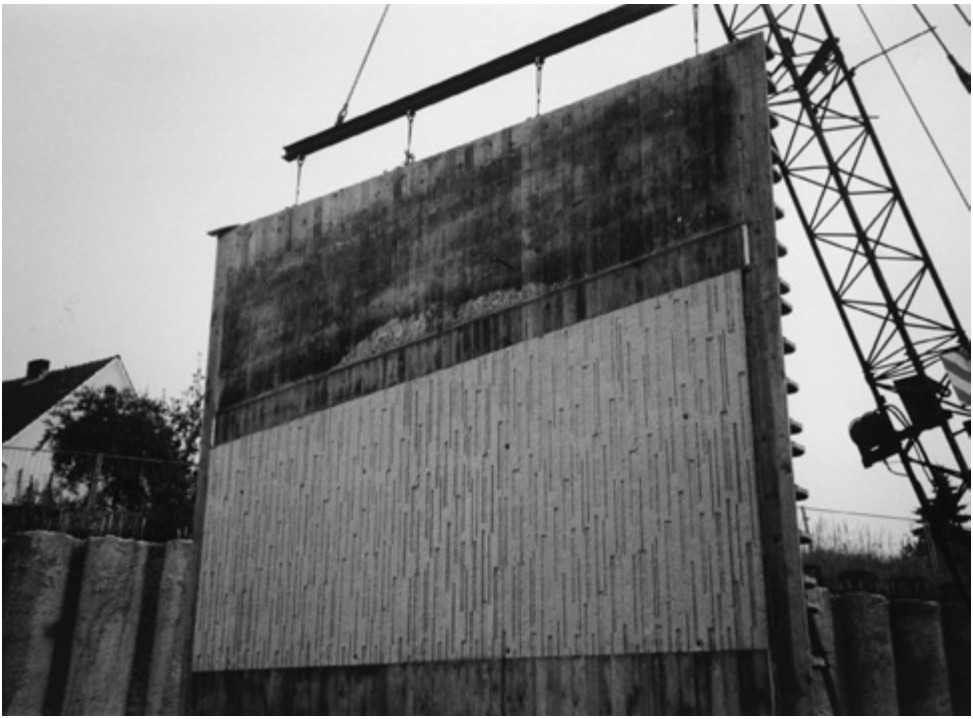
When the formliners are provided with the correct amount of Stripping Wax the formliner will be clean and ready for reuse after striking/stripping, reapply more Stripping Wax ready for the next cast. If, for any reason it becomes necessary to clean the formliner, take a dry, clean rag and soak it with the relevant Stripping Wax and clean off any cement splashes or dirt on the formliner.

