Faux Translucent Stone

FABRICATION MANUAL

The completion and/or installation of applications made from Faux Translucent Stone may involve secondary fabrication operations such as cutting, drilling, bonding or bending. This manual intends to inform the user about the properties of Faux Translucent Stone, the tools to be used and important points that has has to be taken into account when working with this material.

The information below is based on years of experience, however cannot cover all possible fabrications nor applications. The user or installer is strongly advised to perform suitable tests to be sure about the correctness of tools, methods, applications and safety.

Important:

- always allow for expansion / contraction with fluctuations in temperature (0.4. mm. mtr/10 degrees Celsius).
- do not use the Faux Translucent Stone in applications where the sheet temperature will be over 80 degrees Celsius. Accidentally putting an item over 100 degrees Celsius (not hotter than 150 degrees Celsius) over a period of not more than 1 minute will not result in damage - if not repeated.
  The material can be used as shower walls, the material is not suitable for use in saunas. The material can be used as a kitchen top, but take into account the maximum temperature. If this is not taken into account, the material can discolour, warp, develop fissures or even break.
- UV exposure: Faux Translucent Stone is less suitable for applications in which the material is subjected to excessive or long term levels of UV exposure. Discolouration or yellowing may occur.
- avoid larger horizontal surfaces without additional support. The maximum span is 650mm when using 10 mm thick Faux Translucent Stone on 2 sides supported. When under (heavy) load, the span should be less. This should be tested beforehand. For backlit situations, it is possible to laminate the material onto glass or onto acrylic. This can be realised easily. However, glass has a different coefficient of expansion than Faux Translucent Stone. Acrylic has almost the same coefficient of expansion. In vertical applications a load perpendicular to the top edge of the sheet will result in bending and in the worst case even breaking the sheet.

1 Storage

- Faux Translucent Stone should be stored at room temperature in a dry environment. The material should not be exposed to direct sunlight or heat.
- The sheets should be stored horizontally on a 100% flat surface or pallet. Otherwise, the Faux Translucent Stone will warp.
- Protective masking should be removed within 30 days of receipt to prevent adhesive from the foil sticking to the panel.
- Allow material to acclimatise fully (temperature / humidity) before fabricating. Parts to be joined have to be in the same environment for at least 48 hours.

2 Fabricating

In general:

- Faux Translucent Stone can be fabricated by using tools and machines as is advised for fabricating solid surface materials.
- Diamond tools are recommended.
- Cooling of the tools by (cool) air or vapour/air is highly recommended.
- The speed of the tools should be such that the material does not melt from frictional heat.
- The best results are achieved by using the highest speed at which the material does not overheat.
- Leave the original masking on the sheet during machining.
- It is advised to practice on pieces of scrap before you start fabricating the material.
- Use a consistent feed-rate.
- Hold sheets firmly while machining to minimize vibration. It is recommended to use sufficient clamps.
- Always feed against the rotation of the blade or tool.
- Wear and use proper safety equipment.

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It is essential to keep your cutting tools sharp. Use at least hard, wear-resistant tools such as carbide tipped ones with greater clearances than those used for metals. Bring the machine to full speed before entering the material.
As Faux Translucent Stone is quite a good insulator, heat generated by machining is not carried away as easily as it is with metals. In contrast to wood, Faux Translucent Stone has no direction.
A good method of avoiding overheating is by making several passes while cutting or trimming the material.

Do NOT:

- Cut or drill with a dull blade, cutter or bit.
- Apply excessive clamping pressure.
- Scribe-break the material.
- Do not expect that this material will stay fixed safely to the cutting bed using only a vacuum.

2.1 Saw cutting

Circular saws, band saws, saber saws, jigsaws, hacksaws and handsaws can achieve reasonable results. However, some saws are better suited because they produce smoother, faster and precise cuts. For linear sawing, the circular saw - also the ones that can be attached to a rail - are preferred. For shapes, band saws usually produce the best surfaces.

The type of blade is a very important part in successfully sawing the Faux Translucent Stone. It is preferred to use a skip tooth band saw blade. It generates less heat and removes the chips more efficiently. For the best results, the teeth should have zero rake and some set. For a curved cut, the blade should be more narrow and have more set than for a straight cut. The blade must be kept sharp and the blade guide should be placed very near the cut to minimize vibration.

A circular saw is preferred to a band saw for straight cuts even though it tends to generate more heat. A blade with a diameter of 300mm should be operated at circa 3000 RPM with a feed of at least 1 mtr/minute for 10 mm thick material. We recommend to use diamond or HM tipped blades with at least 40 teeth. The geometry of the teeth can be side-set or roof-shaped. An almost zero rake is advised and the tooth should be very free running. A perforated saw blade usually runs cooler. It is essential that the spindle bearing is tight so the saw will run thru.

