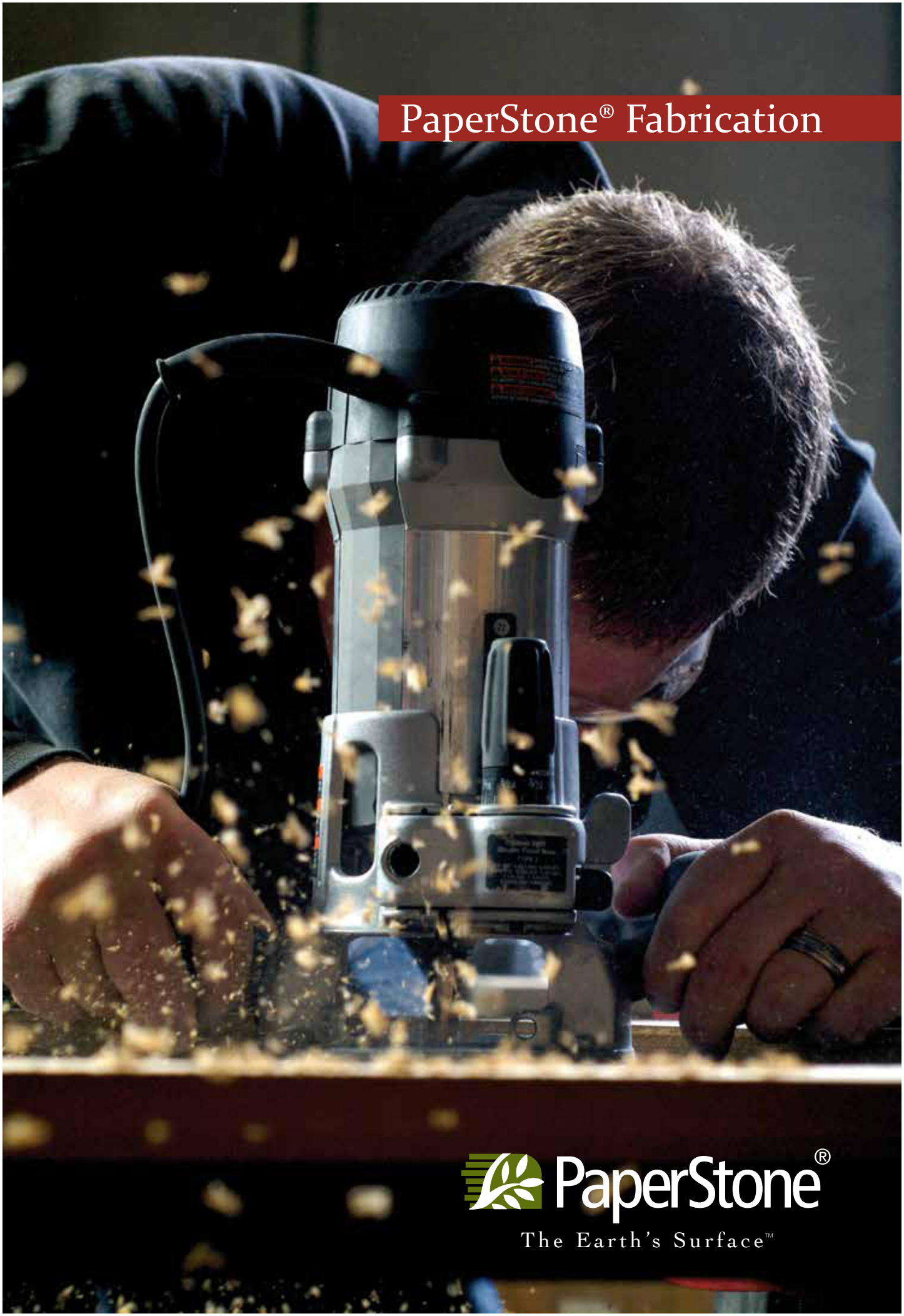
PaperStone® Fabrication



PaperStone®

The Earth's Surface™

PaperStone® Fabrication Guide

Techniques for working with PaperStone®

PaperStone® machines and finishes like extremely dense hardwood. Panels can be cut and routed with carbide-tipped shop tools. However, all fabrication techniques should be tested by the individual fabricator as installations may have varying parameters that can affect the performance of joints and/or laminations.

These guidelines do not imply a warranty of any kind and are superceded by the PaperStone® material warranty.

About PaperStone®

This is how PaperStone®begins

Recycled paper and old cardboard container paper is fully saturated with a pigmented PetroFree™ resin, then dried to a "B" stage paper (tacky but not sticky). Because of the natural characteristics of recycled paper, not all saturation levels are the same across the sheet. Unlike virgin fiber, this *flocculation* is what gives PaperStone® its unique, mottled look. Both the mottling and speckling of PaperStone® are enhanced by sanding away the surface micro-textured resin layer.