31

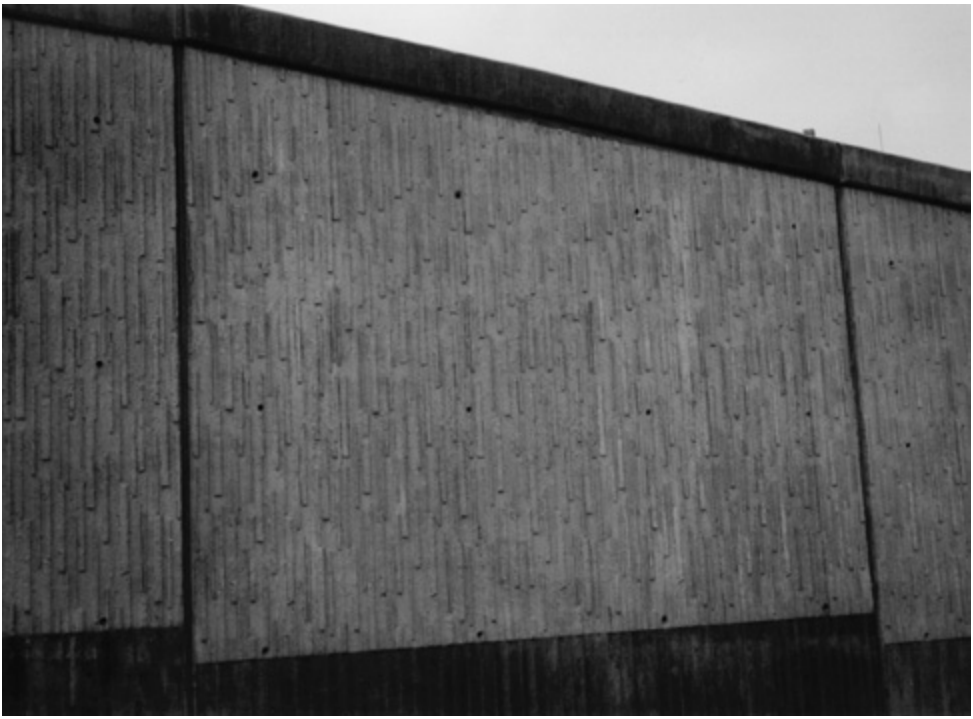
32

33

34



35



17.2 Tools and equipment

For cleaning tools and equipment after use, use RECKLI-EK-PU Thinner. Clean thoroughly while the formliner adhesive is fresh. Use a brush, it is not sufficient to lay the tools in the thinner. You will not be able to remove the cured 2-component material once it has hardened.

This product is **not** to be used for the cleaning of the formliner.

18. JOINTS | CORNERS | EDGES

18.1. Use of profiled fillets

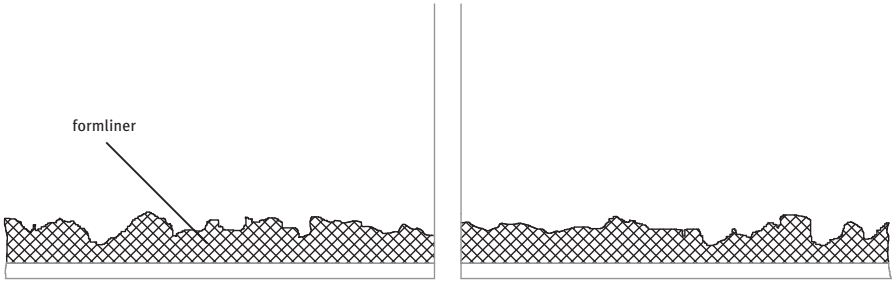
Profiled fillets for shaping corners, edges and joints should be considered. You must calculate the thickness of the profile as to what part of the pattern it is required to be aligned to i.e., top, middle or bottom. The thickness of the formliner back must also be considered. (see sketch 1-5) (Picture 36-39)

18.2 Formliner joints

When placing formliners with coarse or rank patterns side by side care must be taken to see that the joints from this operation are sealed correctly. RECKLI-Formliner Adhesive can be used after you have glued the formliner down. You can also use standard building One Component Silicone applied to the formliner when the adhesive has cured. We do not advise butting or mitring formliners together for 90° corners for such kind of patterns. They will never look good. Make a feature at the corners by introducing a plain band to the pattern, the corner will look sharper and straighter. The formliner will also have a straight line to finish to. (see sketch 6-9)

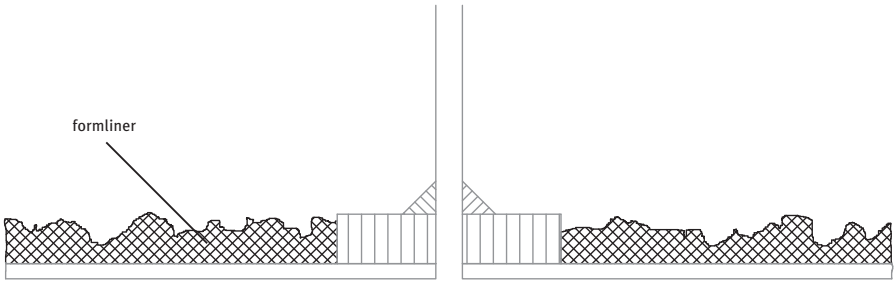
Of course for patterns with straight lines like ribs and waves it is of advantage to cut the liners mitred for 90° corners. (Picture 40+41)