2.2 Drilling

We suggest that the fabricator uses drills suitable for plastics when drilling Faux Translucent Stone. Standard twist drills for wood or metal can be used, however they require a slower speed and feed rate to produce a clean, non-gummed hole. The optimal bit speed, feed rate and applied pressure depends on the size of the hole and the thickness of the Faux Translucent Stone. We recommend to use drill speeds up to 1750 RPM for smaller holes and to use speeds as low as 350 RPM for larger holes. Larger holes can be routed too of course. It is not possible to cut holes with a laser, it is possible to use a water cutting machine.

It is the best to use twist drills as used for plastics. The drills should have two flutes: a point with an included angle of 60 to 90 degrees and a lip clearance of 12 to 18 degrees.
Wide, highly polished flutes are desirable since they expel the chips with low friction and thus tend to avoid overheating and consequent gumming. Drills with a substantial clearance on the cutting edge of the flutes make smoother holes than those with less clearance. Drills should be backed out often enough in order to free chips, especially when drilling deep holes. Peripheral speeds of twist drills for plastics ordinarily range from 30 to 60 meter a minute. The rate of feed generally varies from 0.1 to 0.5 mm each revolution.

Important when drilling: be sure to securely hold or clamp the part to prevent it from cracking or slipping and presenting a safety hazard to the operator.

2.3 Laser-cutting / water-cutting

Faux Translucent Stone cannot be laser-cut. Do not try it. Water-cutting is suitable, especially for complicated work. Water-cutting is an excellent way to cut the material into complex shapes.

2.4 Routing

Routing with sharp two-flute straight cutters produces very smooth edges. Routers are useful for trimming the edges of flat or formed parts (Faux Translucent Stone can be heat-formed), especially when the part is too large or irregular in shape for a band saw. Portable, overarm, CNC and under-the-table routers all work well. The feed should be slow to avoid excessive frictional heating and shattering. The router or sheet, whichever is moving, must be guided with a suitable template. It is recommended to employ compressed air during the routing operation to cool the bit and aid in chip removal. Tool speeds should be such that the Faux Translucent Stone panel does not overheat. In general, maximum tool speeds at which overheating of the tool or sheet does not occur gives best results.
Another way of reducing heat forming is by making several passes.

It is important to keep cutting tools sharp at all times. It is suggested to use hard, wear-resistant tools with greater cutting clearances than those used for cutting metals. Diamond-coated, HSS or carbide-tipped tools are most efficient for long runs.
Bring the equipment to the full correct speed before starting the routing process.

On our router, we use 16000 RPM, 3500 mm/minute, in 6 steps thru 10 mm material, last step 0.5 mm, a cutter with 2 changeable HM-blades, diameter 15 mm. Direction of the tool with the direction of movement.
For V-grooves 90 degrees, we always use 100% fresh HM-blades and go 1.5 mm thru the material. Sand before glueing. The direction of the tool against the direction of movement.

2.5 (Re)finishing

Edge finishing is simply done with a router, in different forms and shapes. In addition to a straight edge, edges may accept beveling and rounding. Additional finishings such as sanding and polishing are easy to realise by using standard woodworking tools (or better: tools used for plastics, especially solid surface materials).

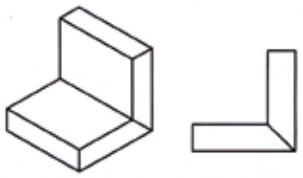
Faux Translucent Stone can be finished by using ordinary sanding paper. However waterproof sanding paper gives better and more efficient results. A double-excentric rotating sanding machine is preferred.
To create a high-gloss surface, you have to sand until grain 1000 sanding paper and then polish the surface with a polishing machine (or a soft cloth on the sanding machine) and a polishing paste as used for plastics.

Faux Translucent Stone can become damaged by scratching. Light scratches can easily be repaired by using sanding and polishing techniques. For very light scratches, you can use polishing paste as used for cars. This is sufficient and leads to good results. Heavier scratches can be repaired by sanding and repolishing the material.

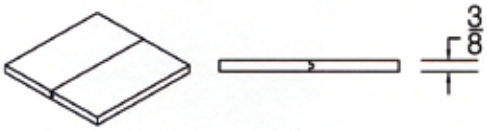
3 Joinery

3.1 Adhesive seams

Miter seem: is an excellent and strong seam for most corner conditions



Tongue and groove seem: is for connecting flat panels.
Minimal visible effect when backlit.

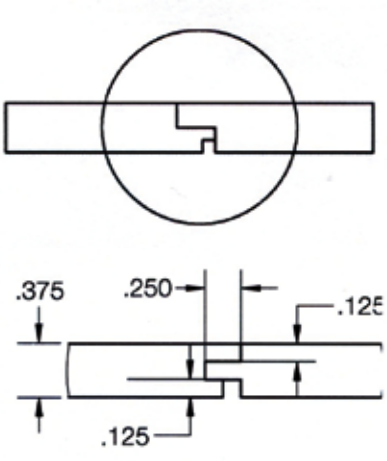


3.2 Loose seams

Loose seams are not glued and are primarily used when panels are backlit and/or when space should be created for panels to "work" in changing temperature conditions.

