VETRITE®

TECHNICAL AND LAYING INFORMATION

This technical document aims to provide suggestions for the correct working and installation of the VETRITE slabs produced by SICIS and tips on how to choose the most suitable materials (adhesives and mortars for sealing the joints manufactured by Litokol S.p.A.) for installing the slabs inside both residential and public/commercial buildings, to cover floors and walls. All the information provided in this document also applies to the most recent VETRITE collections such as Electric Marble, Gem Glass and Spathula.

SICIS
THE ART MOSAIC FACTORY

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1. TECHNICAL DESCRIPTION OF VETRITE

VETRITE is a decorative technical glass slab, which is obtained by pressing together polymers in liquid phase, metal foils and textile fibres. The result is a versatile, high-tech composite that can be used to meet the most ambitious aesthetic, technical and environment requirements. Standard thickness 6 mm; on request, it can be made for special applications in a thickness of 4 to 20 mm. For flooring, a thickness of 10 mm is recommended, with the SicisGrip finish of Satin finish.

2. VETRITE AND THE ENVIRONMENT

The versatility of the VETRITE technology makes it possible to supply the product, **on request**, using special glass that is pre-treated to make it self-cleaning, anti-bacterial etc. The special easy-cleaning types of glass have a thin, transparent layer that gives the glass photocatalytic and hydrophilic properties that are very effective in keeping the surface clean. The photocatalytic layer exploits the combined action of the UV rays of sunlight with water to remove any dirt that accumulates on the surface of the glass. The use of these special pre-treated types of glass is not recommended for flooring.

3. TRANSPORT AND STORAGE

VETRITE must be transported and handled with care, in full awareness that the material consists of slabs of glass. During all phases of transportation, temporary warehousing, long-term storage and storage on the building site, care must be taken to ensure that the stillage holding the VETRITE is always placed on a perfectly flat floor and that the slabs are not exposed to any risk of being grazed, scratched or broken.
The storage areas should be protected from the sun and adverse weather conditions.
We recommend storing at a temperature of between 5° C and 35° C / 59° F – 77° F and a relative humidity of less than 80%.
It is important that VETRITE and VETRITE stillages are always correctly handled and moved.
Referring to the UNI 9151-3[1] as standard for the correct handling[2] of VETRITE stillages, the norms explicitly mentions *forking*, *harnessing* and *lifting*.
When describing the way a stillage/crate has to be handled, the aforementioned standard mentions the following operations:
- forking and lifting;
- harnessing and lifting;

Alternative ways of handling and moving are not contemplated:
[…] it is not permitted to just move the base of the crate forward[3].

Fig 1 Example of harnessing

In other words, using the forklift's forks to push forward the crate/stillage's base by pushing and dragging it is neither contemplated nor suggested by the norm[4].
For loading and unloading VETRITE crates containing full to their maximum capacity, use a forklift with load capacity of at least 3.000 kg that can reach a barycenter of 1,5 m. This way, it will be possible to safely lift and move VETRITE crates (Fig. 2).

Fig 2 correct way of moving a VETRITE crate

The purpose of VETRITE crates/stillages is to protect, in compliance with UNI 9151-1 and UNI 9151-2, their content for a period of not more than 12 months.
The wooden stillages supplied with VETRITE are intended for transportation only and not for long-term storage as, over time, they might cause the slabs to warp slightly. Before use, lay the slabs on a horizontal surface until they return to their original flatness. Alternatively, when laying or cutting the slabs, make them flat again using weights until the adhesive has hardened, or until they have been fully cut. The VETRITE slabs may warp if they are stored for a long period of time resting on only 2 points.
Therefore, the slabs must be stored in purpose-built classifiers/folders, inserting spacers between the slabs, also taking their dimensions into account. We recommend ensuring that any stored slabs are rotated in the best possible way.
Stillages, both the wooden stillages intended solely for the transportation and the steel stillages intended for long-term storage, usually feature black rubber layers used to protect the glass slabs. As consequence of the contact between glass and rubber, after the slabs have been stored for a long time the slabs' edges could develop dark halos in the areas where the glass used to touch the black rubber pieces. This phenomenon results particularly visible in light colors of VETRITE. In case dark halos are visible on the edges of the slab, it will be necessary to clean the areas where the dark halos are, restoring VETRITE's original aesthetic appearance. We therefore advise against allowing for prolonged contact between VETRITE and the black vulcanized rubber.
The slabs must be handled using suitable equipment (glass vacuum lifters, suction cups etc.). All lifting equipment must meet the current laws and standards and be approved by the competent authorities. The glass vacuum lifter must be correctly centered onto the slab's surface. The slab must be lift and only later, once it has been lifted, moved. Avoid any scratch due to the contact between the surface of the one slab and the surface of another slab.
We suggest the equipment produced and marketed by the following manufacturers:

- Raimondi (https://www.raimondispa.com/);
- Battipav (http://battipav.com/);
- Montolit (https://www.montolit.com/);
- Sigma (https://sigmaitalia.com/).

NOTES:
[1] UNI 9151- Wood packages for bulk capacity over 300 kg - part 3: Design and manufacturing.
[2] P. 16 – § 7.1.2.2.1 and p. 17 – § 7.1.2.2.2).
[3] P. 11 - § 7.1.2).
[4] quotations of the norm found in this paragraph were translated by us, as at the time of the draft of this manual the norm was only available in Italian.

Similar equipment is also produced by other independent manufacturers and is very easy to find, including on e-commerce platforms such as Amazon.

Slabs with any traces of condensation due to the variations of temperature during transport must be dried or used as soon as possible.

4. QUALITY ASSESSMENT

In light of VETRITE's technical features, for quality assessment purposes it is necessary to refer to the European standard EN 1036-1:2007 Glass in building.

Quality assessment methods
Inspection methods: VETRITE must be checked in the vertical position, with the naked eye and in normal conditions of diffused light (natural or artificial, between 300 lx and 600 lx), standing at a distance of 1 m. The direction of observation must be perpendicular to the glass slab. It is not permitted to use a source of additional light, such as a reflector, since that such additional lighting could distort quality assessment.
The client/installer is required to carry out a visual inspection of the slab and accurate cleaning of the slab's surface prior to working the slab. Any defects that may be noted must be reported prior to processing. SICIS will not accept any claim or dispute after the slab has been processed or installed.

Size requirements
For sizes below or equal to 2000 mm, the standard tolerance from the nominal size is +/- 1 mm. For sizes above 2000 mm, the standard tolerance from the nominal size is +/- 1.5 mm. The tolerance depends on the maximum dimensions of the slab. The tolerance of orthogonality is expressed as the difference in length between the diagonals of the slab. For slabs in which both dimensions are below or equal to 2000 mm, the difference must not exceed 3 mm. For slabs in which one (or both) dimensions are above 2000 mm, the difference must not exceed 4 mm.

5. GEOMETRIC PATTERNS, SYMMETRY AND TONES OF VETRITE'S DECORATIONS

In Standard productions, it is not possible to guarantee:

- that the patterns of the VETRITE finish are perfectly parallel with the edges of the slab;
- the continuity of the pattern or textures where several slabs are placed in a row.

Electric Marble, Gem Glass and Spathula collections are available in slabs having the standard size of 120x280 cm. These slabs feature a design/pattern that is not symmetrical. Therefore, depending on how the design/pattern is oriented, there can be "right" and "left" slabs. Standard production does not guarantee that putting a "right" and a "left" slab one next to the other results in the so-called "bookmatch", meaning the symmetric continuity between the pattern/design of one slab and that of the adjacent slab. It is nonetheless possible to supply slabs produced through a specific procedure that allows for a higher degree of symmetry between the design/pattern of one slab and that of the other. This specific production method has the effect of

decreasing the slab's maximum size by 5 cm both in height and in width if compared to the size of a standard slab.

It is sometimes possible to see a slight reflection or striation effect close to the edges of the VETRITE slabs. This effect is due to the product's inherent characteristics and tends to be particularly visible in darker colors. Halos and/or striations or polymer residues can also sometimes be visible inside of the slabs. These are consequences of the fusion/production process and, as such, have to be accepted by the customer.

It is not always possible to guarantee homogeneity in tone for VETRITE slabs delivered at different moments in time. This is particularly true for lighter colors. We suggest to keep this in mind when foreseeing further additions to previously supplied orders and/or substitutions or previously supplied VETRITE.

Various colours of VETRITE have a pleasant effect on the back of the slab that can be similar to the colour itself and to other finishes in the collection. Make sure that VETRITE is installed the right way round, with the side requested by the client visible. Here is a list containing just a few examples of the colours with this characteristic: Feather Black, Feather Champagne, Astrakan Pavone, Dragon Sparrago etc. The list is not complete.

VETRITE slabs feature on their backside traces of the working they underwent (cutting, edge profiling, etc.). Such traces do not compromise anyhow the aesthetic and the functionality of the product once it has been laid and installed. The glass layer on VETRITE's back has the function of protecting VETRITE's internal decoration during all the phases of the product's lifespan (transportation, handling, working on site or with machines, laying operations, etc.). Specific VETRITE colors (Antique Blue, Antique Green, Vis One, Vis Two, Alma, Aluminium, Antique, Antique Ocra and Mirror) feature a glass layer on their back that can be as thin as 1 mm. It is therefore possible that during transportation/handling/working/laying of these colors of VETRITE small cracks form on the glass layer on the back. Such small cracks have no aesthetic or functional effect on VETRITE, while they keep VETRITE's internal decoration unharmed. Only in the case of Opalescent finish VETRITE, cracks on VETRITE's back glass layer will possibly be visible when the VETRITE slab is backlit.

VETRITE can, on demand, be supplied double face. In this case, being both the sides of the slab intended to be visible once the slab is installed, take extra care when working/handling the slab during each step of the working/installation procedure. Both sides of the double face slab will be visible, hence they both have to be perfectly cleaned. The minimum thickness of a double face slab may span, depending on the colors involved, from 6 to 10 mm.
Warning: The minimum thickness of the double face slab is not up to the customer, it is something imposed by the production method.

6. WORKING VETRITE ON THE CONSTRUCTION SITE

VETRITE can be transformed directly on-site. Please watch the relative tutorial videos available on our website (https://www.sicisVETRITE.com/eng/Video) or in the Chinese language version (http://id.tudou.com/i/UNDI0Mjc5NTYwOA==/playlists?spm=a2hzp.8253876.0.0&order=4).