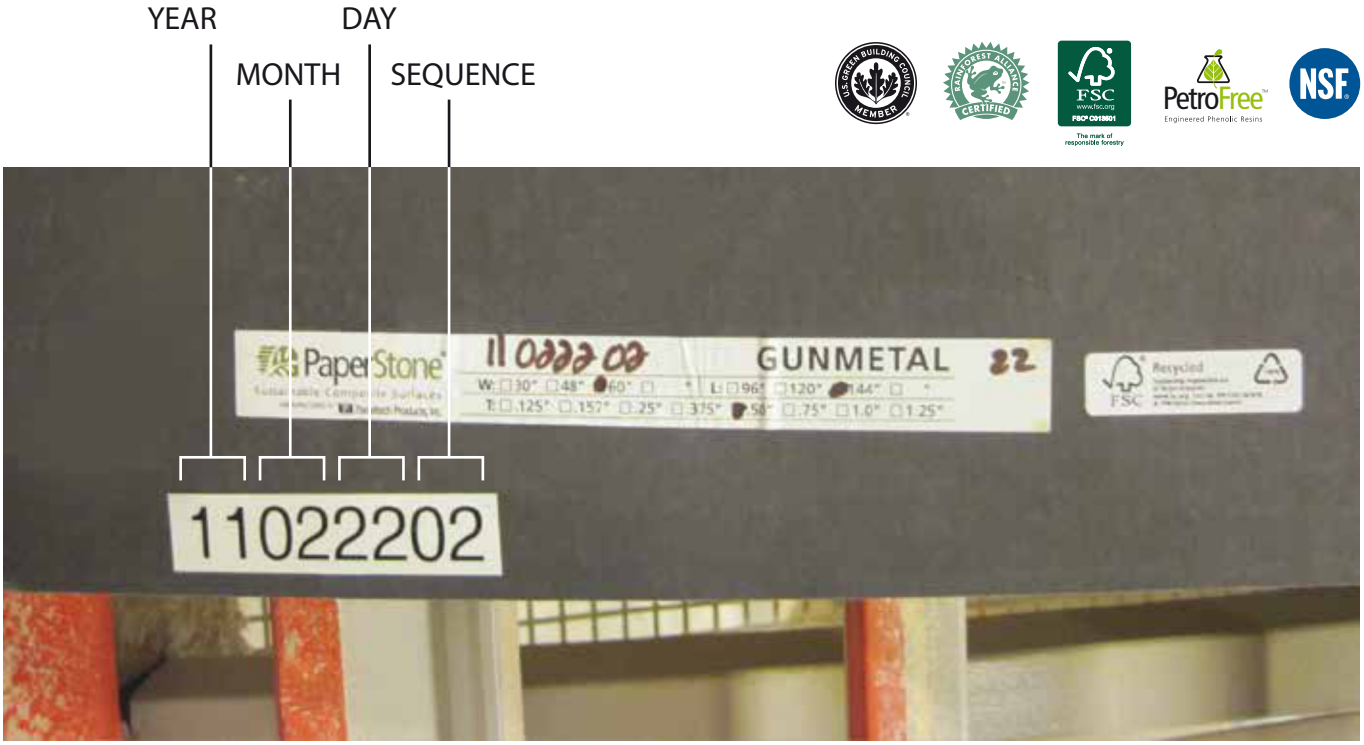
- Stacked layers of post-consumer recycled paper that have been saturated with petroleum-free resin and pressed under heat and pressure into a solid sheet.
- No thermoset process means no off-gassing.
- Using pigments rather than dyes assures superior color stability.

Storage and Handling

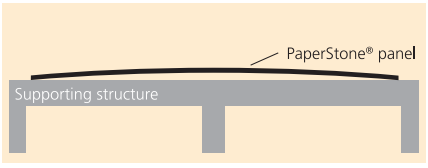
- Store between 40° and 80° F
- Do not overstack
- Store flat, DO NOT store vertically on edge

Panel identification by label and serial number

Each single PaperStone® panel is trackable thanks to a serial number



The "crown" should face up like this



Not down like this

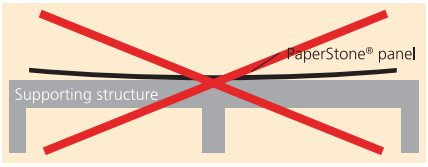


Fig. I

When the worktop is attached to the support frame of the cupboard, the crown will straighten and become level with the frame.
In any case, the crown will not protrude more than 3,1 mm (on a total length of 75 cm).

Preparing a PaperStone® panel

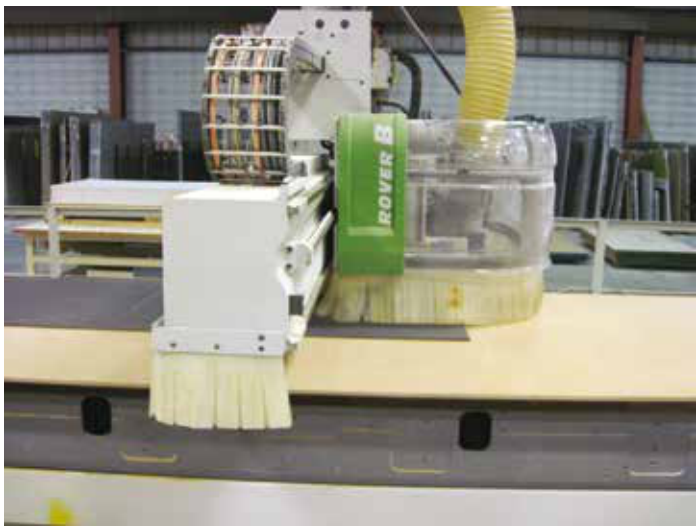
- Check both sides of the panel to determine whether there is a preferable side for the top.
- Take into consideration whether or not the surface has a visible grain direction.
- If seams are necessary, determine where they will be.
- Sometimes a natural "crown" forms in the material. This is not a problem.
  Make sure that the crown of the countertop is facing up = At this point the weight and mechanical fixing of the countertop to the structure will ensure that it aligns perfectly to same. [Fig. I]

Cutting PaperStone® panels

PaperStone® machines and finishes like extremely dense hardwood
PCD diamond tools are the most suitable for working on PaperStone ®.
If well sharpened, it is also possible to use Widia-HM tools
To avoid burning the material, do not stop the blade until the cut is complete.
Burn marks can be removed by sanding, but it's always better to avoid them.