Half lap quirk: gives great accessibility for multiple panel installations.

Tonge and groove quirk: best aesthetic loose seam,
however, accessibility is limited on larger installations.



4 Fastening, adhesion and laminating techniques

4.1 Mechanical fastening

Faux Translucent Stone can be fastened with mechanical fasteners. It is strongly recommended to use through-holes. The hole should be larger than the screw. It is not an option to use self-tapping screws. It is also not recommended to use inserts. If this is the only option, you should test it beforehand. Mechanical fastening is the correct approach for assembly of larger products.

DO
- Always drill oversized holes to allow thermal expansion and contraction.
- Ensure that drilled holes have smooth edges.
- Use washers for better load distribution.
- Use light or moderate clamping pressure.

DO NOT
- Overtighten fasteners. It is sufficient to tighten it by hand.
- Use self-tapping screws to hang large panels.
- Use cyanoacrylate or solvent type thread locking materials.

4.2 Bonding with adhesives

The use of solvent glues or cyanoacrylates is not recommended for bonding or seaming Faux Translucent Stone. Also, dry glues used for solid surface materials are not that suitable since they are translucent and too dry.
We have the best experiences with 2 component glue as used for PMMA, such as Acrifix 192 when bonding Faux Translucent Stone to Faux Translucent Stone. When some movement is needed, we recommend to use a transparent (when laminating on glass) or white acid-free silicone sealant. This is suitable when you would like to laminate stone to a wooden surface. Stone and wood have a different coefficient of thermal expansion. A bond of FTS to FTS will never be invisible due to the simple fact that the Faux Translucent Stone is not even and solid coloured as is Corian or Hi-Macs.
When bonding two Faux Translucent Stone sheets together, we always use a special mixture of glue, opal white pigments and light scattering agents. We use this mixture to reach the same translucency as the Faux Translucent Stone.

Surface preparation

Ensure that all substrates are clean, dry and free of oil, dust and other surface contaminants. The amount of surface (or edge) preparation directly influences the final bond strength of an adhesive.
Wipe the resin substrates with a clean cloth with a 50/50 solution of isopropyl alcohol (IPA) and water.
For metal substrates, sandblast or abrade with 150 grit sandpaper followed by a water wipe with a dry clean cloth.

Directions for use

Download the instructions if you want to use Acrifix 192. You can find the instructions via their website: www.acrifix.com. Also, safety-datasheets can be found there. The glue can be supplied by us or by your local Evonik representative.
For the silicone sealant when making transparent or translucent bonds: we recommend to use any acid-free silicone sealant. Follow the instructions of the supplier. In general: the thickness of the sealant-layer should be the same as the expected difference in expansion between the two materials. For not-visible bonds, you can use a construction-sealant that stays permanently flexible and cannot be seen through the sheet.

When bonding the edges of Faux Translucent Stone sheets, it is important to first mask the face of the sheets with masking tape close to the edges that need to be bond. Do not use PVC tape when you are using acrylic glue. We use a PE-tape with an acrylic adhesion layer.
During the curing of the glue, only slight pressure should be applied on the sheet near the bond. Too much pressure will lead to tension and possible cracks in the sheet!
Be careful with sheets having parts removed by milling, for example in order to attach below the FTS-panel a bassin, that all inside corners should be rounded with minimal R=5 mm to avoid stress concentration and cracking from the inside of corners!

4.3 Bonding with VHB or PE-foamtapes

Several VHB tapes can be used to adhere Faux Translucent Stone to a variety of substrates while still achieving desirable aesthetics. Clear 3M tape 4910 or 4905 are 2 examples you can use. This tape is suitable for attaching the stone to sealed wood, sealed ceramics, metal, glass and some other plastics. VHB tape is UV stable and can be used in interior and exterior conditions, even in the toughest environmental conditions. This tape provides an excellent seal against moisture, however, splices or seams in the tape may require additional sealing. The tape can tolerate some shear extension due to substrate movement from thermal expansion or contraction.

Special surface preparation is absolutely needed before applying VHB tape to a Faux Translucent Stone sheet. First, clean the material with the 50/50 percent solution of isopropyl alcohol (IPA) and water. Secondly, the stone surface should be primed with -for example- 3M primer 94. Follow the manufacturers directions on how to safely handle and apply this primer. After the area has been primed and is dry, the tape can be applied to the first surface. Only handle the tape by the edges and apply firm presssure to the tape by using a roller.
Attach the second bonding substrate and apply pressure on the finished joint with a roller. Apply real firm application pressure to the total length of the taped area to develop good adhesive contact and to improve the bond strength. Bond strength will increase over time with 90% of the ultimate strength developing after 24 hours and full strength after 3 days. Ultimate bond strength can be achieved more quickly by exposure to higher temperatures.