SKETCH 1



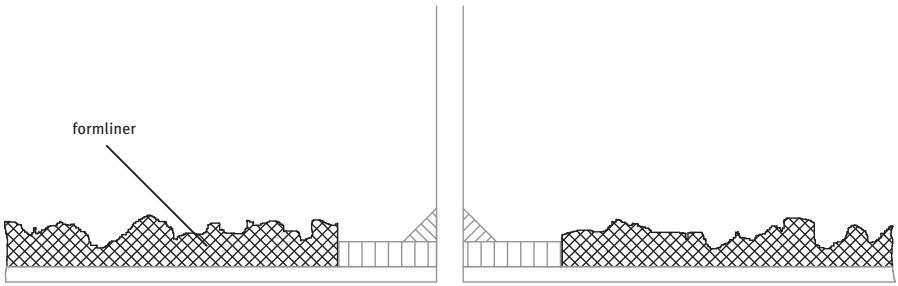
BUTT JOINT

SKETCH 2



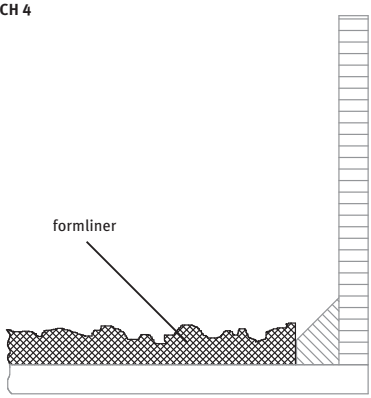
SMOOTH FRAME WITH CHAMFER DEEP IN CONCRETE

SKETCH 3



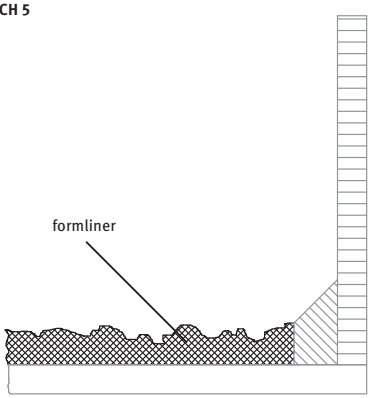
SMOOTH FRAME WITH CHAMFER HIGH IN CONCRETE