Once the VETRITE has been cut and drilled as necessary, the edges must always be polished (Fig. 3); this reduces risks of injury to people and eliminates any micro cracks that can form during the cutting and drilling phase.
After laying, micro cracks can gradually spread if they are not removed during installation (Fig. 4).
The main causes of the spreading of cracks include:


Fig 3 Example of edge polishing

- Excessive pressure applied when tightening bolts and accessories (taps/locks/wall-mounted sanitary fixtures/electric sockets etc.). To reduce or eliminate this risk, always use controlled tightening tools (ratchets or torque wrenches; see fig. 10);
- Structural movements of the substrates caused by:
  - Dilation of the substrates due to variations of humidity in the surrounding atmosphere;
  - Continuous vibrations due to the proximity to infrastructure subject to heavy traffic;
  - Use of wall-mounted sanitary fixtures, shelves, coat racks, lamps and in general, any furnishing elements that are fixed to the wall using unstable anchoring systems. (see dedicated section);
  - Normal settlements and/or natural phenomena.

It is recommended to avoid slots or notches with sharp corners on VETRITE slabs (Fig. 4). Corners must always be rounded (a minimum radius of 5 mm is recommended). If VETRITE is requested to be supplied with slots or notches, these will always be rounded (Fig. 6).


Fig 4 Example of a sharp corner (non-rounded)


Fig 5 Example of eccessive tightening

When making slots/notches on site, first use a driller with a diamond bit to drill holes where the slot/notch's corners will be; only then use a saw to cut form hole to hole "connecting" them. If the slot is very close to the slab/tile's edge (thus, the risk of this operation to cause the slab/tile to break is higher), cuts connecting the holes can also be performed once the slab/tile has been laid on the wall. Therefore, instead of drilling holes / cutting from hole to hole / polishing the cut edges / laying on the wall, it is possible to do as follows: drilling holes / laying the slab/tile on the wall / cutting from hole to hole / polishing the cut edges.

Fig 6 Example of rounded corner

When 45° (a.k.a. "Jolly") edges are required, it is advisable to take pre-existing 90° edges and work them turning them into 45° degrees. This way the 45° degree edge is achieved. Then, just cut the slab on the other side (with a regular 90° cut) to give the slab the desired size.

General observations:

- All suction cups must be perfectly clean;
- Before handling, check that the suction cups adhere properly to the surface;
- Prevent damage to the glass by using the specific protection materials in the points of contact;
- Guarantee at all times the safety of the staff carrying out the operations;
- Avoid the presence of unauthorised personnel in the manoeuvre areas;
- Provide the personnel with adequate equipment and individual protection;
- The personnel in charge must have received adequate training.

7. INSTRUCTIONS FOR THE APPLICATION OF VETRITE IN THE PRESENCE OF WALL-MOUNTED FURNISHING ELEMENTS

Wall-mounted furnishing elements generally include: shelves, coat racks, light fixtures, other electric/electronic devices, plumbing components (wall-mounted sanitary fixtures, heated towel rails, boilers, etc.).
As an example, in this document detailed instructions are provided for the application of VETRITE together with wall-mounted sanitary fixtures. The basic principles given here should be extended to all the other cases. This application must be carried out by experienced professional installation workers.
VETRITE must be installed on a stable, firm substrate. If wall-mounted elements are planned, adhesive must be applied to the entire surface of the substrate, avoiding any empty spaces between VETRITE and the substrate in proximity to the anchorage points.
Several tutorial videos are available online. Among those:
https://www.youtube.com/watch?v=ZSm2H3WDfcM
https://www.youtube.com/watch?v=nM6-dDgrY4M

Example of application of VETRITE together with wall-mounted sanitary fixtures

Wall-mounted sanitary fixtures involve the use of anchoring systems that guarantee the required load resistance, but do not always ensure the perfect stability of the sanitary fixtures themselves.
Depending on how the anchoring system has been fixed (number of anchorage points, distance of the frame from the sanitary fixture, etc.), there may be slight movements of the frame/bar and consequently the fixture itself.
When the sanitary fixtures are used, the entire weight can be concentrated in a single point of the VETRITE wall covering, causing it to break.
Below, we have provided some suggestions on how to make the frame and consequently the sanitary fixture more stable, in order to reduce/eliminate any risk of breakage of the VETRITE.

Figure 7 shows a typical anchoring system for wall-mounted sanitary fixtures that are generally available in the stores.

These articles are typically supplied with the materials necessary to anchor the frame in 4 points:

- 2 points at the top, on the wall, on the outside of the vertical brackets.
- 2 points at the bottom on the floor, in the centre of each horizontal bracket.

Using only the materials for 4 anchorage points supplied by the manufacturer, it is not possible to ensure the perfect stability of the wall-mounted sanitary fixtures.
It is thus necessary to add 2 more anchorage points, towards the top and inside the brackets, using two L-shaped profiles and anchoring them symmetrically on the wall, exploiting the pre-existing holes.

Fig. 7 Example of anchoring system of wall-mounted sanitary fixtures.

We strongly recommend you to:

- Anchor the frame in 6 points and not only 4 points, as described above;
- Check the flatness of the sanitary fixtures on the surface to which they are to be mounted, before installation;
- Use the noise reduction gaskets (see fig. 8), which also act as a seal, distribute the load, and compensate for any small differences of flatness of the sanitary fixture;
- Keep the number of holes in the VETRITE slab to a minimum. We advise drilling a single, large hole (smaller than the surface of the sanitary fixture), rather than drilling the 4 smaller holes (see example in fig. 9 showing the water inlet and outlet pipes and the two holes for the support brackets);
- Use controlled tightening tools (ratchets or torque wrenches; see fig. 10);
- Always polish the edge around any holes/cuts made during installation.
- Do not make slots or notches with sharp corners, but always ensure these are rounded.

Fig. 8 Noise reduction gasket

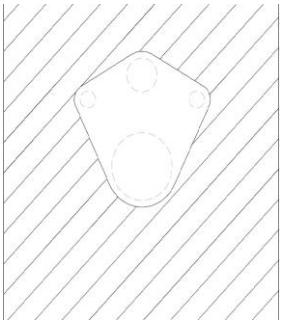

Fig. 9 Single hole for fittings

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When the accessory features a frame or a base that is big enough, it may be convenient to previously create a slot/notch onto VETRITE that is bigger than the accessory (but not as big as the accessory's frame or base) and fill that slot/notch with an insert (in wood or plastic) slightly thicker than VETRITE. This way, all the pressure deriving from installing and/or using the accessory will be borne by the insert, and not by VETRITE. This solution is not always feasible, but when it is (that depends on how the accessory to install is made: it may be the case or electricity plugs or hanging sanitary ware), this can be a useful trick that helps minimizing the pressure borne by VETRITE.

8. CONTROLLED TIGHTENING TOOLS

Using controlled tightening tools such as a torque wrench (Fig. 10) is helpful in minimizing the risk of causing VETRITE to crack when being worked in order to install accessories onto VETRITE. Nonetheless, this is just one of the several elements at play when working VETRITE.

Fig. 10 Example of torque wrench

Other factors relevant to the working of VETRITE are the following:

- whether adhesive was evenly spread or not, below the area there tightening takes place;
- whether the holes/edges have been polished or not;
- the distance between holes and slab/tile's edges;
- VETRITE's thickness;
- presence of gaskets that absorb the pressure applied on VETRITE during the tightening;
- amount of points that are tightened for each accessory;
- the way tightening is carried out (each point has to be tightened with increasing strength; move from point to point, applying progressively increasing strength on them each time; do not tighten each point completely and then start tightening the other points: keep on moving from point to point, applying more strength each time);
- area of contact between the accessory being tightened and VETRITE.

The two following examples make clear how all the above mentioned factors are at play when tightening accessories onto VETRITE:

- When installing a wall mounted sanitary fixture* with noise reduction gasket to be tightened in 2 anchoring points, it is possible to reach a strength of 7 Nm using a torque wrench (controlled tightening tool) without the slab to crack. This is mainly due to how wide the surface onto which the strength of the tightening operation is distributed;
- When installing a faucet* with 2 anchoring points onto a support on which adhesive has been evenly spread and no void between VETRITE and the adhesive layer has been left, it is possible to reach a strength of 1,5 Nm without micro-cracks to form onto VETRITE's surface. When installing the same faucet onto a support onto which adhesive was NOT applied around/below the anchoring points and voids below VETRITE around the anchoring points have been left, even a strength of as little as 0,5 Nm may cause VETRITE to crack.

Fig 11 Example of eccessive tightening

These two examples make it clear how there is not an absolutely accurate rule for determining in advance the appropriate strength to apply when tightening a hanging accessory onto VETRITE. The goal of tightening operations is to fix the accessory to VETRITE, in a way that is appropriate to the use the accessory is destined to. Exceeding in the strength applied when tightening only increases chances of VETRITE to crack .The skills and the experience of the installation worker are decisive conditions in order for a well performed installation to be delivered.

* The elements tested for these examples and values mentioned are NOT to be considered as binding rules for determining the strength to apply when installing hanging accessories onto VETRITE; they are to be just considered examples of how much the appropriate amount of strength can vary, and of how important the caution to be applied by the installation worker is.

9. MANUAL CUTTING OF VETRITE USING THE GLASS CUTTER

If VETRITE has to be cut manually, it is mandatory to observe the following recommendations and precautions:

- the cutting marks must be made and coincide perfectly on both sides;
- the pressure parameters, wheel size, speed etc. must be established on the basis of the thickness of each slab, depending on whether it is to be installed on the floor or a wall;
- the cutting line must be lubricated with a suitable type of oil that is sufficiently volatile and easy to wash off;
- the breakout must be made independently on each slab and be adjusted in such a way to prevent the surface from flaking;
- the decorative polymeric films can be separated by cutting with a razor blade;
- during the last 2 phases mentioned, make sure not to cause any detachment of the layers VETRITE is made of, as such detachments could later result in aesthetic alterations of VETRITE.
- always prevent the formation of flakes;
- once cut, the slabs must be kept separate using purpose-built separators;
- watch the relative tutorial videos available on the Internet:
  - https://www.sicisVETRITE.com/eng/Video
  - http://id.tudou.com/i/UNDI0Mjc5NTYwOA==/playlists?spm=a2hzp.8253876.0.0&order=4 (Chinese version)

Work conditions:

- cutting staff must wear clean gloves;
- all equipment, work benches, conveyor belts etc. that may come into contact with VETRITE must be kept clean at all times;
- if the slabs are cut using templates, ensure that they are scrupulously clean;
- any personalised cuts in more than two slabs of VETRITE can only be carried out using a Waterjet machine.