If the entire weight of a Faux Translucent Stone sheet is supported by the VHB tape, a minimum of 50cm2 should be used for every kilo of material to be supported. It is highly recommended to test this beforehand, especially when bonding to other nonmetal (porous) substrates.

DO

- Seal porous materials such as cement and wood before bonding.
- Keep tape clean and handle by the edges.
- Make sure both surfaces are clean and dry.
- Use 50/50 isopropyl/water solution for metal and plastic surfaces.
- Apply a suitable primer such as 3M 94.
- Apply primer to first surface and apply **firm** pressure.
- Remove liner and apply to second surface.
- Apply very firm pressure to the whole bond line.
- Wait 72 hours until tape has reached the full adhesion strength.

4.4 Silicone sealants

Acid-free transparent silicone sealant can be used for laminating Faux Translucent Stone to another transparent surface. Follow the instructions of the silicone-supplier and use if needed a primer. It is important to have a thick silicone layer which allows the material to expand and contract due to temperature differences.

We also have positive experiences when using this type of sealant when bonding Faux Translucent Stone to non-transparent surfaces. Of course, care should be taken that both surfaces are flat, clean and dust-free.

Silicone sealants are very useful when making bigger constructions. The parts of the construction should be allowed to have some space for the expansion and contraction of the material. You can use silicone sealant to join the parts. This is an elegant and proven way to allow the material to work due to temperature differences.

Silicone sealant should not be used underwater or in food contact situations. Also, silicone sealant is not suitable for bonding with surfaces that can corrode such as milled aluminium or bare steel. The cure depth of the silicone layer should not exceed 9 mm from the airside.

4.5 High-tack sealant

We do not have enough experience with high tack sealant to give proper advice. Make sure you use high-tack sealant which cannot be seen through the sheet. These sealants are suitable as long as they stay flexible in the long term. Of course, this flexibility is needed because of differences in coefficients of expansion of the Faux Translucent Stone versus the substrate. When the substrate has the same coefficient of expansion or when the application is in an environment with a 100% stable temperature, no flexibility is needed.

5 Warm and cold bending

Faux Translucent Stone is NOT suitable for blow-moulding or vacuum-forming.
Be aware that cold bending can happen when you are using too large surfaces without proper support. See appendix 1 with the tests and theoretical finite element analysis.

Warm bending by using an oven, a mould and/or vacuum equipment is possible. The maximum radius for bending Faux Translucent Stone is 800mm for 10mm thick material. It is not recommended to bend a radius smaller than 800mm. Two-axis bending is not suitable for this material. If a complex shape is needed, it is better to ask our production facility to "cast" this shape by using a mould.

The procedure we use for 10 mm Faux Alabaster is below. The main problem is that the material will discolour slightly when it is heated too high or/and too long. For example, Faux Alabaster will yellow. The other problem is that the material will crack when you are trying to bend in a radius that is too small and at a too low temperature. We currently do not have any experience with vacuum tables. We expect that it is possible to bend in a smaller radius with a vacuum table.

One advantage of heat-bending is that the Faux Translucent Stone does not shrink, in contrast to materials as PMMA, PETG or PC.

Procedure for bending 10 mm:

- Do not Pre-dry, it is not needed.
- Do a full inspection of the surface quality and colour, also with light behind the sheet.
- Check the colour of different parts to be bent. Are they from the same batch? Identical colours?
- The side that will be directed to the viewer is the side that should be laying on the mould.
  The backside of the sheet is laying on the mouldside that is directed to the viewer.
  So this decides whether the mould will be positive or negative.
- Make the mould with bend-MDF 8 mm and ribs separated from each other 200 mm max.
- Cover the mould with fabric as used for the inside of gloves (we can supply this).
- Put the mould with the sheet in a preheated electric oven with an even temperature distribution at 110 ^{0}C for 35 minutes.

- Remove the mould gently from the oven.
- Check if the sheet is completely following the curve of the mould and is laying in the correct position. If needed, you can put some well distributed load on it.
- Cover the sheet and the mould with blankets and avoid rapid cooling. You should cool for at least 1 hour.
- It is always a good idea to test the procedure with a cutoff before starting the real parts.
- If the quantity to be produced is large, then 2 moulds are needed.

All the types of the Faux Translucent Stone collection behave in the same way.

6 Larger constructions

We highly recommend to fabricate larger translucent constructions of Faux Translucent Stone by companies who are having experience in this field.

However, we can mention a few aspects might you prefer to develop your own professionality in this.