Recommendations for CNC tools

PCD Diamond or Widia-HM tools for working with a router



- 18000 rpm
- Forward speed 762 cm per minute
- Fast cutting movement … if you can see burn marks you are cutting too slowly.

Layout

Layout the worktop as you would for any other solid surface project.

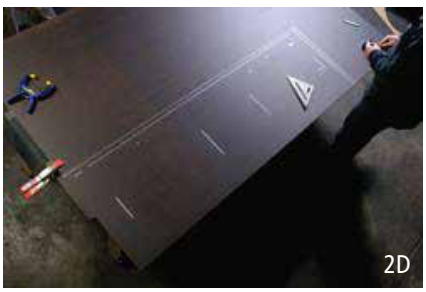
Transfer the template to the PaperStone® panel

- Locate the best position to cut on the panel so as to make optimum use of the material [Fig. II]
- Position the template on the panel [2B] or [2C]
- Trace template onto the panel and mark all internal cut-outs [2D]

Mark the outlines of any sinks, stoves or holes for taps on the PaperStone® panel

- Carefully position the sink and stove templates and draw round them [2E] and [2G]
- Check the number of holes for the taps and their diameter (usually approx. 3.5 cm) – mark correctly in relation to the sink template [2F] and [2G]

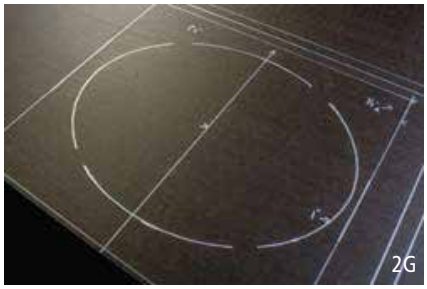

2B


2D


2F


2C


2E


2G

Check all measurements before cutting. Before using any tools, read the manufacturer's safety instructions. Always wear protective eyewear

Preparing a built-up edge

• A PaperStone® built-up edge profile is 2 strips adhered to a PaperStone ® panel, each with a thickness of 10 mm and a width of 25 mm, thereby obtaining a front profile with a thickness of approximately 30 mm that is easy to customise with subsequent routing.

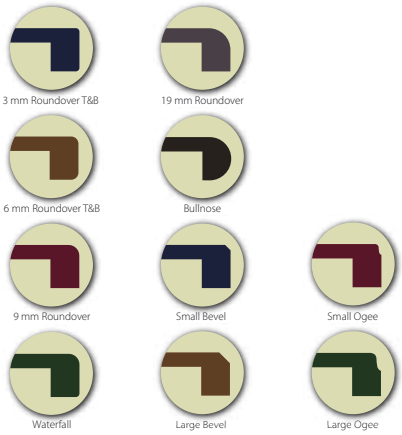
Backsplashes [optional]

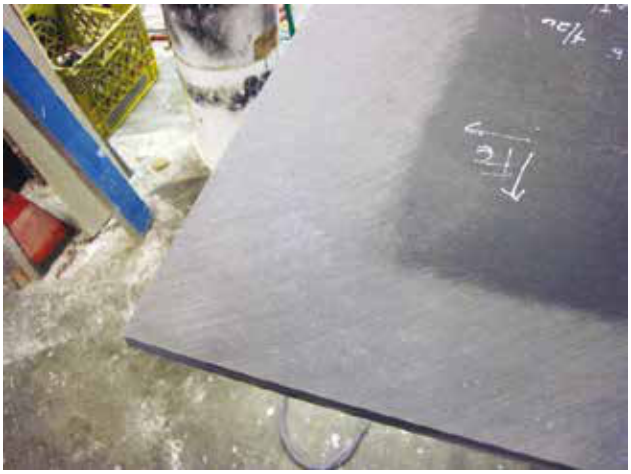
- Pre-mount backsplashes (check to ensure there are no gaps between countertop and backsplash or wall and backsplash) (scribing of the wall side of the backsplash is possible, but it can be a challenge)
- Remove backsplashes
- Mark correct length and cut to size (45º/butt cut)
- Apply a thin bead of silicone adhesive to underside and back of backsplash (hot glue if not using a fast-setting epoxy)
- Mount backsplash on top; clean any excess adhesive
- Allow adhesive to cure according to manufacturer's instructions

IMPORTANT!

To correctly glue the edge, all of the surfaces **MUST be sanded beforehand** (see pictures on right).

Typical PaperStone® built-up edge profiles





Using a sanding belt with 60/80 grit sandpaper, remove the layer of resin on the surface to be glued. Sand down to the level of the paper.

Gluing with epoxy adhesive

The epoxy adhesive is a bicomponent specifically designed for seaming PaperStone®

fig.1

We recommend using epoxy adhesive available in 400 ml and 50 ml sizes *(page 11)*.
This adhesive sets in about an hour, depending on the room temperature. Clean all surfaces to be glued with methylated spirits *(fig. 1)*.
When using a new cartridge, purge a small amount of adhesive directly from the cartridge to be sure both sides are ¬flowing. Affix the mixing tip to the cartridge and purge the adhesive onto a paper towel. This insures that the adhesive is well mixed prior to gluing. Tips can only be used once.