SKETCH 4



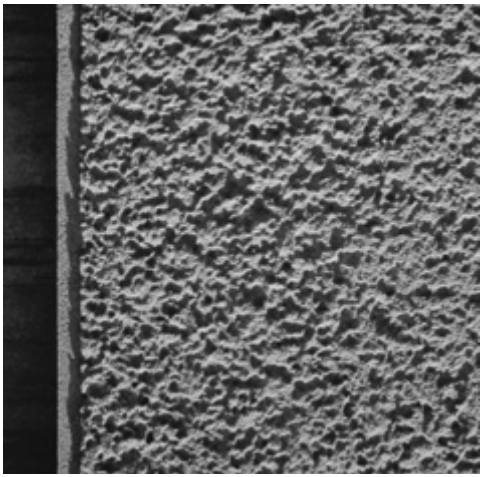
CHAMFERED COVE, HIGH IN CONCRETE

SKETCH 5



CHAMFERED COVE, DEEP IN CONCRETE

36

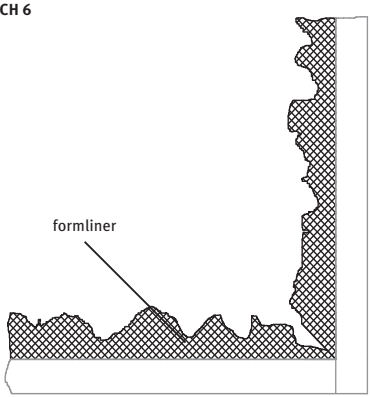


37

38

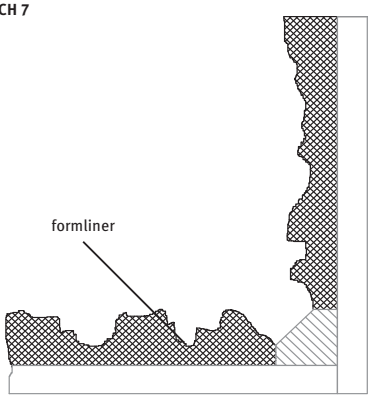
39

SKETCH 6



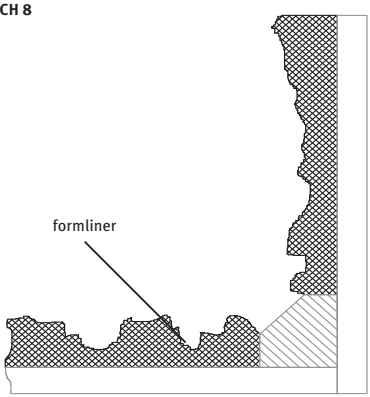
CHAMFER IN FORMLINER

SKETCH 7



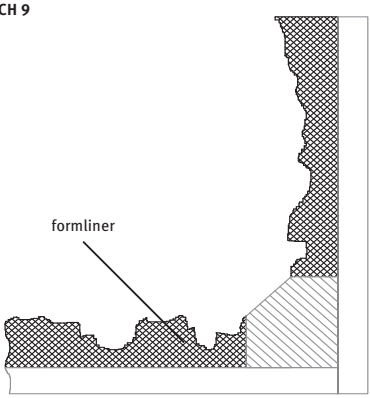
COVE WITH CHAMFER, HIGH IN CONCRETE

SKETCH 8



COVE WITH CHAMFER, MIDDLE IN CONCRETE