If you would like to use the material for vertical applications, support free, we recommend using 6mm for a height of 500mm, 8mm for a height of 750mm and 10mm for a height of 1000mm. The thickness also depends on the weight that is applied to the top of the sheet and other application-dependent variables. This must be tested beforehand. The sheet should be supported by vertical beams of translucent acrylic of each 1200x15x50mm. These beams can be glued onto the backside of the sheet with acrylic glue such as acrifix 190. You cannot use a transparent acrylic, we recommend to use translucent acrylic with a transmission of 80%. These parts should be in the same room for at least 48 hours before bonding the parts together.

For horizontal applications, we recommend full-surface glueing (or taping) of the Faux Translucent Stone to transparent acrylic of minimum the same thickness as the translucent stone. For 6mm Faux Translucent Stone, the maximum recommended span without support is 400mm, for 8mm this is 500mm and for 10mm this is 650mm. Of course, the way the material is used (loaded) is the crucial factor determining the choice of the maximum span. See also appendix 1.The glueing procedure is quite complex and involves safety precautions. We use Acrifix 192, a 2 component glue. You can glue the stone horizontally on a 100mm oversized acrylic sheet. (50 mm each side) This is full-surface glueing. The result is very good.

Non-translucent constructions are easier. Do not forget: the well-known expansion and contraction, to use of a sealant that is not visible thru the stone, to use a substrate that does not influence the colour of the stone, to take care of inside corners, to work clean, to use tape, and to put enough pressure on the sheet, you could use any instruction for solid-surface material such as Corian or Hi-Macs for the faux translucent stone.

7 Printing or silkscreening

It is recommend to test the adhesion of the ink beforehand. We do have excellent experiences with flatbed UV- and not-UV printing and also screenprinting. As there are a lot of different inks and hardening-systems, no testing is adviced. The substrate should be cleaned as described in the section of glueing.

8 Use of LEDs behind the material

As stated earlier, we have the best experience with LED-cells with a batwing shaped light pattern. We realised a distance of 80 mm while the LED-cells had a distance LED-to-LED of 150 mm on a rectangular matrix.
Also here: as different types of Faux Translucent Stone have different transmissions and diffusion-characteristics, a small test is needed.
However, do not expect any complex problems when backlighting Faux Translucent Stone.
The results with proper installed lighting are great!

9 Certifications

Fire behavior

Bs1d0 according to (N)EN 13501, tested by Peutz Laboratory for Fire safety on April 2016. The material can be used safe everywhere.

Food safety

samples have been tested by Merieux NutriSciences on June 2016. The material is approved according to directive 10/2011: EC 1935/2004 and EC 023/2006.

Disclaimer: as usual with this kind of documents: the text above is made in all honesty and we try to assist you get good results when fabricating the material. However, it is your responsibility, fully, in all aspects and dimensions, and concerning all regulations and laws. Convince yourself that what you do, how you do it and the tools and equipment you use are safe and fit for the intended purpose.

Appendix 1: Testing the deflexion and finite element analysis.

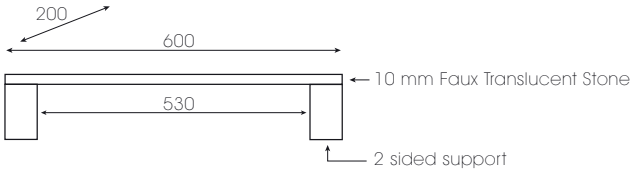
Appendix 1

1.1 Measurements

We start with flat sheets.

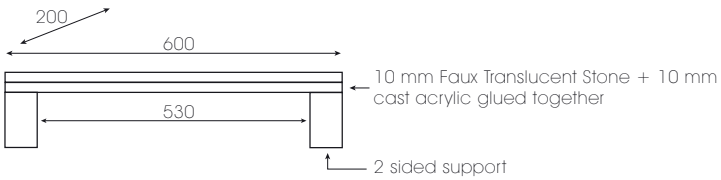
Setup 1:
A 10mm thick Faux Translucent Stone sheet of 200x600mm with both shorts ends supported, so there is 530mm of free space in the middle. This results in a 1mm deflection after 1 week with no load at 21°C.
Result with no load after 1 week at 21°C: 1 mm deflection. The long-term expectation is 2mm.

1



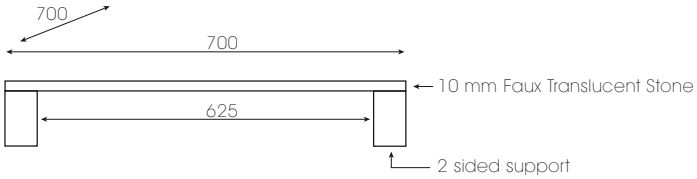
Setup 2:
A 10mm thick Faux Translucent Stone sheet with a 10mm thick cast acrylic sheet of both 200x600mm. These two sheets are "glued" by using 7 strips of 10mm wide and 0,5mm thick 3M clear VHB tape. Both of the short ends are supported, so there is 530mm of free space in the middle. This results in a 0,3mm deflection after 1 week with no load at 21°C. The long-term expectation is 0,6mm.