10. CUTTING VETRITE WITH THE CIRCULAR SAW

VETRITE can be cut using the circular saw machines usually available on construction site and often used by installation workers. Several tutorial videos are available on the internet, including the following:
https://www.youtube.com/watch?v=5rXwI6XeYSc
https://youtu.be/lm6G6yHb3so

In order to cut VETRITE, we specifically suggest to:

- Use disks specifically designed for glass (i.e. D151 disk without circumference interruptions), which allow for enhanced safety and performance in the cut operations if compered to multi-purpose saw blades;
- Use suitable tools to keep the saw blade sharp;
- Make sure that the circular saw machine is equipped with a well-functioning cooling system;
- Use a machine in good conditions, stable and that does not vibrate much during the cut operations;
- Keep to a minimum the portion of the disk that stays below slab/tile that is being cut.

Blade's speed during the cut: 300 - 1000 mm/minute.

The blade's speed that has to be kept during the cut depends on several factors:

- VETRITE's thickness;
- whether the cut is a 90° or a 45° cut (in the latter case, decrease the speed by around 40-50%);
- at the beginning and at the end of the cut, reduce the blade's speed by around 40-50%.
- conditions of the disk used to cut VETRITE (diamond's size, kind of binder, thickness of the diamond part, etc.);
- conditions of the machine.

It is important to remember that when cutting VETRITE using the circular saw, VETRITE must be cut with one straight cut that, in just one movement, breaks both the glass layers of VETRITE. In other words, unlike what is required for the manual cutting of VETRITE performed using the glasscutter, do NOT cut one glass layer and then the other. On the contrary, VETRITE must be cut by the circular was in just one single movement of the saw. Noncompliance with these guidelines might result in the water used by the circular saw not flowing below the slab being cut and encountering instead the resistance by a non-completely cut layer of glass, and therefore flowing inside of the polymeric decoration between the two glass layers of VETRITE. These infiltrations may result in aesthetic alterations of VETRITE. It may also happen that such aesthetic alteration become visible not immediately after the incorrectly performed cut but after a relevant amount of time has elapsed.

11. WATERJET CUT

Waterjet machines are commonly used to treat materials, such as marble and metal, that are substantially different from VETRITE. Whoever is used to using the Waterjet machine for working such materials and intends to use it in order to work VETRITE is required to respect given parameters when setting the machine and to comply with specific guidelines that have the goal of granting that the integrity and the beauty of the VETRITE slabs subject to the Waterjet cut are preserved. This paragraph specifies the parameters to adopt when setting the Waterjet machine in order to cut VETRITE and provides the guidelines to follow in order for the Waterjet cut to be performed in a proper way. Several tutorial videos are available online on this topic, including the following:
https://www.youtube.com/watch?v=RUGe3jjB_4o
https://www.youtube.com/watch?v=V_0RkZfOwkg

Waterjet - parameters

waterjet settings		
tubo della sabbia	abrasive feed tube	polyurethane tubing ,038
abrasivo	abrasive	sand 80 mesh
portata abrasivo	rate of abrasive	250g/min
velocità di taglio	cut speed	950mm/min
rubini	orifice	0,254mm
raggio taglierina/compensazione	waterjet ray/compensation	0,5 mm
hp	hp	1500psi
bp	lp	500psi
pressione acqua in entrata	entering water pressure	6 bar
focalizzatore	focusing tube	7.14x1.02x76.2mm
nesting settings		
software	software	Lantek
separazione fra pezzi	Distance between torches	4mm
valori degli attacchi in entrata	lead-in value	7mm
valori degli attacchi in uscita	lead-out value	5mm
valore dei ponticelli	dimension of the bridge	0,1mm
tempo di foratura in Bp	time LP static piercing	2 sec
tempo di foratura in Hp	time HP static piercing	2 sec
distanza del getto dalla lastra	head distance from the slab	2mm

Work surface

Before launching the machine, it is mandatory to lay the VETRITE slab onto a flat work surface. The slab must be laid onto a flat and non-continuous surface (such as a grid with a mesh measuring 15x50 mm, see fig. 12). It is important that the surface onto which VETRITE slabs are placed is perfectly planar and does not move while the cut is being performed. If the slab was laid onto a continuous surface (such as a marble slab), the jet of water proceeding at normal cut speed that pierces the slab and hits the underlying surface would cause the so called "bounce effect", which would damage the VETRITE slab. Likewise, the VETRITE slab would be damaged by the movement of the jet of water proceeding at cut speed if it was not completely flat. It is thus extremely important to make sure that these requisites are fulfilled before performing the Waterjet cut.

Fig. 12 Example of a correctly arranged work surface

Breakthtough

Experience shows that the most critical phase of the Waterjet cut is the breakthrough. Breakthrough is the moment when the machine opens the jet and the jet pierces the slab for the first time. A point above the work surface in which the machine opens the jet is designated. The jet starts at low pressure and, after a static piercing time that we suggest to set at 2 seconds, switches to high pressure. After 2 more seconds of static piercing at high pressure, the jet, already at high pressure, starts to move and goes on performing the cut by moving along the cut trajectory that the operator had previously set using the machine's software. Breakthrough performed in an improper way may cause the slab to crack and break.

Performing the breakthrough in the proper way allows to preserve the integrity of the slab. To this end, we now provide the guidelines to follow when cutting VETRITE using the Waterjet machine:

- Perform the breakthrough not directly onto the perimeter to be cut, but at least 7 mm away from it (this phase is called "lead-in"; see "lead-in value" in the chart above). In case you are not experienced in the field of Waterjet cutting and want to be particularly cautious, start this pre-cut phase at a greater distance from the cut trajectory;
- It is always preferable, when possible, to perform the breakthrough outside of the slab's surface. In case it is not possible (for instance, when performing the cut in order to make a slot onto the slab's surface), do the breakthrough onto a part of the slab's surface that will be then removed. This way, the breakthrough and the switch from low pressure to high pressure will happen outside of the cut trajectory and the jet of water will reach the cut trajectory after that the breakthrough has already taken place and already at high pressure;
- The "lead-in" phase described above gives the operator the time necessary to check that the jet of water properly works before that it reaches the cut trajectory. During this time, in case the jet of water does not work as planned, the operator can stop the machine and change its settings. During the lead-in phase the jet of water, already at high pressure, moves slower than its normal cut speed (we suggest to set the machine in order for the lead-in speed to be around 2/3 of the cut speed), giving the operator enough time to make sure that the machine and the jet of water work properly.

The parameters featured in the chart above are those that SICIS's experience has revealed to be optimal for cutting VETRITE using the Waterjet machine, whichever the machine used to perform the cut is. VETRITE is a complex of different technologies and different materials having different characteristics and physical and mechanical resistances, mixed in order to develop a wide range of esthetic effects. Furthermore, the Waterjet cut is a process influenced by a multitude of factors. For these reasons it is important not only that the Waterjet operators perform the Waterjet cut complying with the parameters specified above, but also that the operators apply to the cut what they have learnt in their personal experience of using the machines at their disposal.
The development of a file that foresees the machine to autonomously perform the breakthrough in the proper way may turn relatively time-consuming. In case the operator intends to cut a high number of VETRITE slabs all having the same size, this approach is obviously convenient since it makes it possible to develop just one file and use it for cutting several pieces, resulting in a significant optimization of work time. Otherwise, in case the operator intends to cut just one slab of VETRITE or a limited amount of them, experience shows that it is practically more convenient to manually drill a hole (using an electric screwdriver and a 10-12 mm wide diamond bit) in the point where the breakthrough is foreseen to take place and to only later launch the machine. This way, the jet will do the breakthrough and will switch from low to high pressure without physically hitting the VETRITE's surface and will only then, after that the breakthrough has already happened and the jet is already at high pressure, start to move along the cut trajectory.

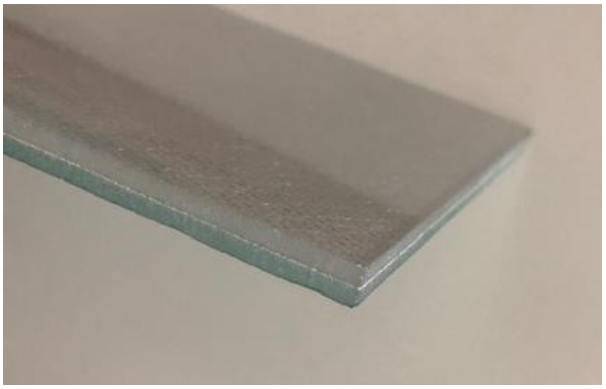

Fig 13 Example of Waterjet-cut edge

Warnings regarding the Waterjet cut

A correctly performed Waterjet cut looks like that depicted in fig. 13. If the slab's edge cut with the Waterjet looks different, it means that the Waterjet cut has not been correctly performed.

Fig 14 Example of edge resulting from a Waterjet cut in which too little abrasive was used and cut speed was too high – upper glass layer

Fig 15 Example of edge resulting from a Waterjet cut in which too little abrasive was used and cut speed was too high – lower glass layer

An edge cut with the Waterjet machine in an improper way is marked by the presence of flakes on the lower glass layer (such flakes are not present in a correctly cut edge). This can be due to several factors:

- An insufficient amount of abrasive was used to perform the cut;
- Cut speed was too high if compared to the other parameters (VETRITE's thickness, water pressure, amount of abrasive, etc.);
- The Waterjet machine releases the abrasive in an intermittent, non-continuous way. This can be due to:
    - The abrasive is wet;
    - Presence of unwanted residues mixed with the abrasive (residues of paper, rust, etc.);
    - Poor quality of the abrasive;
    - The machine's dosage system does not work properly.