N.B.: As with any type of epoxy adhesive, it is important to wear protective gloves and avoid direct contact with skin.

Epoxy glue guns examples

- **Mixing gun for 400ml adhesive - Cox M 300LV**

Available on Amazon.com
type Cox M300LV in the search box

- **Mixing gun for 50ml adhesive - Cox MP25**

Available on Amazon.com
type Cox MP25 in the search box

Attaching the built-up edge and gluing to the MDF structure

- Attach the edge with 10 cm spring clamps (Pony spring clamps are fine), one every 10 cm, and leave until the adhesive is dry (about 1 hour).

IMPORTANT: when gluing side B of the PaperStone® panel to the external MDF frame using epoxy adhesives, it is necessary to sand down the PaperStone® surface in advance, using 60/80-grit sandpaper, and to clean it with methylated spirits before starting to glue.

Attaching the backsplash

- It is possible to produce backsplashes with PaperStone®; however, some colours may vary when cutting the end of the material.

Adhering PaperStone® to MDF Substrate with a Built-Up Edge*.

Instructions for attaching 2-3 mm PaperStone® material to 19 mm MDF substrate with a built-up edge making the countertop appear full thickness.
(*Materials like hardwood, metal, or other edging options may also be used.)

Step 1 - Planning, preparation and cutting countertop panels to size

- Make a detailed drawing of the countertop configuration including precise measurements
- Select materials: 2-3 mm PaperStone® panels, 19 mm MDF, tools, adhesives, fasteners, finishing materials
- Determine the type of seam for a built-up edge before cutting panels to size (mitered seam, flush seam, contrasting color strip) or other edge options like hardwood, metal, etc.

Positioning

Before cutting, lay PaperStone® panel on a flat surface. If any crowning is evident, make sure it faces up (Fig. A) and the panel ends come in contact with the MDF substrate.

*Any crown in the material should face **up** on a countertop and **out** on a built-up edge*

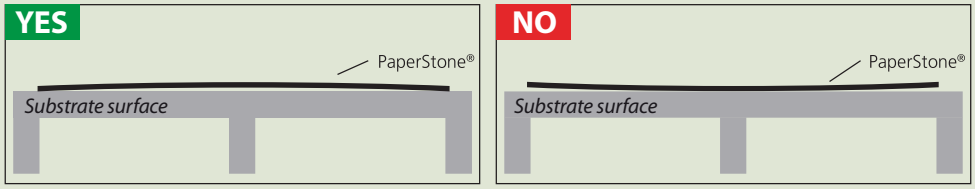


Fig. A

• Transfer drawing measurements to PaperStone panel and cut countertop pieces to size.
Allow enough overhang of material for built-up edge.

Surface Preparation

For optimum bonding, ***pre-sand the underside*** of the PaperStone® panel with 60-80 grit sandpaper, then clean the sanded surface with acetone or lacquer thinner to remove any oils or other substances that could interfere with adhesion.

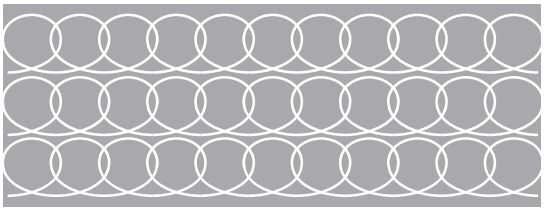
Step 2 - Selecting and applying adhesive

Always follow adhesive manufacturer's application recommendations.

Adhesives recommended for large areas:
• Contact cement with Epoxy (3M Scotch-Weld™DP 105 or Araldite® 2011) on edges and corners
• Copolymer adhesive (Emmebi Emmevil KS-215 with 1030 hardener)

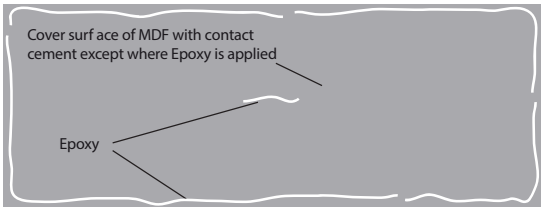
Adhesives recommended for smaller areas:
• Contact cement (for example: Bostik)
• Construction grade adhesives/sealants for glass or steel
• Urethanes and Structural Polyurethane Glues
• Silicones (for example: Silicone Building & Glazing Sealant)

Epoxy, silicone, polyurethane or urethane adhesives should be applied in a 3-inch circular pattern (Fig. B) on the MDF surface.
When PaperStone is placed on top, the adhesive spreads under pressure creating a natural suction, which helps achieve a stronger bond.
Panel must be clamped or weighted while drying..



Epoxy, silicone, polyurethane or urethane applied only to MDF surface. Fig. B

With contact cement, coat both surfaces to be adhered.
Apply with a roller or brush to cover the underside of PaperStone® panel and top of MDF surface (Fig. C).
Allow to dry according to manufacturer's directions.
When adhering pieces coated with contact cement, use cardboard stand-off strips.
Once contact is made between coated surfaces they cannot be moved.
With contact cement, it is not necessary to use clamps or weights.