2



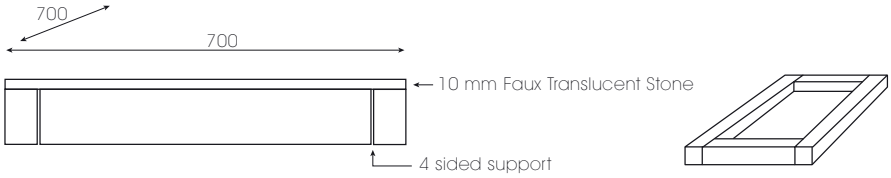
Setup 3:
A 10mm thick Faux Translucent Stone 700x700mm. Both of the short ends are supported, so there is 625mm of free space in the middle. This results in a 1mm deflection after 1 week with no load at 21°C. The long-term expectation is 2mm. The result with an 8kg load in the middle of the sheet is a deflection of 1,5mm extra after 2 days. In the long-term, this will result in a 3mm extra deflection.

3



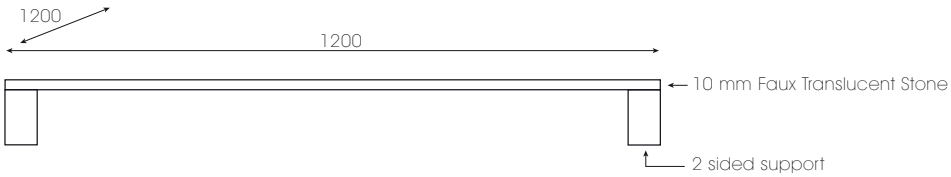
Setup 4:
Here we have the same setup as in setup 3, 4 sides are supported.
This will result in no deflection. In the long-term, it may result in a deflection of 1mm.

4



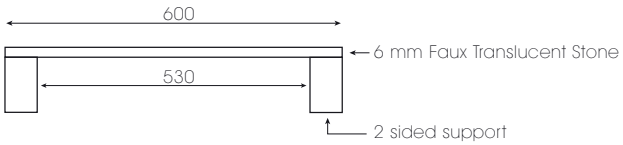
Setup 5:
A 10mm thick Faux Translucent Stone of 1200x1200mm. Both of the short ends are supported, so there is 1130mm of free space in the middle. This results in a 6mm deflection after 1 week with no load at 21°C. The long-term expectation is the double! The result with an 11kg load in the middle of the sheet is a deflection of 5mm extra after 2 days. In the long-term, this will result in a 10mm extra deflection!

5



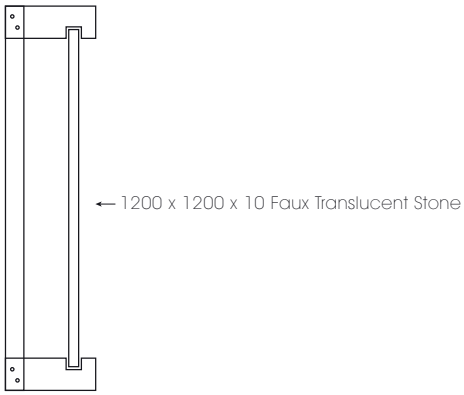
Setup 6:
A 6mm thick Faux Translucent Stone of 600x600mm. Both of the short ends are supported, so there is 530mm of free space in the middle. This results in a 1mm deflection after 1 week with no load at 21°C. The long-term expectation is 2 to 3mm.

6



Setup 7
A vertical sheet of 10mm thick Faux Translucent Stone of 1200x1200mm. It is supported on the bottom and the top. After 1 week with no load, the sheet is still fully flat.

7



Conclusion: 2 sided support, 650 mm wide seems to be a practical limit for a horizontal surface without constant load for a 10 mm thick sheet. The long-term expectation is 3mm.

Additional testing has been done with a 10 kg block of lead in the centre of setups 5 and 6. After 14 days, both setups fail in the final test: the material breaks. In the second test, there is no failure. Conclusion: Faux translucent stone is NOT suitable, when it is used with heavy concentrated loads. Do not use it as a bartop or counter when there is something heavy on top of it without proper additional support!

1.2 Deflection using Finite Element Analysis

The amount of deflection is largely controlled by the load, size, thickness and support structure.
The three options are: fully framed support, simple support and point support.

We investigated flat horizontal panels with a thickness of 10 mm. The vertical panels will not experience deflection when it is supported properly with no loads. The best way for using vertical panels is to have them fully fixed at the top and fixed at other points (half-way) and at the bottom with some possibility for movement in the vertical direction (temperature-differences). A vertical panel without any support on the top of the panel will probably sag.

1.2.1 Fully framed support condition in 4 sided frame 25 mm

In a fully framed application (figure 1 and 2) Faux Translucent Stone sheets with a thickness of 10mm, are fixed around the entire perimeter of the panel. The edge is fixed with a frame or adhesive bonding as shown in figure 2.
Deflection of the panel is entirely depending on the shortest side of the sheet. So, as a panel of 500 x 1000 mm will exhibit the the same deflection as a panel 500 x 500 mm. The amount of edge capturing is of course also of influence.