The presence of flakes on the Waterjet-cut edges are the evidence of an incorrectly performed cut. More specifically, edges have the features shown in fig. 14 and 15 when the jet of water correctly cuts only the upper glass layer, while the lower glass layer is "slashed" but not completely and neatly cut.
When the slab being cut is in these conditions, the water at high pressure used to perform the cut does not flow below the slab's lower layer but tends to infiltrate between the two glass layers, at the height of VETRITE's polymeric decoration. Such water infiltrations can, even after a relevant amount of time, result in aesthetic alterations of VETRITE.

It is important to underline that in practice it is not always easy to recognize the difference between a non-correctly performed Waterjet cut and a correctly performed one, especially when the flakes resulting from a non-correctly performed cut are removed after the slab has been cut. In other words, an edge non-correctly cut might look like a correctly cut one when looking at the edge; nonetheless VETRITE may undergo aesthetic alterations of its polymeric decoration even after a relevant amount of time has elapsed. It is thus strongly suggested, when not directly working VETRITE, to outsource the working of VETRITE only to trusted and reliable partners. Avoid any non-reliable operator.

Removing the slab from the work surface
Once the Waterjet cut has been performed, it is necessary to lift the slab up and remove it from the work surface. In order for the slab not to crack and break during this operation, use appropriate tools (i.e. suction cups) and make sure that the slab never bends when being lifted up. Make sure that the slab remains in a straight position during the whole operation. Chose and put into practice the most appropriate way to lift the slab up depending on its size, the presence of drills, slots or notches onto the slab's surface, their number and their size.

12. EDGE POLISHING

VETRITE supplied in standard sizes, custom sizes and in compositions features edges that, when not explicitly decided together with the client, depend on SICIS's production standards and might be different depending on the slab's size and color. Usually (but not necessarily, as the following piece of information is not binding unless the edge finish has been previously and explicitly settled), the following applies:

- Alma, Aluminium, Antique, Antique Ocra, Antique Blue, Antique Green, Mirror, Vis One and Vis Two come with the "straight" edge (fig. 16);
- All the other colors come with the "rounded" edge (fig. 17).

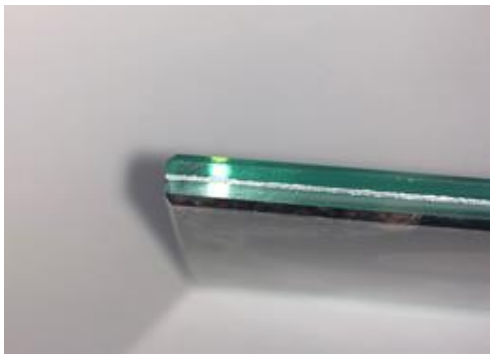

Fig. 16 Example of "straight" edge

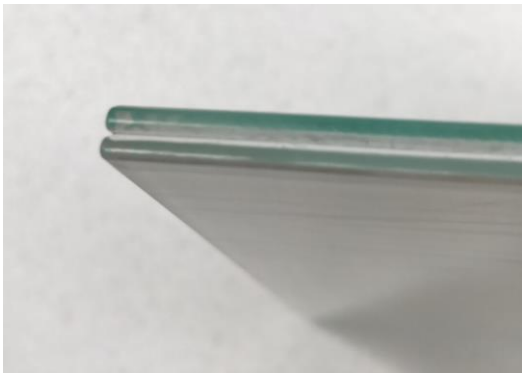

Fig. 17 Example of "rounded" edge

Waterjet-cut items with edges that have not been polished come with the "Waterjet-cut" edge shown by fig. 12 (see above).

Jolly edge / 45° edge

VETRITE's polymeric decoration is inside of the VETRITE slab, between the two glass layers. The distance between the slab's surface and the decoration may vary depending on the color of VETRITE and on VETRITE's thickness (6, 10 or 20 mm). The jolly edge, also known as 45° edge, is achieved through the removal of a small portion of the glass and the polymeric decoration. This might result in the fact that the slab might end with few mm of glass with no decoration below them that, as consequence, look completely transparent. This features becomes more visible the thicker the VETRITE slab (or moulding) is.

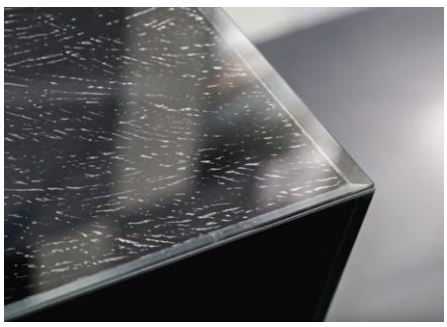

Fig. 18 Example of Jolly edge / 45° edge

13. EDGE PROFILING

It is possible to work VETRITE's edges with pieces of industrial machinery such as profiling units (also known as "straight machines") or CNC machines. These machines remove portions of on VETRITE's edges through the action of grinding pads (with grain that becomes gradually finer) and pressurized water. The water is necessary in order to constantly cool down the glass and offset the friction caused by the grinding pads. Edges worked this way not only look aesthetically better, they also become more resistant. The action of the profiling unit eliminates all the micro cracks formed during the cut that, if left of the slab's edge, could become the origin or a wider crack that spreads onto the slab's surface. This kind of machinery allows for the creation of:

- "Straight" or "rounded" polished edges;
- Jolly edges / 45° edges or edges having different angles (i.e. beveling, etc.);
- Edges having other kinds of profile or shape.

Different machines feature grinding tools (wheels) that may work in different ways and apply a different amount of force onto the glass:

- Some machines may apply force on the glass in a perpendicular way, like in the case of profiling units (fig. 19);
- Some machines may apply force on the glass in a tangential way, like in the case of CNC machines equipped with peripheral wheels (fig. 20).

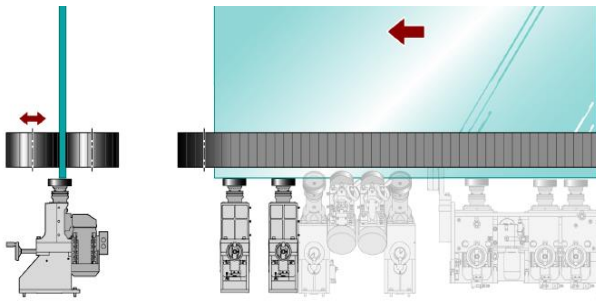

Fig. 19 Example of profiling unit ("straight machine")

Fig. 20 Example of peripheral wheel

In both cases, the consumption of the grinding tools is a natural consequence of the machine's use. In order for these machines to properly work, it is necessary to keep the machine clean, upkept and correctly set at all time. Not making sure that these machines are in good conditions and work properly at all time could lead to the alteration of the actual parameters with which these machines work VETRITE. In other words, even if the machine's parameters are correctly set (pressure, speed, etc.) but the state of consumption of the grinding tools has not been considered, the machine used to work VETRITE could cause:

- Evident problems (such as the breaking of the glass or an incorrectly performed cut);
- Hidden problems (such as the infiltration of water inside of VETRITE's polymeric decoration).

In the second instance, the deficiency in the treatment of VETRITE might not be immediately visible; nonetheless it might be enough to cause, even after a relevant amount of time, aesthetic alterations of VETRITE. It might be not always easy to spot this kind of non-evident problems. In other words, the slab's edge could have been worked improperly but look, apparently, as it had been properly worked.

Still, the aesthetic alteration of VETRITE resulting from the improper working could become evident only after a relevant amount of time has elapsed. It is strongly suggested, when not directly working VETRITE, to outsource the working of VETRITE only to trusted and reliable partners. Avoid any non-reliable operator.

It is thus necessary to make sure that:

- The machine used to work VETRITE is suitable to this end;
- Utensils specifically designed for laminated glass* are used, and that such utensils are of good quality;
- The machine's parameters are correctly set and suitable to the working of VETRITE.

*These are grinding utensils that have the characteristic of allowing for a better cooling of the glass's surface if compared to utensils designed for standard glass.

Profiling unit (straight machine) - parameters

Water pressure: 1.5 bar
Rounds per minute (RPM): 1400 rpm
Speed: 2.5 m/min
Removal: 2 mm
Absorption: 0,1-0,3 A

CNC machines equipped with side cutters - parameters

	Raw grinding wheel	Fine grinding wheel	Polishing wheel
VETRITE 6 mm - removal	0,5-1 mm	0,5 mm	none
VETRITE 10 mm - removal	1-1,5 mm	0,5 mm	none
VETRITE 6 mm – absorption	0-1 A	2-3 A	adaption to 5 A*
VETRITE 10 mm – absorption	0-1 A	2-3 A	adaption to 6 A*
VETRITE 16 mm - absorption	0-1 A	2-3 A	adaption to 8 A*

* It is a function of the machine in which the placing of the utensil depends on the engine's absorption rate, so that the distance between the wheel and the glass is kept constant.

As for the parameters mentioned for the Waterjet cut, the parameters featured in the chart above are those that SICIS's experience has revealed to be optimal for working VETRITE using this kind of machinery. For this reason, it is important that the operators apply to working with these machines what they have learnt in their personal experience of using the machines at their disposal.

Parameters and characteristics of cooling water

Comply with the guidelines provided by the machine's manufacturer regarding the quality of the cooling water.
When VETRITE's edges are being worked, it is possible that some cooling water enters inside of VETRITE's inner decoration. That water will then evaporate. Still, it is possible that some of the impurities that are present inside of the cooling water remain inside of VETRITE's inner decoration even after that water has evaporated, resulting visible even after the working of VETRITE's edges has ended. This phenomenon may be visible in particular in darker colors (i.e. Feather Black in Fig 21).

Fig. 21 Example of impurities remaining onside of VETRITE's inner decoration after the water has evaporated

14. CLEANING VETRITE BEFORE LAYING

Before installation, VETRITE must be cleaned using clean water, if necessary with a small quantity of neutral detergent.
Avoid any acid and/or abrasive detergents (in particular those containing hydrofluoric acid and/or any other substance mentioned by the paragraph of this manual dealing with the substances non-compatible with VETRITE).
Before cleaning, eliminate any residues that might scratch the surface of the glass (grains of sand, fragments of glass, particles of rust).
In the case of automated cleaning, to prevent any damage to the glass surface it is necessary to regularly check the level of hardness and cleanliness of the brushes, the washing equipment and the water used for washing.
Should residues of limestone be visible on VETRITE's surface following the working of VETRITE, remove them prior to installation.
Dry VETRITE immediately after cleaning.