Contact cement applied to MDF surface **and** underside of PaperStone® panel. Bead of Epoxy applied only to MDF perimeter and center. Fig. C

These adhesive types are not recommended for bonding PaperStone® to MDF:
Polyvinylacetate PVA's (white glue, yellow glue), acrylics, latexes, caulks

Step 3 - Clamping and/or weighting

When using adhesives other than contact cement, PaperStone® will need to have moderate pressure applied to adhere properly. After gluing, clamps and/or weights should to be applied while drying. More weight may be necessary if the panel is crowned. Use enough clamps and/or weights to insure complete contact. Leave in place long enough to allow the adhesive to cure properly (usually 24 hours.)

If using contact cement only, sufficient drying time is 1 hour. With contact cement and Epoxy on edges and corners, sufficient drying time extends to 4-6 hours..

Installation Considerations
After curing, the edges may be routed and the material may be worked as needed with conventional woodworking tools such as routers and laminate trimmers.

Step 4 - Built-up edges: Option 1

Adhering 2-3 mm PaperStone® edge to MDF
Positioning
If there is a crown on the PaperStone® material make sure it is **OUT** when adhering edge pieces.

Surface Preparation (for 19 mm countertop substrates)
Glue and/or screw a strip of MDF or particleboard to the front underside of the countertop to provide a bonding surface (Photos 1 and 2; Fig. D).

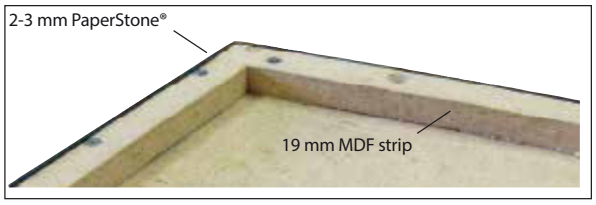
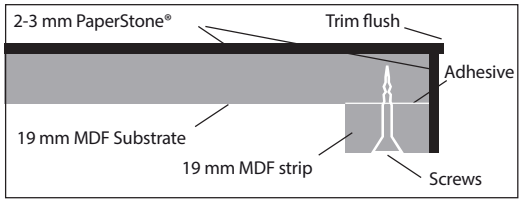


Photo 1

Photo 2

MDF Built-up Edge:



Detail:

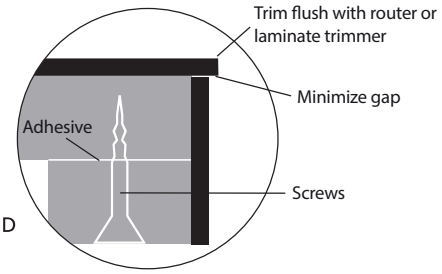


Fig. D

Measure, cut and glue PaperStone® edge strips

- Cut strips from 2-3 mm PaperStone® material to length.
- Glue edge strips to built-up MDF edge with contact cement or Epoxy, clamp, allow to dry and trim countertop edge flush with router or laminate trimmer (Fig. D).

Built-up edges: Option 2 Use 10-13 mm PaperStone® for edging **without MDF strip**

Positioning

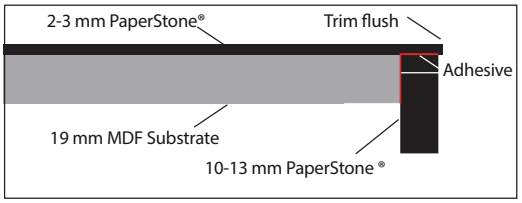
If there is a crown on the PaperStone® materiai make sure it is **OUT** when adhering edge pieces.

Measure, cut and glue PaperStone® edge strips

- Cut strips from 10-13 mm PaperStone® material to length.
- Apply Epoxy adhesive* to the edge of the MDF substrate and the underside of the 2-3mm PaperStone® material that is overhanging the substrate. Clamp and allow to dry, then trim countertop edge flush with router or laminate trimmer (Fig. E).

** If using contact cement, apply to PaperStone® edge strip AND countertop edge surfaces, allow to dry then adhere. For Epoxy, use 3M Scotch-Weld™ DP-105. DP-105 requires a common 2-part applicator gun (page 6)*

PaperStone® Built-up Edge:



Detail:

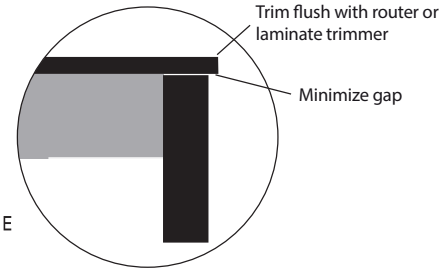


Fig. E

Recommended adhesives for the various applications

Installing PaperStone® requires different types of adhesives for each specific application, for example, an adhesive that is perfect for seams is not suitable for gluing sandwich panels. This table, following careful research, shows the adhesives that work best for the various types of PaperStone® applications. Remember that regardless of the adhesives and their use, the surface to be glued must be sanded with 60-80 grit sandpaper.

STRUCTURAL JOINTS 45° end/ end – 45° constructing baths and gluing PaperStone® panels with PaperStone®

3M Scotch-Weld DP-105 Epoxy adhesive - cartridges of 400 and 50 ml

ASSEMBLY WITH WOODEN PLUGS OR METAL INSERTS to be glued under the sink edge and used to install the undermount sink

3M Scotch-Weld DP-105 Epoxy adhesive - cartridges of 400 and 50 ml

GLUING SANDWICH PANEL with CHIPBOARD interior - MDF EXTERIOR - POPLAR PLYWOOD - PURENIT

AKZO NOBEL EPI 1920/1993 Bicomponent adhesive in tubs of 25 kg *

N.B.: with 15% hardener to qualify as class D4 and be H2O resistant, amount applied 150g / m2 pressing temperature 50° - pressing time 5 min.