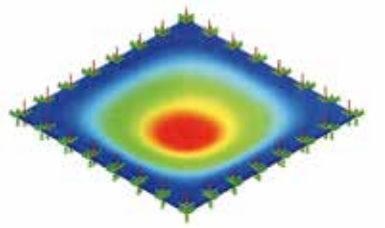
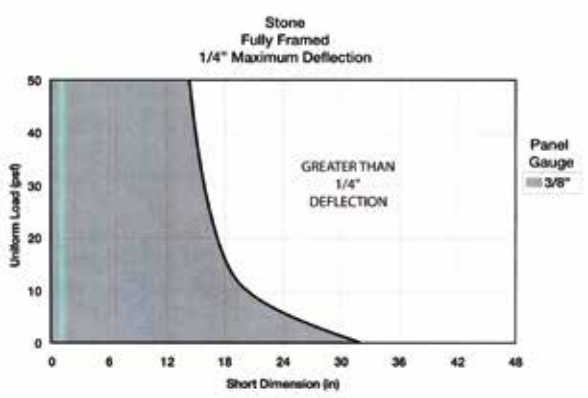
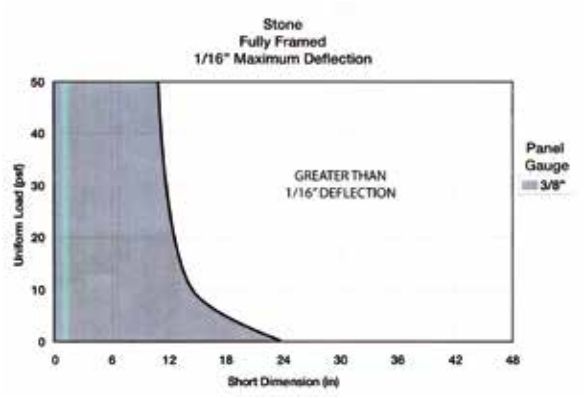


Figure 2. Fully framed deflection cross-section

Clear from the first chart is that a sheet with the smallest dimension 500 mm (free over 450 mm) will deflect 6 mm with a load of 50 kg/m2 (or 25 kg/m^2 evenly distributed over a length of 1000 mm with this sheet 500 mm wide). With a 100 kg/m^2 load a 450 wide sheet will deflect 6 mm.



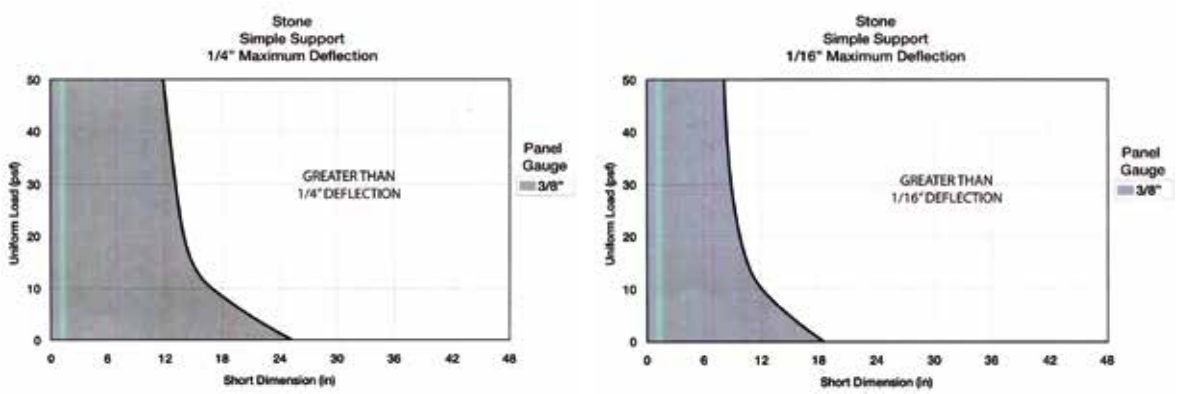


If we want to limit the deflection to 1.5 mm the sheet will be 350 mm, wide with 50 kg/m^2 and even 300 mm wide with 100 kg/m^2. The load is to be assumed uniform over the full surface of the sheet.