15. LAYING VETRITE

In terms of laying operations, the VETRITE slabs can be considered on a par with ceramic elements. For this reason, the planning and actual laying of the slabs must be carried out in line with the national regulations and standards for the installation of ceramic materials in each country, such as the Italian standard UNI 11493, which provides the indications necessary to ensure that the required levels of quality, performance and durability are reached. For the installation of large formats (slabs with a length equal to or exceeding 59.3 cm), we recommend referring to paragraph 7.13.8 of the standard UNI 11493.
As an example, we have provided below some requirements that should be followed in general.

Substrates - Before laying, check that the substrates are clean, free of any loose parts, sufficiently dry and cured, flat and at the right height, and have an adequate level of mechanical resistance.

Site conditions - Check that the conditions of temperature, humidity, light, etc. are adequate at the time when the products are installed.

Materials - Check that all the materials used during installation (slabs, levelling compounds, skim coats, adhesives, sealants, waterproofing products, etc.) are suitable for the intended use and correctly stored.
Do not use bituminous sheath for waterproofing purposes or sheathing in vulcanized rubber for sound insulation purposes in case you intend to lay VETRITE. These kinds of coating include sulfur, which may react with VETRITE resulting in red halos in the areas adjacent to VETRITE's edge.
Likewise, make sure that VETRITE are not installed in combination with any of the other substances mentioned by the paragraph of this manual dealing with the substances non-compatible with VETRITE.

Dilation joints - Check that all dilation joints, that serve the purpose of absorbing any movements/vibrations of the wall, have been properly planned and arranged. In general, these joints are sealed with a neutral curing silicone.

Single adhesive coating - Installations that envisage a single coating (application of adhesive to the substrate only) are permitted for formats that are applied to walls, with their longest side measuring less than 59.3 cm, and only on stable supports that are not exposed to vibrations and/or dimensional movements or dilation. The grooves on the adhesive spatula must in any case ensure that the adhesive is spread evenly over the substrate, with a coverage of 70-80% of the slab.

Double adhesive coating - For the installation of large formats (slabs with a length equal to or exceeding 59.3 cm), which are to be installed on the floor or in wet rooms/swimming pool areas, the adhesive must be applied both to the substrate and the back of the slabs, so that the adhesive covers the entire surface without leaving any gaps. For this reason, we recommend applying the adhesive to the substrate with a toothed spreader of 6x6 mm, and to the back of the slab using a toothed spreader of 3.5X3.5 mm.

Joints - Leave joints among the slabs/tiles. The width of the joints will depend on the following parameters:
• slab format;
• mechanical characteristics of the substrate;
• room and atmospheric conditions of the room in which the slabs are to be installed.

Pursuant to the standard UNI 11493, the slabs may not be installed without joints. Any plastic spacers must be removed before grouting.
To ensure that walls covered with large formats are perfectly flat, we recommend using self-levelling spacers.

16. CHOOSING THE ADHESIVE

Indoor walls in residential, public/commercial buildings	
Substrates	Adhesive
Plaster in lime/cement	Hyperflex K100 - Litoelastic
Gypsum-based plaster[1]	Hyperflex K100 - Litoelastic
Concrete poured directly during installation [2]	Hyperflex K100 - Litoelastic
Precast concrete	Hyperflex K100 - Litoelastic
Existing substrates consisting of old ceramic, mosaic or stone tiles [3]	Hyperflex K100 - Litoelastic
Substrates waterproofed with Hidroflex, Aquamaster, Elastocem, Coverflex	Hyperflex K100 - Litoelastic
Panels in cement and fibre cement	Hyperflex K100 - Litoelastic
Slabs of waterproof/non-waterproof plasterboard	Hyperflex K100 - Litoelastic
Lightweight panels	Hyperflex K100 - Litoelastic
Wooden or metallic surfaces	Litoelastic
Furnishing accessories	Litoelastic Neutral silicone
Indoor floors in residential, public/commercial buildings	
Substrates	Adhesive
Cement-based, seasoned screed, separate or floating	Hyperflex K100 - Litoelastic
Cement-based screed, heated after the pre-heating cycle	Hyperflex K100 - Litoelastic
Sanded anhydrite screed, treated with Primer C[1]	Hyperflex K100 - Litoelastic
Smoothed concrete	Hyperflex K100 - Litoelastic
Existing substrates consisting of old ceramic, mosaic or stone tiles [3]	Hyperflex K100 - Litoelastic
Wooden or metallic surfaces	Litoelastic
Wet rooms/indoor pool areas	
Substrates	Adhesive
Substrates waterproofed with Hidroflex, Aquamaster, Elastocem, Coverflex	Litoelastic

Key
(1) After treatment with Primer C in the case of Hyperflex K100. Maximum humidity = 0.5%
(2) Seasoning time: at least 6 months.
(3) After being cleaned and degreased with a solution of caustic soda or by sanding the surface.
(4) After treatment with Primer C for plasterboard that is not waterproof.

17. ADHESIVES

Hyperflex K100: Cement-based, single component adhesive in white or grey manufactured by Litokol S.p.A.: high-performance, extremely deformable, very low emission of volatile organic substances, no vertical slip and extended open time of class C2TE-S2 according to EN 12004 and EN 12002 for the installation of ceramic, natural stone and mosaics on both indoor and outdoor floors and walls. Suitable for tiles-on-tiles, heated flooring and installation on façades. Product developed using the new *Litokol Dust Reduction* system, which limits the amount of dust produced during the mixing phase.

Litoelastic: White reactive epoxy-polyurethane adhesive with two components in class R2T according to EN 12004, no vertical slip, suited to the installation of any type of ceramic, natural stone and mosaics on traditional substrates or difficult substrates, such as metallic, wooden and fibreglass substrates, on both indoor and outdoor floors and walls, manufactured by Litokol S.p.A. Suitable for overlapping tiles and heated flooring.

18. SEALING THE JOINTS

Prior to sealing the joints, make sure that the gaps between VETRITE slabs/tiles are perfectly clean. Keep in mind that any residue will be visible once the VETRITE has been laid.
Make sure you remove the following residues:

- residues of adhesive used for laying VETRITE;
- any other residue deriving from operations carried out on the construction site that may have fallen onto the gaps between glasses (for instances: residues of wood, residues of steel that may undergo oxidation over time and lead to red halos, etc.).

Grouting operations must take place within a limited amount of time from the laying of VETRITE. The exact amount of time before which grouting must take place depends on the laying materials used and on the environment of the construction site. In other words, we advise on one hand to comply with the time required for the hardening/polymerization of the adhesive as per pointed to by the adhesive's manufacturer (in most cases it will be at least 24 h) and, on the other hand, to carry out the grouting operations within 5 days from the laying of VETRITE. In the case of VETRITE used as flooring material, consider that any residue deriving from operations carried out on the construction site will fall onto the floor (where not-yet-grouted VETRITE is) and will possibly dirt and react with VETRITE. The area of VETRITE where such residues tend to gather the most is between the two glass layers, at the level of VETRITE's inner decoration. This area, once VETRITE has already been laid, is particularly hard to reach and clean. Aesthetic alterations due to contaminations by residues fallen onto not-yet-grouted VETRITE may become visible even after weeks from the laying operations. The aforementioned considerations underline the importance of timely grouting of VETRITE, especially when VETRITE is laid on the floor. Make sure that VETRITE is not contaminated by and reacts with any of the substances mentioned by this manual's paragraph dedicated to substances that are non-compatible with VETRITE.

Laid but non-grouted VETRITE, be it just a slab or a more complex composition, is more subject to oxidation or color change phenomenons, reason for which grouting is always suggested.

It is suggested to perform the grouting operations Starlike, the bi-component epoxy-based grout produced by Litokol. Before grouting, we suggest you to try the grouting material on a limited area of the surface to grout, so to verify the aesthetic of the grouting material used and the way it matches VETRITE.
For the final cleaning and to remove any halos of epoxy resin, use the detergent Litonet/Litonet Gel by Litokol S.p.A., 24 hours after grouting.Litonel is a strongly basic substance. If directly in contact with VETRITE's inner decoration, it can damage the decoration and alter VETRITE's aesthetic. In order for this not to happen, before applying Litonet make sure that:

- there are no holes in the grout;
- Litonet is NOT used to clean VETRITE before VETRITE is grouted;
- Litonet does not accidentally make contact with VETRITE during the on-site working.

19. EXPANSION JOINTS

When the surface onto which VETRITE is laid undergoes relevant amounts of vibration, movements due to humidity / movement of the ground / heating systems installed below the surface / etc., it is always suggested to foresee elastic expansion joints so to compensate for the underlying surface's expansion / contraction. Even when installing VETRITE next to materials having different coefficients of thermal expansion (i.e. steel, brass, aluminum, etc.), it is strongly suggested to foresee suitable expansion joints.
Such expansion joints are usually sealed using the neutral silicon such as Ottoseal S70 manufactured by Ottochemie.

20. APPLICATION OF VETRITE IN WET ROOMS/INDOOR POOL AREAS

VETRITE collection involves different production technologies and it is always wise to check with the sales manager in charge or the SICIS technical department before installation, during the planning stage.
Here are a few tips:

- The finishes that contain fabrics (Athena Gold, Bolis Grey etc., or which derive from the Sicis Tessere Collection or fabrics provided by the customers themselves), must be pointed out beforehand, if they are to be used in humid areas. In this case, the product supplied will undergo a special treatment, which will affect the appearance and colour of the fabric;
- The finishes that contain fibres are normally sold without any waterproofing treatment. During the life of the product, water and other liquid substances can be absorbed, affecting the appearance and colour of the fabric. This phenomenon can happen if the product is stored for an excessively long time outdoors, on the building site where water is used, or after installation, if it accidentally makes contact with water (broken pipes, leakages etc.);
- In pool areas, depending on the size and design of the pool itself, the format and thickness of VETRITE can be chosen according to personal needs. It is possible, for example, to place slabs and mosaics of the same colour side-by-side in order to follow curved surfaces more effectively.
- For use in a pool, if the size of the VETRITE slabs is increased, we recommend increasing their thickness depending on the format. For formats in which the longer side exceeds 59.3 cm, we recommend a thickness of 10 mm in order to compensate the water pressure in either direction.