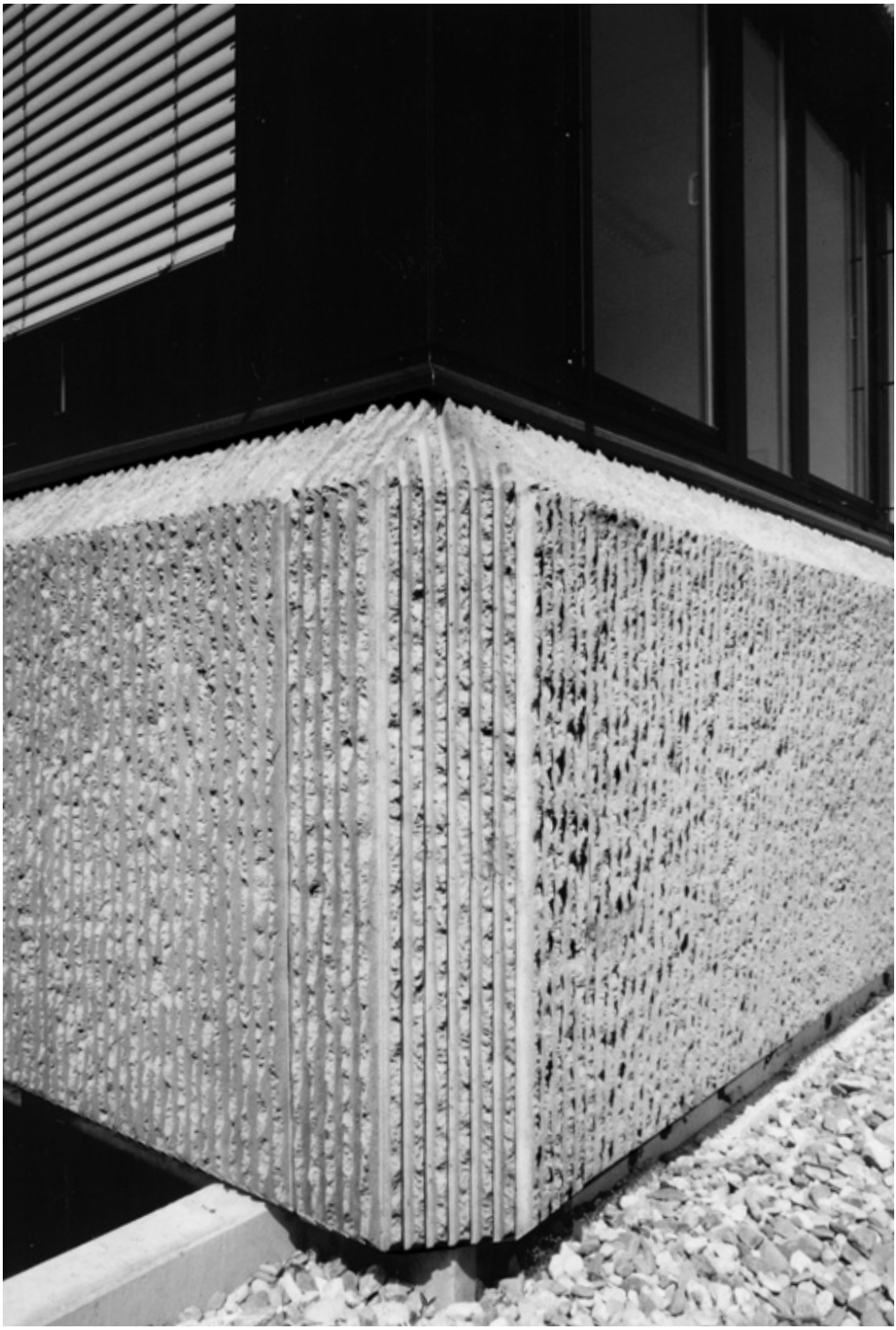
SKETCH 9



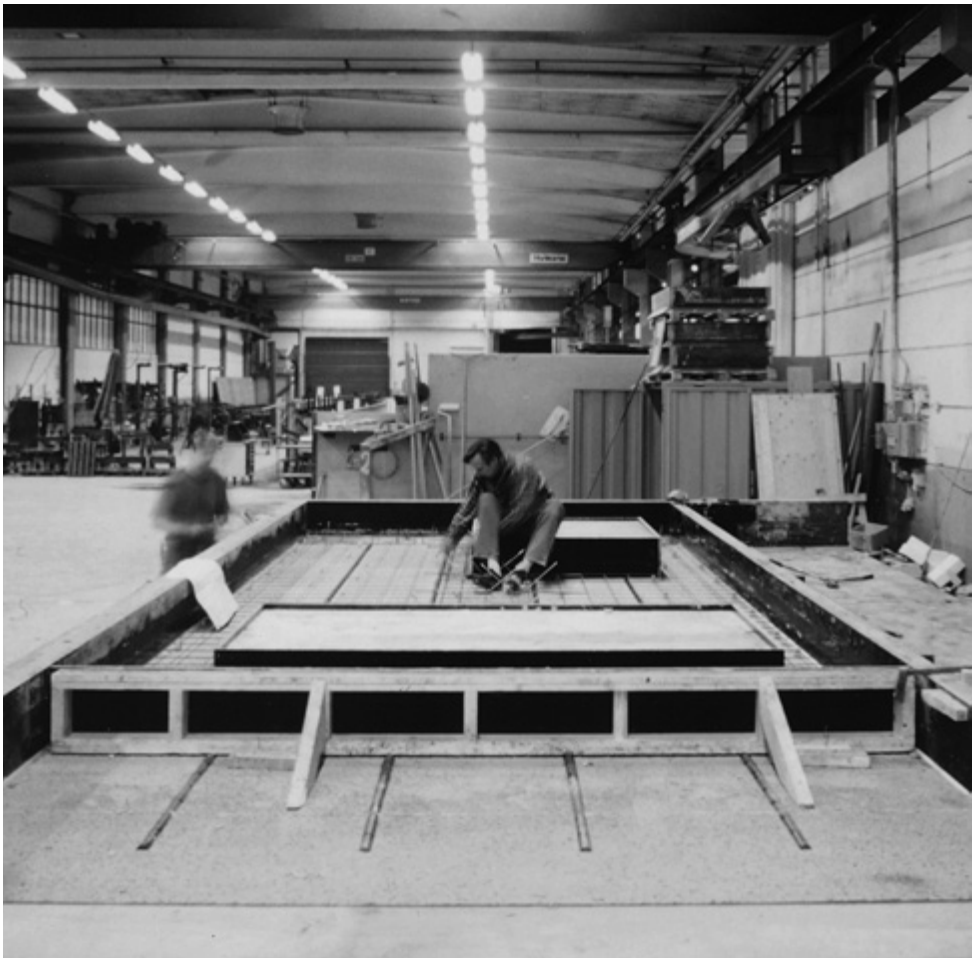
COVE WITH CHAMFER, DEEP IN CONCRETE

40

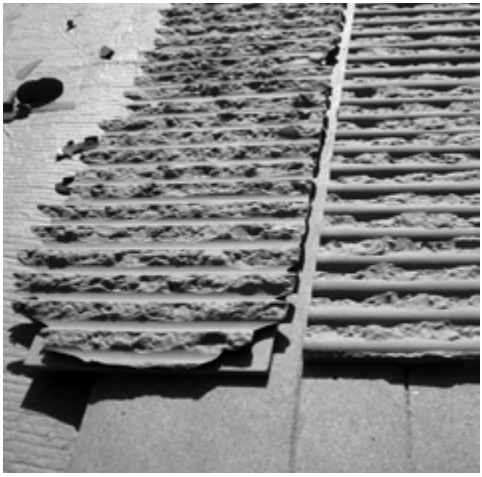
41



42



43



44

19. STOP-OFFS

19.1 Cut-outs

Pattern stop-offs for i.e. windows, doors or lighting can be formed by cutting out the shapes in the formliners and inserting a frame. This is suitable if the same openings are to be used in the same position for every use of the formliner. (Picture 42)