** with a Purenit interior glue with a pressing temperature of 20 ° and a pressing time of 60 min*

Edge-finishing

Step 1
Remove any excess adhesive and finish edges with a router and straight edge.

Step 2
Rout the selected edge profile.

Typical PaperStone® built-up edge profiles

Preparing the seams

Wavy bit for seams

(Optional. Requires knowledge acquired through specialised training).

The use of a wavy bit for seaming is an excellent technique for aligning the panels and creating high resistance during the gluing procedure. However, specialised training and experience are essential.
If you do not have the necessary knowledge to use a wavy bit, we advise you to not use this technique on PaperStone®.

Cam lock system

This seaming system (see fig. A-B-C-D) can be used on kitchen worktops with a thickness of 19mm, using elements such as Maxifix 35, which is produced by the company Hafele (www.hafele.com).
If the worktop has a thickness of less than 19 mm it is necessary to build it up as shown in fig. C

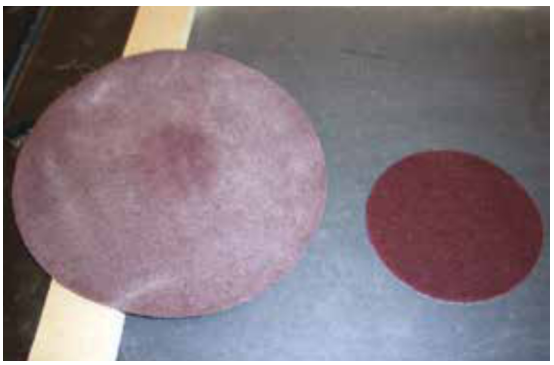
Shaping by trimming and adaptation

Join the worktops and shape by trimming

Finished seams and final sanding

Before sanding, read how to prepare the surface, options A and B, on page 16.
Also see the details in the finishing product instructions on pages 16 and 17.

Preparing the surface for the finish



- With an orbital sander and 120 grit sandpaper, remove any resin build-up around the seam on the front edge of the worktop.
- Clean the surface with methylated spirits between each step.
- Now use the orbital sander with 180 and 220 grit sandpaper, followed by the application of ScotchBrite™ 7447
- **DO NOT TOUCH with bare hands before applying the finish.**
- **Attention, a deep sanding, changes the natural finish, creates an uneven and spotted staining .**

Waxing required for kitchen and bathroom worktops and horizontal surfaces subjected to high stress

Finishing products and recommendations

While any oil or wax-based wood finish may be applied to PaperStone®, we recommend Osmo® TopOil and Bee's Wax®. These finishes deepen the colour of the panel and add a soft lustre to the appearance.
Osmo® Top Oil is a neutral treatment made with natural vegetal oils and waxes.
It protects surfaces from substances commonly used in domestic environments.
Bee's Wax® is a natural treatment product. Suitable for contact with food, it cleans, maintains and restores surfaces.

Before applying OSMO® TopOil, follow the following steps

1. Prepare the worktop surfaces as described in options A or B, depending on the desired visual effect and finish…

Option A: ScotchBrite™ (maintains the natural PaperStone ®surface)

If necessary, finish the PaperStone® surface with a ScotchBrite™ 3M 7447 pad or a similar product to remove dirt and evidence of the work carried out.
The pads can be used with an orbital sander or manually, ensuring that the entire surface is treated evenly
Attention: apply minimum pressure to the pad so as to not change the original finish and bring to the surface an uneven and spotted staining.

Option B: Sandpaper (eliminates the original PaperStone® surface, giving the worktop a smoother , shinier appearance and a more mottled coloring)

Sand the PaperStone® surface with 180-220 grit sandpaper using a vibrating orbital sander or manually, making sure that you treat the entire surface evenly
N.B.: depending on the condition of the worktop surface, sand with coarser sandpaper to remove marks or scratches, then pass over the surface again with 220 grit sandpaper.
Finish with a ScotchBrite™ 3M 7447 pad.

2. Clean the surface with water (or methylated spirits) and leave to dry after each sanding.
3. DO NOT TOUCH with bare hands before applying the finishing product
4. Apply the OSMO® TopOil

The complete application instructions are on the next page>>

Finish Guide [continued]

We recommend spraying on a coat of The Original Bee's Wax® furniture polish to provide further surface protection after the final application of OSMO® TopOil is cured. The Original Bee's Wax® may also be reapplied weekly or more frequently as a maintenance coat. The surface shouldn't show fingerprints and it doesn't leave a wax build-up.

Detailed Finish Application Steps

Fabricate the PaperStone® panels in accordance with instructions in the Fabrication Guide

You may choose to prepare the countertop surface and edges in the shop prior to installing the countertop, or you may install the countertop first and then prepare the surfaces. The steps to prepare the surface and apply the finish are as follows:

1. Sand the exposed countertop edges with 180 grit sandpaper, followed by 220 grit sandpaper.
2. Prepare the countertop surface with chosen option A or B.

Scotch-Brite™ option A [2U]

- This option will maintain PaperStone's natural micro-textured surface.
- Sand the PaperStone® surface with a maroon non-woven pad (*7447 Scotch-Brite™* or similar product) to achieve an even surface treatment. Non-woven pads can be used with a vibrating orbital sander. Be sure to treat the entire surface evenly.