- In addition to the normal waterproofing systems, once the holes have been made for the water inlets/spotlights, we recommend sealing any gaps manually applying a layer of two-component epoxy-polyurethane adhesive such as Litoelastic produced by Litokol S.p.A., or a neutral silicone such as Ottoseal S70.
- VETRITE is recommended for indoor use, so also for pool areas it can only be used for internal applications. Outdoor use is not recommended.
- In application scenarios in which optimization of small spaces are particularly important and mechanical forces applied onto the laid materials might be very relevant (for instance, in the nautical sector), the installation of VETRITE is to be designed and realized taking into consideration also the possible presence of technical spaces next to where VETRITE is installed. For instance, the bottom of a swimming pool on a yacht or cruise ship might coincide with the ceiling of a technical space below in which there may be cables, electrical plugs, etc. Risks possibly affecting this installation scenarios might derive from further working on the technical spaces next to where VETRITE is installed (i.e. drilling, installation of new fixtures, etc.) that could lead to the breakage of VETRITE.
- In order to compensate for any movement (structural movement or movement of the ground) that could affect the swimming pool, expansion joints must be foreseen in all the corners and angles of the swimming pool. The joints must be sealed using neutral silicon such as OTTOSEAL S70, manufactured by Ottochemie. This product is available in several colors, possible to match with the color of the grouting material used in order to fill the joints among slabs. Furthermore, this silicon is highly resistant in conditions of continuous immersion and in contact with the substances used for the cleaning and sanitation of the swimming pool.
- If VETRITE is used for floors, we always recommend a thickness of 10 mm.
- The Satin finish of VETRITE makes the floor slip-resistant (R10) and make it meet the slip-resistance characteristics required by the standard ANSI A326.3 and ANSI A137.
- Floors treated with Sicisgrip 400 meet the slip-resistance characteristics required by the standard ANSI A326.3 and ANSI A137.

For installation in wet areas, it is always necessary to use a waterproofing membrane. After waterproofing, we advise against applying a second coat of cement-based products. The two-component epoxy-polyurethane adhesive Litoelastic must be applied above the waterproof layer.

For the colors Alma, Aluminium, Antique, Antique Ocra, Antique Blue, Antique Green, Mirror, Vis One and Vis Two, it is necessary to follow the guidelines and warnings regarding the Colibri collection as provided by the installation manual for SICIS's mosaic (available at SICIS's website: www.sicis.com). As adhesive, it is necessary to use the two-component epoxy-polyurethane adhesive Litoelastic EVO or neutral silicon (when silicon is foreseen). For these colours, we advise against the use of cement-based adhesives and grouts, also in rooms that are not exposed to humidity. If the aforementioned colours are applied to lightweight panels to which a coat of cement-based product has been applied, it is always necessary to apply a vapour barrier prior to proceeding to install the slabs. In this case, we suggest to use Primer SK manufactured by Litokol followed by the application of a further layer of Litoelastic EVO. For these colors, it is strongly suggested to lay VETRITE within 12 weeks from the reception of the material.

21. EXPOSURE TO HEAT

VETRITE's versatility allows for a wide and diversified range of applications. In applications marked by exposure to heat, it is always suggested, when planning VETRITE's installation, to keep in mind VETRITE's composition: glass and liquid polymers. As a general guideline, we always advise against letting a heat source directly affect and heat a limited portion of VETRITE's surface.
Glass is considered a poor thermal conductor. When working VETRITE, or once that VETRITE has been installed, it is important to keep this in mind and avoid that VETRITE undergoes any significant thermal shock.
Working VETRITE (cutting, drilling holes, polishing edges, removing superficial scratches, etc.) using tools that have not been duly cooled down (using water in sufficient amount) can cause thermal shock which, in turn, may lead to VETRITE to crack.
Thermal shock takes place following glass's expansion due to a significant variation in the glass's temperature. When two different areas on the same glass surface reach different temperatures, the heated area tends to expand, while the area that remains cool does not. The expanding area of the surface meets resistance by the non-expanding area. Such resistance leads to tensions that may result in thermal shock-induced breaking of the glass. Thermal shock may occur on a glass surface even following relatively small changes in temperature, especially when defects (such as micro-cracks) deriving from incorrect handling or working of VETRITE are present on the glass surface.

Besides the aforementioned working of VETRITE without proper cooling of the glass surface, other sources of heat may be:

- *High degree of solar radiation*: relevant changes in temperature tend to take place in glass marked by a high degree of energy absorption, especially in dark colored glasses. For this kind of glass, the likelihood of thermal shock-induced breaking is higher, and we suggest to keep this in mind when planning the installation of such glasses. It is to be noticed that glasses may break due to thermal shock also before the glass is installed.
- *External sources such as flames, radiators and convection heaters* may irradiate the glass with heat, increasing the likelihood of thermal shock. This is especially so when the heat directly hits the glass surface.

Unwanted consequences of heat: some materials (i.e. stainless steel, profiles in aluminum or brass, etc.) often installed together with VETRITE have a coefficient of linear thermal expansion that is higher than that of glass. This means that when planning to install VETRITE close to sources of heat (this may be the case of kitchens, elevators, hot areas inside of bathrooms, areas next to technical spaces, etc.), it is necessary to take the heat-factor into consideration. In order to prevent thermal variations-related breakings, it is necessary to foresee expansion joints that compensate for the different thermal expansion the aforementioned materials may undergo.
In order to furtherly reduce the risk of dilatation-induced or shrinkage-induced breakings of VETRITE, it is suggested to use flexible adhesive, like Litokol's Litoelastic, or neutral silicone. To the same end, it is also advisable to foresee VETRITE in smaller sizes, leaving space for suitable expansion joints.
The presence of liquid polymers (therefore, organic material) inside of VETRITE implies that VETRITE's inner decoration will undergo a natural and gradual color alteration when constantly exposed to heat for a long time. This phenomenon will be easier to recognize, as time goes by, in lighter colors than in darker colors.

The structure commonly referred to as ***fireplace*** exists in a wide range of dimensions, sizes and materials and may use a wide range of different kinds of combustible. Besides the traditional installation technique, fireplaces built using several new technologies are becoming more and more popular.
At the same time, VETRITE's versatility and beauty are pushing architects and designers to foresee the installation of VETRITE in more and more fields of applications, including the most non-traditional and extreme ones.
Given how many possible concrete application scenarios there are, it is evident that there is not a rule for determining with perfect precision the suitability of VETRITE to this specific application. Here follow some guidelines to keep in mind when considering the application of VETRITE as decoration of a fireplace:

- It is possible to use VETRITE to cover the chimney breast, if the fireplace features a shelf or a mantel on the frontal area of the fireplace. In case the fireplace does not feature any shelf or mantel, please assess whether VETRITE is suitable to the specific installation scenario in light of the structure of the fireplace, the fuel it runs on and how often it is used;
- VETRITE can also be used as shelf or mantel of the fireplace; it can also be used to cover the superior or inferior part of the fireplace. These applications are possible, but it is strongly suggested to assess them case by case depending on the concrete scenario and the structure of the fireplace;
- VETRITE slabs' edges cannot be directly exposed to the flames. Moreover, VETRITE cannot be used to cover the internal walls of the chimney;
- When foreseeing VETRITE for this kind of application, consider the different thermal expansion coefficient of the different laying materials involved in the laying operations. Laying materials must be elastic, to allow for compensation of the different thermal expansion coefficients. Furthermore, expansion joints must be foreseen;
- In light of the composition of VETRITE, which includes an inner decorations made of liquid polymers, it is always preferable, in lack of more precise information regarding the fireplace's structure, to opt for dark colors, instead of light colors, for this specific kind of application.

VETRITE collection involves different production technologies and it is always wise to check with the sales manager in charge or the SICIS technical department before installation, during the planning stage.

22. OPALESCENT FINISH AND BACKLIGHTING

VETRITE includes *opalescent* (semi-transparent) colors such as the *Opalescent* finish of the Gem Glass collection and some colors of the VETRITE collection (Feather Champagne, Elephant Panna, Elephant Calima, Feather Cipria, Iguana Calima, Elephant Tortora, Iguana Tortora, etc.).

In these VETRITE colors might feature, once laid, interferences due to the contact with the below layer of adhesive might be visible. The presence of such interferences depends on:

- the color of the adhesive;
- the way the adhesive has been spread (whether it was spread in a homogenous way or not);
- the kind of spatula that was used to spread the adhesive.

The mark of the teeth of the spatula used to spread the adhesive may be visible through the semi-transparent slab. In order to minimize the degree of visibility of the spatula's teeth on the adhesive layer, spread the adhesive using a fine-toothed (VVVV) spatula, and then flatten the adhesive layer using a flat spatula.
We suggest to always try and spread the adhesive on a small portion of the slab, in order to assess the aesthetical effect, before moving to completing the procedure on the whole surface of the slab.

In case anything had been written behind the slabs (it might be the case of writings having the purpose of identify the slabs during the installation), remember to erase it before installing the opalescent slabs as the writings could be visible through the slab even once it has been laid.

Laying opalescent VETRITE slabs on the illuminating device (i.e. LED panel)

The following guidelines reflect the procedure that SICIS has found to be optimal for the laying of opalescent VETRITE (i.e. opalescent Gem Glass, etc.) onto an illuminating device (such as a LED panel). We suggest using devices that use cold light (4.000 K), so to avoid the interference of warm light (3.000 K) with the colors of VETRITE's decoration (fig. 22).

Fig 22. Visualization of the different effect of cold light (4.000 K, on the left) and warm light (3.000 K, on the right).

Remove the transparent protective film from the illuminating device (if present). Before laying VETRITE onto the panel, clean and degrease both the panel and VETRITE using a suitable detergent and cloths that do not release any fiber onto the panel's or VETRITE's surface.

Due to the transparency of the slab, the following elements will be visible once the slab is installed and backlit:

- Any residue of dirt left on VETRITE's surface or onto the panel's surface;
- Any defect (resulting from incorrectly carried out laying operations, or otherwise caused) of VETRITE's surface or present on the panel's surface;
- The marks left by the teeth of the spatula used to spread the adhesive onto the panel or onto VETRITE.