19.2 Pattern stop-offs using RECKLI-Stop-off Paste PUR

If they are to be used once or twice or the formliner needs to be used in a different position then RECKLI-Stop-off Paste PUR should be used. (Picture 43+44) Select the area for the pattern stop-off and paint on RECKLI-Mould Wax exceeding the area by at least 100 mm all round. On textures, shallow patterns deep ribs place a frame larger than the required stop-off. Use clay or Plastercine to fill in the space between the bottom of the frame and the pattern detail. On deep rib patterns, to save material block off with timber pieces. Paint the frame, clay, Plastercine with a coat of Mould Wax. Mix and pour the RECKLI-Stop-off Paste PUR inside the frame forcing the material into the pattern detail with a spatula. You can mix and pour wet on wet material to reach the required level which should be approx. 6mm higher than the highest part of the pattern. Place a clean dry board onto the fresh RECKLI-Stop-off Paste PUR making sure it is level. Leave to harden. When hardened remove from formliner and trim off surplus material for sharp square or cut bevelled edges.

19.2.1 Properties of RECKLI-Stop-off Paste PUR

RECKLI-Stop-off Paste PUR is a pasty elastic 2-component material. The mixing ration is 10:1 by weight. If using only part quantities from a drum the amounts of base solution and hardener must be weighed out, never mix by volume. For mixing use a slow speed electric drill with the correct mixing agitator. Mix only so much paste as you can work with within the pot-life. The pot-life is approx. 10-15 minutes depending on temperature. The curing time is approx. 1 hour. The consumption depends on the type of pattern. The specific weight is approx. 1.4 g/cm^3.

19.2.2 Removing of mould wax residues

To avoid different colours in the finished concrete, the area treated with RECKLI-Mould Wax must be removed and cleaned by using RECKLI-Stripping Wax. Soak a clean cloth with RECKLI-Stripping Wax TL, TL-SO or TL/W and wash and clean off the areas where the Mould Wax remains. If this procedure is not carried out carefully, colour differences in the finished concrete surface should be expected.

19.3 Inverted formliners

For symmetrical patterns (ribs or waves) you can use the same formliner pieces inverted for stop-offs. (Picture 10)

20. REPAIRING | PATCHING | EQUALIZING

20.1 Repair

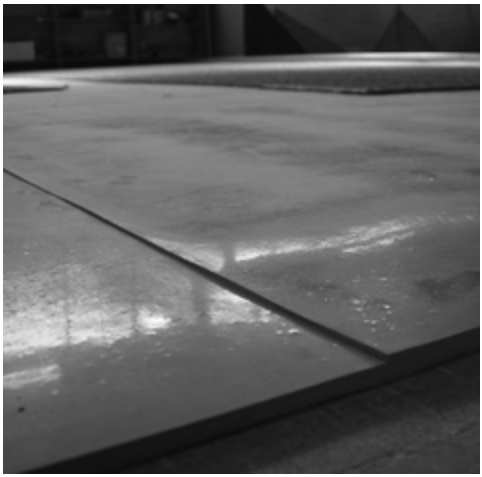
With RECKLI-Elasto Filler you can patch and repair damaged or torn formliners. To get a correct bonding of the Elasto Filler to the formliner the damaged area holes or tears must be clean, dry, dust, oil, wax and grease free. The area to be repaired or filled must be roughened by sand paper. The filler must be applied quickly and within the pot life time. Surplus material must be removed while the material is still fresh. Texture and shape modelling must be done also within the pot-life. Any hardened residue can be ground off after approx. 2-3 hours. After 4-5 hours you can load the repaired area. Tears and splits: Carefully clean and pre-treat the sides of the split or tear as above mentioned. Under the tear lay a piece of polyethylene to avoid unwanted bonding of the paste. Apply RECKLI-Elasto Filler to the sides of the tear and press the tear together. Surplus filler can be removed with cloth or spatula and is best removed while fresh. Cured filler you can only remove by sanding or cutting. After curing turn the liner onto its front side. Grind out 3-5 cm left and to the right of the tear line and approx. 3 mm deep. Fill this recess with the Elasto Filler and smooth it. After 2-3 hours hardening it can be ground level. Turn the formliner back onto its rear and apply RECKLI-Stripping Wax to the repaired area.