Sanding option B [2V]

- This option will produce a smoother PaperStone® surface.
- Sand the PaperStone® surface with 220 grit sandpaper using a vibrating orbital sander. Be sure to sand the entire surface evenly.

NOTE: Depending on condition of top surface, sand with coarsest required grit to remove any rub marks or scratches, then work up to 240 grit sandpaper.

- Finish with a maroon non-woven pad

3. Clean surface with water (or denatured alcohol) and allow to dry after each sanding step.
4. DO NOT touch the prepared surface with bare hands prior to finish being applied.
5. Once the surface is clean, dry and free of any dust, apply a coat of the OSMO® TopOil to the installed countertop using a soft, clean cloth. Rub the finish into all exposed areas, spreading evenly and generously in a circular motion to ensure consistent coverage.
6. Wipe off excess finish; then continue buffing with clean cloths or towels. Buffing should continue until finish no longer changes appearance. Keep changing cloths and wiping until you can no longer see fingerprints when the surface is touched.
7. Allow first coat to dry at least two hours.
8. Apply a second coat of the TopOil and allow to sit overnight to fully cure prior to use *(at least 8 -10 hours)*.
9. After the final coat of OSMO® TopOil is cured, spray on a liberal amount of The Original Bee's Wax®. Wipe onto the entire surface, ensuring it is spread evenly. Then wipe off the excess using a soft, cleancloth towel until the appearance of the surface no longer changes. Allow to dry for a few minutes. The surface should not show fingerprints when touched.
10. Refer to the PaperStone® Care & Maintenance Guide for usage, cleaning and maintenance guidelines.

Finishing products and recommendations (continued)

OSMO® TopOil 3058
Preventive treatment for bathroom and kitchen countertops using a fabricator

OSMO® TopOil is a clear matte finish that is long-lasting and microporous, ideal for kitchen worktops and general interior furnishings (table tops and furniture). The Osmo® TopOil surface is extremely resistant and hard-wearing.
Once dry, the finish is moisture and stain resistant.
Dirt can be easily removed.
It is applied in two or three thin coats with a lint-free cloth or cleaning paper. It is easy to reapply, even partially. It is enough to clean and re-treat the worn areas. It is not necessary to sand the surface again. There is no need to repair or remove previous finishes before applying Osmo® TopOil. Use clean, lint-free cloths to apply the product on PaperStone®. To avoid scratching, do not use any kind of brush. It is important to remove any excess product to avoid PaperStone® absorbing it, thereby ensuring an even surface without rings.

How to apply:
1. Make sure that the surface is clean, dry and dust-free. Apply one coat of OSMO® TopOil to the installed surface, using a soft clean cloth. Apply the product to all visible areas, distributing it evenly and thoroughly with circular motions to ensure that the surface is uniform.
2. Remove any excess following the direction of the grain; continue to polish with soft cloths or sponges until there are no visible differences. Continue to change cloths and clean until there are no marks.
3. Leave the first coat to dry for at least two hours.
4. Using the same procedure, apply a second coat of Osmo® TopOil and leave to dry over night before using the surface (minimum 8-10 hours), making sure that the area is well ventilated.
N.B.: It takes a week for OSMO® TopOil's crystallisation process to be complete. The surface will only be fully protected after this period.

For particular uses such as shower trays, trellises, shower cubicles or steps, we advise the use of Bee's Wax®, following the same procedure described above for Osmo® Top Oil.

Bee's Wax® Spray
Maintenance and restoration treatment to be carried out by the final user.

The Original Bee's Wax Polish requires NO buffing. Simply lightly spray and wipe mooth. It has NO wax buildup over time and it leaves NO fingerprints! It is never greasy.

For more info please see our "TECHNICAL VIDEOS" on YouTube

click to see the video

PaperStone® Finishing Video

click to see the video

PaperStone® Refinishing Video

For further information on how to use the product, carefully read the instructions on the back of the spray

Waxing the worktop

Finished project

Kitchen and bathroom worktops must always be treated with Osmo® TopOil.
The treatment must be carried out with a double application on the top, bottom and edge of the countertop.
This product makes cleaning easier and acts as an insulating film, protecting the worktop from temperature changes and substances commonly used in the home

Incorrect seam
(without sanding)

- The surfaces were not sanded correctly before gluing, leading to weak cohesion and therefore a weak seam (see page 5).

Correct seam

- This photo shows how a correct edge seam leads to the panel breaking before being glued.

Installing the worktop

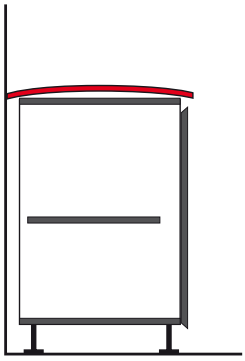


Fig. 1

If the PaperStone ® panel is slightly curved, we recommend that the panel is placed with the "crown" facing up. (see Fig. 1)

At this point, the weight of the panel and its subsequent attachment to the structure will ensure that the worktop is perfectly aligned with the feet of the cupboard. (see Fig. 2)

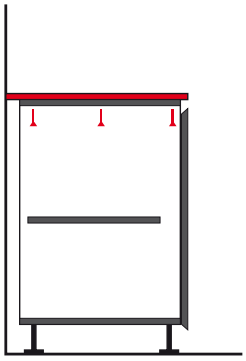
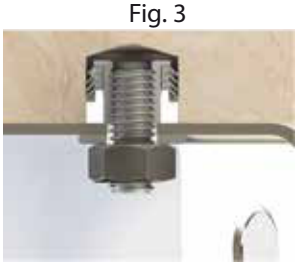


Fig. 2

Fig. 3



Proceed with attaching the PaperStone® worktop to the structure, using threaded inserts such as the Keep-Nut produced by Specialinsert srl (www.specialinsert.it), selecting those which are most suitable for the thickness of the worktop and therefore for the possible insertion depth of the socket (Fig. 3).