We suggest trying to put VETRITE onto the LED panel and try to light the panel up before actual laying VETRITE onto it in order to assess that:

- No anomaly or defect is present on the panel or on VETRITE;
- The LED panel works properly;
- The size of the VETRITE slab and that of the LED panel coincide or that they coincide with what had been planned.

Carrying out all the following operations could require a significant amount of time, especially when working with a large size slab. During this time, depending also on the conditions of the working site, the adhesive could harden and a film could form on the adhesive's surface. This makes it more difficult to evenly spread the adhesive and could make the adhesive less adherent, potentially resulting in a less satisfying aesthetical and functional outcome. For this reason, it is advisable starting this procedure only after making sure to have all the material necessary to carry out the laying operations and to carry out the operations with the help of as many people as possible, so to minimize the required amount of time.

Adhesive must always be evenly spread both on the back of the VETRITE slab and on the surface of the LED panel. Pour the mono-component transparent neutral silicone making it flow out of its cartridge using an appropriate "gun", making sure to make flow as much silicon as possible, without restraining the silicon flow.
Spread the adhesive/silicon using a triangular-toothed spatula (VVVV); flatten the adhesive/silicon layer using a flat spatula.
When flattening the adhesive/silicon using the flat spatula, we advise doing it following the VETRITE slab's pattern. Do NOT flatten the adhesive/silicon following straight lines or geometric pattern, as the movement of the flat spatula could, this way, result visible.
Once the adhesive/silicon has been applied onto both the LED panel's and the slab's surface, bring the slab above the LED panel. During the whole length of this operation the LED panel must be turned on. Place the slab above the LED panel. Once the slab has been placed above the LED panel make the slab gently fall onto the LED panel, starting from the slab's shorter edge, in order to make it completely adhere to the LED panel's surface.
If the LED panel is turned on, it will be possible to spot air bubbles and make slight adjustments in the way the slab adheres to the LED panel's surface. Nonetheless, given glass's low flexibility, it will be impossible to completely remove all the air bubbles that remain between the slab and the LED panel. Air bubbles that have not been removed will be visible when the lighting device is turned on. Spreading the adhesive in a homogeneous

way, in compliance with the guidelines provided above, without following straight lines or geometric patterns, will allow to hide as much as possible the air bubbles that remain between the slab and the LED panel.
Neutral silicon, despite being less transparent than more modern materials such as MS Polymer, is more often used because it is easier to spread and hardens slower.
Necessary quantity of silicon per each silicon-spreading operation: around 3-5 cartridges per sqm of surface.

23. RAISED FLOORING (STANDARD AND BACKLIT)

VETRITE's versatility allows for applications as raised flooring, as certified by test reports issued by Certimac:

- SQM 220-2019 in the framework of the EN 12825 standard;
- SQM 221-2019 in the framework of the EN 10545-4 standard.

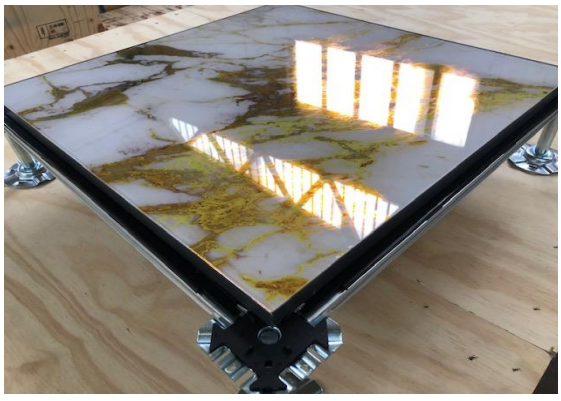

Fig 23 Raised flooring with VETRITE

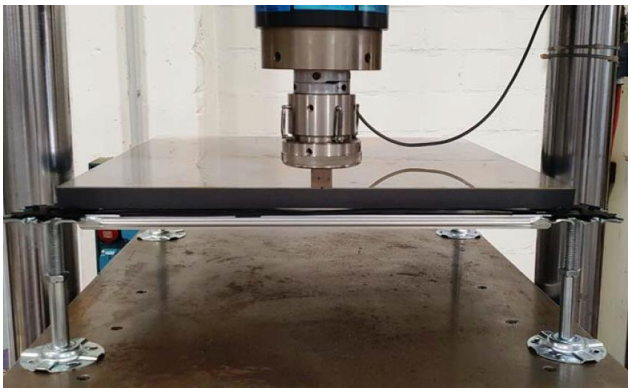

Fig 24 Testing raised flooring with VETRITE

Raised flooring is becoming more and more widespread in shops, office buildings, technical spaces and any other functional space. VETRITE easily allows to decorate these structures.

Standard (non-backlit) raised flooring composed of 25 mm thick units (fig. 23 and 24)

595x595x25 mm flooring units composed of:

- 10 mm thick VETRITE;
- 15 mm thick porcelain layer.

Lay VERITE and the porcelain layer onto the metallic structure, without spreading any adhesive (dry-mortarless installation). The flooring units (VETRITE + porcelain layer) can be saw-cut at the construction site in order to fit the space where installation takes place. Likewise, the flooring units (VETRITE + porcelain layer) are customizable in shape also using Waterjet cut.

Backlit raised flooring composed of 45 mm thick units (fig. 25 and 26)

595x595x45 mm flooring units composed of:

- 16 mm thick (thickness suggested for this application scenario) *Opalescent* finish VETRITE Gem Glass;
- 12 mm thick illuminating device (or equally thick layer of non-backlit material, for the parts not designed to be backlit);
- 15 mm thick porcelain layer.

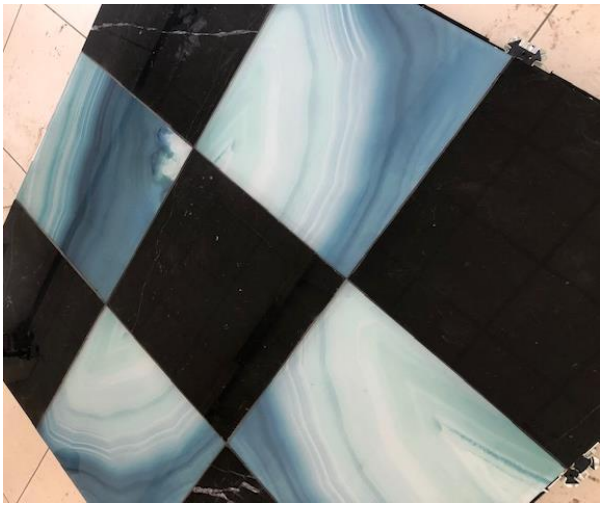

Fig 25 Backlit raised flooring simulation – light off

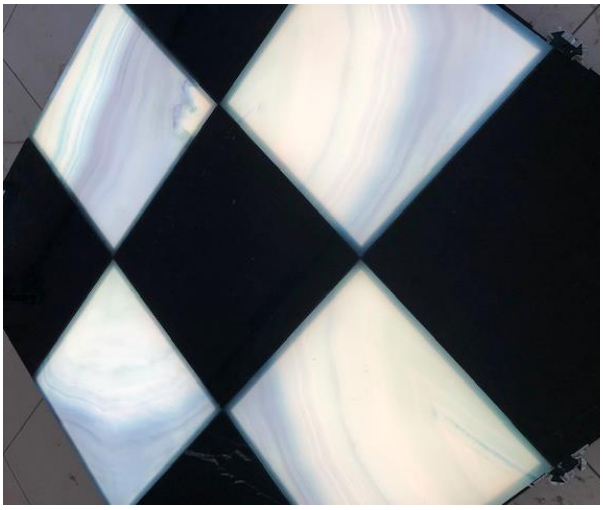

Fig 26 Backlit raised flooring simulation – light on

Usually, in a backlit raised flooring not all the flooring units are backlit; only some of them are. It is not possible to combine 25 mm thick non-backlit flooring units and 45 mm thick backlit flooring units without compromising the floor's overall planarity. It is necessary to only use 45 mm thick flooring units, using for the non-backlit units layers having the same thickness of the illuminating device foreseen for the backlit units. This way, the floor will be overall planar.
Even when foreseeing non-backlit flooring units made of VETRITE Gem Glass, it is suggested using *Opalescent* Gem Glass also for the non-backlit units, and not using *Solid* Gem Glass instead. *Opalescent* and *Solid* Gem Glass, even when having the same color and pattern, do NOT have the same tone and color intensity. The non-backlit flooring units featuring *Solid* Gem Glass will have a different aesthetic from the flooring units featuring *Opalescent* Gem Glass, even when the backlighting system is turned off.

In raised flooring that includes backlit VETRITE, the choice of the illuminating device is essential in order to achieve the desired aesthetical result. To this end, we suggest using illuminating devices that use cold light (4.000 K) and avoid devices that use warm light (3.000 K), as the latter could result in the warm light to interfere with Gem Glass's color and distort the product's aesthetic (see fig. 22).

Even when the installation of a raised flooring has the goal of allowing for the backlighting of VETRITE (and not that of leaving space for the cables and fixtures below the floor, such as cables, electric wires, air conditioning, water pipes, etc.), there is a minimum elevation that the raised floor has to meet in order to leave enough space for the illuminating system's power supply unit. The minimum necessary elevation is around 10 cm. This elevation derives from the necessity to leave enough space (at least 5 cm) for the placing and moving of the power supply unit and the metallic support's stand (fig. 27).

Fig 27 Minimum required elevation

The illuminating device cannot be cut on the construction site to fit the spaces onto which it has to be installed. For this reason, illuminating devices must be installed as they are, making sure in advance that they fit the space into which they are to be laid. When foreseeing to backlight an area of the floor smaller than one unit (it might be the case of a flooring unit close to the wall), the illuminating device must be designed and manufactured in advance with the purpose of making it fit in the flooring section it has to backlight.

The choice of which LED panel to use for the backlighting of the raised flooring can foresee more than one option. Here follow some possible options.

LED panel – custom option (fig. 28 and 29)

The most preferable option is using a LED panel specifically designed with the purpose of being included in a backlit raised flooring. This kind of LED panel has the following characteristics:

- Better aesthetic results (no dark areas along the backlit VETRITE pieces' borders);
- Easier to install;
- Usually higher price;
- Production of a custom solution likely to require more time;
- Possibility to manually set and customize the intensity of the light;
- Possibility to customize the device's shape and size, therefore the possibility of having not only entire 595x595 mm units, but also rectangular units or units with a different size.