Note: We must categorically point out that a repaired seam cannot possibly give the same result as an undamaged formliner. There is always the possibility of the repaired formliner tear showing through in the patterned surface even when the repair has been carried out extremely careful.

20.1.2 Properties of RECKLI-Elasto Filler

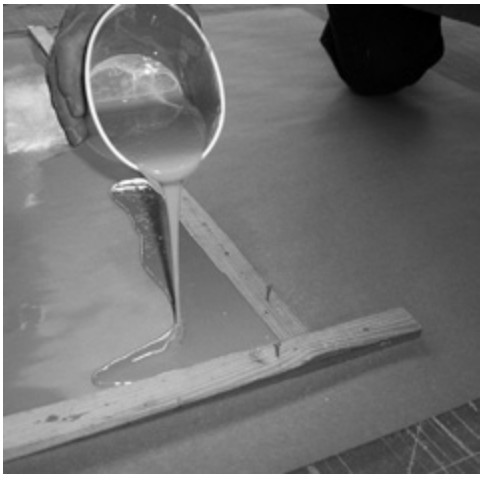
RECKLI-Elasto Filler is composed of 2 liquid components. The mixing ratio is 8:1 by weight. After mixing the hardener with the base component a thixotropic action will take effect after about 2-3 minutes. The thixotropic effect increases until the end of the materials workable time. In this time RECKLI-Elasto Filler can be used as a pourable material and as a filler. The pot-life takes approx. 10 minutes at + 18° C. The layer thickness can be up to 10 mm in one application. Consumption depends on the area to be repaired. The specific weight is approx. 1.4 g/cm^3.

45



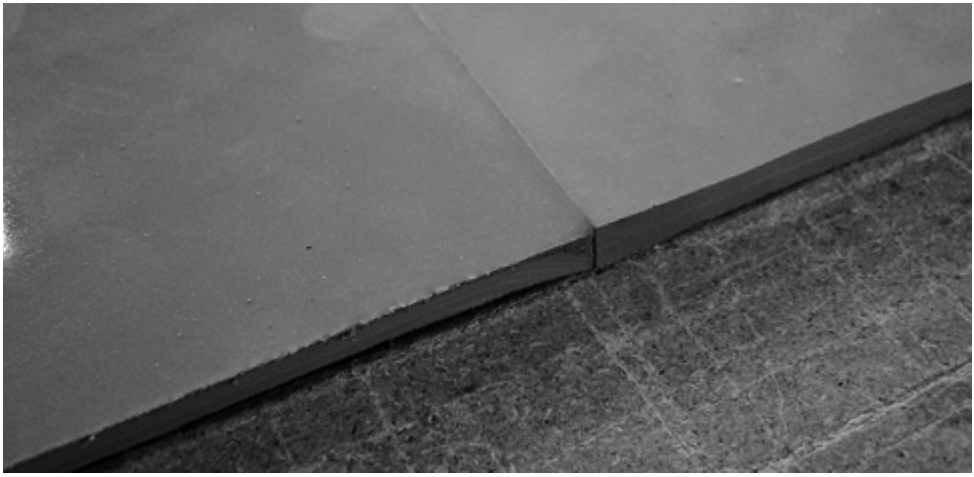
46

47



48

49



Note: To extend the workable time of Elasto Filler spread the mixed filler onto a board as a thin coat.

20.2 Equalizing of formliner rears

As already mentioned (see 9.) dimensional tolerances of some mm in the rear wall thickness of the formliners is unavoidable. (Picture 45) Therefore, sometimes it is necessary to adjust the thickness of the formliner rear. This you can do by grinding down the thicker one or by increasing the thickness of the thinner one. Turn the liners onto their pattern sides put them together and grind or sand down the thicker parts along the edges in a flat strip until you have reached the thickness of the thinner formliner. (Picture 46) Be sure to 'feather' away the grinding or sanding to the centre of the formliner so that you do not leave a step.