The three inserts must be positioned as follows: as close as possible to the back; in the centre; close to the front edge. (Fig. 4)

As you move around the kitchen, the inserts must be placed, depending on the modules, every 60-90-120 cm, as shown in the floor plan (Fig. 5).

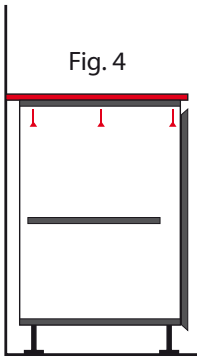


Fig. 4

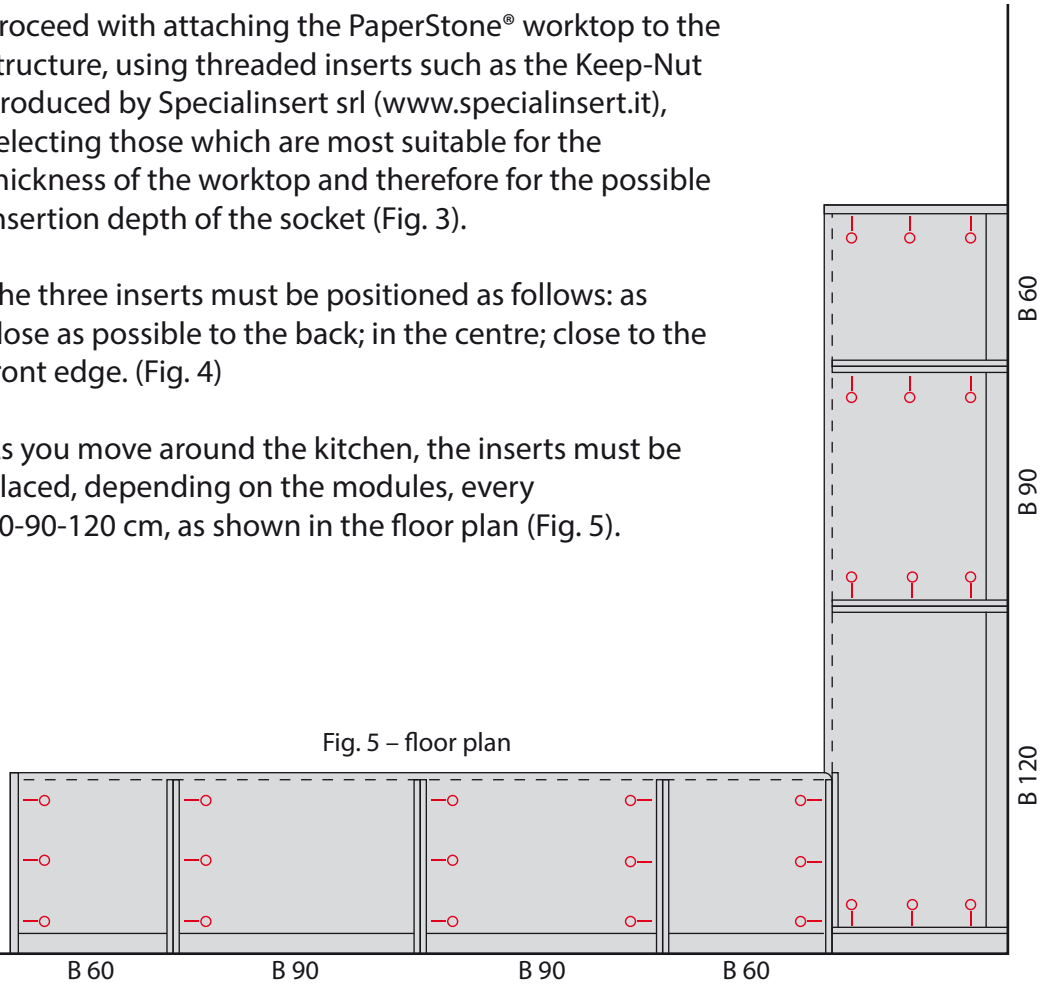


Fig. 5 – floor plan

Troubleshooting

- **OVERSANDING**
  Oversanding will create an undesirable pattern, like contour rings on a map. It is most noticeable in darker colors. Be cautious with seams and uneven surface areas (bumps or divots). After applying finish, these may even out, but the lines will never disappear.

- **SANDING TOO AGGRESSIVELY**
  Will develop an extremely mottled pattern; especially noticeable in the Gunmetal and Sienna colors. Use only a random orbital sander on the finish surface with no added pressure.

- **ADDRESSING UNEVEN THICKNESS**
  Tolerance is 40/1000 per inch, (+/- 4%) Index from the top and belt sand difference along the bottom front edge. Dry-fit all seams. See tolerance on page 26.

- **REPAIR**
  Use router dust mixed with epoxy in thick paste form to do small spot repairs. Depth of repair may need to be made deeper for repair to take.

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