1.2.2 Simple support condition on 4 sided frame 25 mm

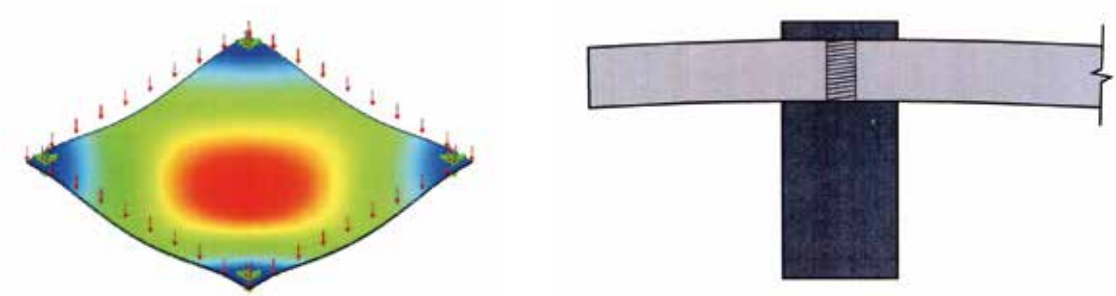
Faux Translucent Stone sheets are in this situation supported, but not fixed around the perimeter of the sheet.
This type of support is commonly used for ceiling panels that are installed into support grids. The edge of the panel is fixed as shown in figure 4. The deflection of also simple supported panels is entirely depending on the shortest side of the sheet.

We see that a sheet a 10mm thickness with the smallest dimension 400 mm (free over 350 mm) will deflect 6 mm under a load of 50 kg/m^2.
Limiting the acceptable deflection to 1.5 mm a sheet 300 mm wide (250 mm free) will deflect 1.5 mm with a load of 50 kg/m^2. Double the load and the max sheetwidth will be less then 250 mm.

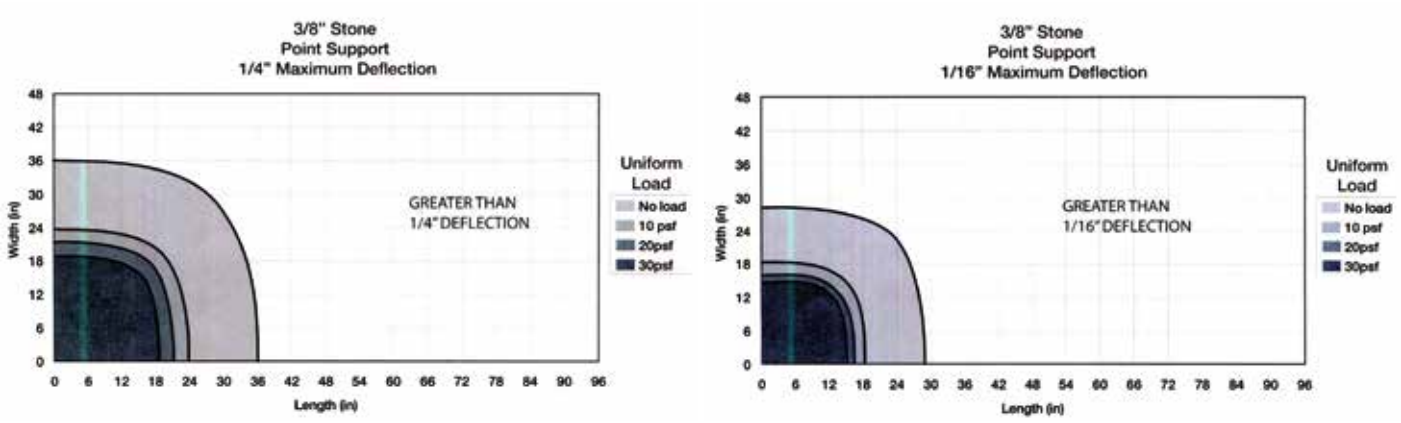


1.2.3 Point support

Faux Translucent Stone sheets in point-support condition are fixed at the 4 corners using a 25 mm cap and barrel. As the amount of support is minimal as compared to a 4-sided supported panel, point-supported panels are more susceptible to deflection. Unlike fully supported panels, the deflection of a point-supported panel is dependent on all dimensions of the panel. A 500 x 1000 mm panel will deflect considerably more than a 500 x 500 mm panel. Of course, the diameter of the support and the location influence the deflection. In our calculations the supports were located on 50 mm from each edge of the panel.



It is important to note that panels fixed with point-supports suspended from cables will exhibit more deflection than panels supported by point-supports using threaded rods. This latter is more rigid and prevent lateral movement of the panel at the support location.



From the graph is clear that a sheet of 900 x 900 mm with no load will deflect 6 mm or more. With a 50 kg/m^2 load, the largest acceptable sheetsize is 600 mm (ceiling panel!)

When 1.5 mm is choosen as maximum acceptable deflection, a non-loaded sheet will measure max 700 x 700 mm. Loaded 50 lg/m^2 reduces the sheetsize to 450 x 450 mm.

Remark: stiffening the sheets by gluing support ribs will reduce the deflection. We did not calculate this as there are too many possibilities. Making a mock-up and measuring the deflection during 2 weeks every day and make the measurement visual in a graph time versus deflection. It is easy to extrapolate the long-term deflection from the shape of the curve.

Laatste stukje was in het vorige document weggevallen.