When the difference of the rear thickness' is too big, it could be easier not to grind the formliner down but to increase the thickness of the thinner one. Turn the liners onto their pattern side. Clean the area to be levelled by grinding or sanding this also acts as preparing the foundation. Place a piece of timber along the edge to be levelled to the required height. Paint the board with RECKLI-Mould Wax allow to dry and fix along the formliner edge which you wish to fill level. Mix the RECKLI-Formliner Adhesive SO (see 12.2) and pour it onto the roughened rear part of the formliner. (Picture 47) Being a liquid it should find its own level. Take RECKLI-Elasto Filler (see 20.1.2) for the levelling material when the area to be levelled is not too large. (Picture 48) After the Formliner Adhesive or the Elasto Filler has cured remove the board along the formliner edge. If necessary grade the repair into the formliner by grinding or sanding which will also remove any high spots. The formliner is now ready for use. (Picture 49)

21. WASTE DISPOSAL

RECKLI-Formliners are made from Polyurethane Elastomers. The code of the European Waste Register is 12 01 05.

22. PRODUKT & CONSUMPTION TABLE

22.1 Material – Please refer to the relevant technical pamphlets, too.

MATERIAL	APPLICATION	CONSUMPTION
RECKLI EK-PU Thinner	Cleaning of tools and equipment	Depending on the degree of contamination
RECKLI Elasto Filler	Repair of damaged formliners and equalizing of formliner rears	depending on the volume of damage or filling, $\gamma = 1{,}4$
RECKLI Formliner Adhesive SO	Adhesive for full entire surfaces on steel or timber and equalizing of formliner rears	approx. 750-1000 g/m²
RECKLI Stop-off Paste PUR	For making pattern stop-offs	Depending on the pattern, $\gamma = 1{,}4$
RECKLI Mould Wax	Release agent for RECKLI-Mould Paste PU and for steel or timber gauges while equalizing of formliner rears	approx. 150-200 g/m²
RECKLI Standardiser 100	Thickener for Formliner Adhesive for gluing on vaulted or curved surfaces	1-5%
RECKLI-Stripping Wax TL	Release agent for pre-cast concrete, contains solvent	approx. 100-150 g/m² depending on the pattern
RECKLI Stripping Wax TL-SO	Release agent for in-situ concrete, contains solvent	approx. 100-150 g/m² depending on the pattern
RECKLI Stripping Wax TL-W	Release agent for pre-cast concrete and in-situ concrete, water-based	approx. 100-200 g/m² depending on the pattern

22.2 Tools | Equipment

TOOL | EQUIPMENT	APPLICATION | USE
Boards / rips / laths	Restraining of formliner during and after adhering, boards for pressing into Mould Paste PU for stop-offs
Brush	Cleaning tools
Buckets	To decant after mixing 2-component material in original container
Circular grinder / belt grinder	Removing residue of adhesive film / grinding rear of formliner for better bonding / grinding of recesses for strengthening of repaired tears / equalizing of formliner rear
Cloth / rags	Removing of Mould Wax residues while using Mould Paste PU / soaking up of surplus of Stripping Wax
Gauging/pointing trowel	Scraping material from pails or drums
Hand circular saw	Cutting of formliners index 1/.. and pattern stop-offs
Marker-pencil	Marking of stop-off lines
Metal / wood straight edges	Straight edges for cutting liner index 2/..
Mixing paddle	For electric hand drilling machine for mixing 2-component material
Polyethylene	Protection of formliners and Stripping Wax application against weathering
RECKLI-Formliner Knife / hand panel saws	Cutting of formliner index 2/..
Sandpaper	Cleaning and sanding of formliners / removal of surplus Elasto Filler and levelling of repaired areas
Screw clamps	To apply pressure to boards while Formliner Adhesive cures / clamp preparation for peeling off of glued formliners
Serrated trowel	Spreading of Formliner Adhesive
Slow speed electric hand drill	Mixing of 2-component material
Spatula	Mixing and application of Elasto Filler, cleaning and pointing joint lines and smaller quantities of Formliner Adhesive
Spray	Application of Stripping Wax
Stanley or RECKLI-Formliner Knife	Peel off of adhered liners from form-work
Tape measure	Checking of formliner measurements
Weighing scales	Weighing out of smaller quantities of 2-component materials

RECKLI GmbH
Gewerkenstr. 9a
44628 Herne
Germany

T +49 2323 1706 – 0
F +49 2323 1706 – 50

info@reckli.com

RECKLI.COM