Fig 28 Example of customized LED panel - front side

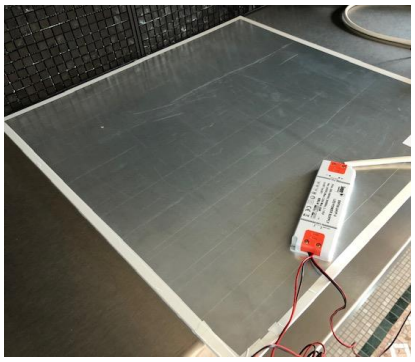

Fig 29 Example of customized LED panel - backside

The alternative option is the use, instead, of illuminating devices not specifically designed for the creation of backlit raised flooring; for instance, the illuminating devices usually used for the illumination of dropped ceiling.

LED panel – commercial option (fig. 30 and 31)

This option has different characteristics:

- Aesthetic influenced by the presence of a frame-shaped shadow area measuring around 20 mm that will be visible when the illuminating device is turned on;
- Low price;
- Easy to find in stores;
- Few necessary adjustments to carry out prior to installing:
  - Fixtures that might be found on the back of the illuminating device and add thickness to it must be removed;
  - The frame that surrounds the illuminating device must be filled with plastic material in order to give the whole illuminating device enough thickness;
- No possibility to manually set and customize the light's intensity;
- No possibility to customize shape and size, hence only 595x595 mm devices are available.

Fig 30 Customized LED panel (left) and commercial LED panel for dropped ceiling (right)

Fig 31 Commercial LED panel: removal of fixtures on the back of the panel

The illuminating device is powered by an electric wire connected to the power supply unit. This means that the porcelain layer has to be drilled and worked to allow for the wire to pass through it and through the underlying metallic structure.
If the power supply unit is close to one of the LED device's corners, it is necessary to create an opening measuring around 50 mm in order to allow for the metallic support's stand to fit in (fig. 32). If the power supply unit is close to an edge (but not to a corner), it is necessary to make a simple hole (fig. 33) or slot (fig. 34).

Fig 32 Example of opening fitting the electric wire to pass close to the illuminating device's corner

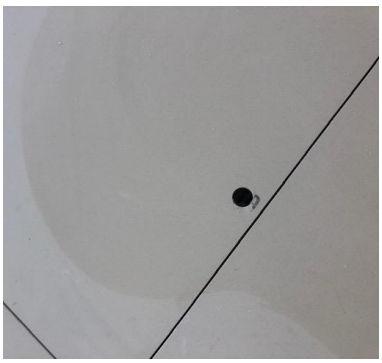

Fig 33 Example of hole for the electric wire

Fig 34 Example of slot for the electric wire

Installation procedure

1. Install the metallic frame and its accessories, following the guidelines provided by the frame's manufacturer.
2. Dry-lay (no adhesive) the porcelain layer above the metallic frame, only on the flooring units that have to be backlit. At this stage, do NOT also lay the porcelain layer onto the flooring units not to backlight. It will be useful to leave some spaces, so that it will be easier to install the illuminating device sand the electric wires and power supply units below the metallic frame.
3. Dry-lay the illuminating devices (after removing the unwanted fixtures and protective films) onto the porcelain layers and make all the electric wires pass through the holes previously drilled to this end on the porcelain layer.
4. Verify that the illuminating devices and all the electric equipment properly work. Keep in mind that any dirt or unwanted material left on the illuminating device's surface will be visible once the illuminating devices are turned on.
5. Dry-lay 16 mm thick Opalescent Gem Glass onto the illuminating device. Make sure that no dirt has been left between the VETRITE pieces and the illuminating devices below them.
6. Dry-lay the following onto the flooring units that will not be backlit :
    a. the porcelain layers;
    b. the layers that give the units thickness instead of the illuminating devices.
7. Dry-lay the pieces that will not be backlit. Make sure to leave 2 mm gaps between the tiles. Use spacers to this end. As no adhesive is involved in this procedure, suction cups will be enough to carry out this operation.

8. Prepare the floor for the sealing (using neutral silicon).
9. Cover the perimeter of all the flooring units using adhesive tape (fig. 35), leaving space to fill the gaps with silicon. Fill the gaps between all flooring units with neutral silicon.
10. Use a flat spatula to make sure that the silicon properly fills all the gaps, and to remove the residues of silicon.
11. Remove the adhesive tape once finished with the sealing operations, making sure not to step on the still not hardened silicon. Do not wait the silicon to completely harden before removing the adhesive tape.

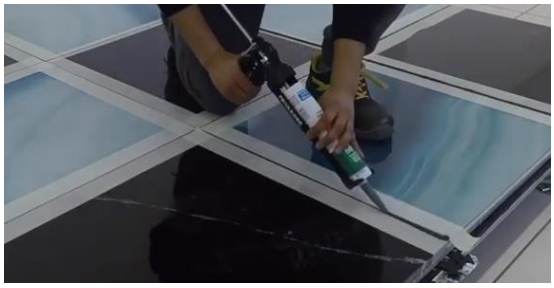
Fig 35 Sealing the gaps using neutral silicon

NOTE:
Backlit raised flooring featuring *Opalescent* Gem Glass is composed of several elements. Furthermore, underneath the raised floor the will most likely several cables, wires and other kinds of equipment (such as those for the water piping, air conditioning, heating, etc.). The necessity of maintenance and working on such structures, that are below the raised flooring, over time will make it preferable to dry-lay the components of the flooring unit (as per guidelines provided to this point) and then seal the gaps on the surface with neutral silicon. It is nonetheless possible to install and/or grout all the layers using adhesive and/or other products such as Starlike.

24. SICISGRIP ANTI-SLIP TREATMENT

SicisGrip is a permanent treatment of VETRITE's surface that gives VETRITE anti-slip properties in compliance with the ANSI A326.3 and A137.1 standards. This treatment is likely to slightly alter VETRITE's aesthetic, being especially visible in darker colors. It might also be possible that, in large size pieces of VETRITE that undergo this treatment, there are areas where the marks left by the treatment overlap. However, this condition does not interfere with the anti-slip treatment's characteristics anyhow.

25. SPECIAL APPLICATONS

VETRITE can also be provided in small sizes, assembled as mosaic sheets. VETRITE supplied this way must be laid in compliance with the guidelines provided by the installation manual for SICIS's mosaic and, in particular, with the guidelines provided for the Colibri collection. This special format of VETRITE might be particularly useful for neatly covering curved surfaces such as arches and curved ceilings.
Large size VETRITE slabs can also be applied on flat ceilings. It is always advisable applying VETRITE slabs on flat ceilings securing the slabs to the ceiling using mechanical structures. Given the peculiarity of this application scenario, it is always advisable to make sure to be in compliance with the local laws and regulations. We advise preemptively contacting SICIS's commercial or technical office when foreseeing these peculiar applications for VETRITE.

26. CLEANING AND MAINTENANCE

The accurate, regular cleaning of the surface will not only preserve their beauty but will maintain the characteristics.
The slabs must be cleaned manually or using suitable equipment, working from the top downwards. We always recommend cleaning a small area of the surface first, to check that the detergent is suitable. Do not spray detergent directly onto the surface of the material, but onto a soft, clean cloth. Do not use any abrasive, aggressive detergents. Avoid detergents or chemical compounds containing hydrofluoric acid or sulfuric acid.
Apply extra caution when cleaning VETRITE that has not been grouted yet or in which gaps between edges have not been sealed yet. Make sure to only use neutral detergents. Make also sure that none of the substances listed as non-compatible with VETRITE by the dedicated paragraph of this manual makes contact with VETRITE.

Cleaning and maintenance of VETRITE with satin finish

First time cleaning. Very dirty glasses must always be cleaned with an abundant amount of clean water, in order to avoid the abrasive action that residues of dirt could apply on the glass's surface. When using detergent sponges, only use sponges specifically designed for glass (those with blue or white felt, never green felt). Never use abrasive detergents. In order to remove particularly resistant stains like oil or limescale, a rubber eraser (such as white Scotch Brite 3M) can be used. In particular, limescale stains can be removed using a specific product designed for limescale-removal, or with vinegar or citric acid (applying them on VETRITE for around 2-3 minutes). In case of even more resistant stains, we advise cleaning the glass's surface using some pumice stone dust powder (usually available in stores). Prior to that, clean the glass surface using soap and water. Then, mix the pumice stone powder with water in order to create a solution. Gently rube the aforementioned solution against the glass's surface. After this, use clean water to clean the glass's surface.
Ordinary cleaning. Even for the ordinary cleaning operations, always use an abundant amount of clean water. As material to use for the cleaning operations, it is suggested to use a microfiber clothes, leather and sponges. As detergent, it is possible to use suitable solvents such as alcohol, acetone or gasoline (depending on the kind of dirt to be removed). To remove grease stains (such as fingerprints) apply regular detergent for glass on the whole surface. Spread the detergent (or other material used for the cleaning) onto the glass's surface using some white, soft, clean and non-filamentous cloth. Do not apply excessive pressure when carrying out this operation, as any abrasion of the glass could leave a halo on the glass. Proceed this way until the detergent has homogeneously dried. The more the moistened surface is homogeneous, the less likely it is that a halo will remain on the surface. Never apply excessive pressure when rubbing on the glass's surface. When wet, the surface of VETRITE with satin finish can feature apparent stains that disappear as soon as the glass dries. Such phenomenon has no real influence on the integrity or on the aesthetic of VETRITE. Alkaline solutions, acids and products containing fluorine must never be used.
Warning: given the great amount of kinds of dirt that there are, it is not possible to provide specific instructions regarding each and every possible kind of dirt. In case of particularly resistant stains, it is suggested to try to clean them in some specific areas of the glass's surface, to assess the result.

27. REMOVING SCRATCHES

VETRITE may become damaged if it is knocked or grazed, but it can be repaired using all the instruments available in stores that have been specially designed for removing scratches on glass.
Watch the tutorial videos available on the Internet (on VETRITE's website: https://www.sicisVETRITE.com/eng/Video or the Chinese version: http://i.youku.com/i/UMzQzMjA3NTc3Mg==?spm=a2hzp.8244740.0.0) and consult the sales manager in charge for further information on the possible solutions available.

Residues of limestone may easily be mistaken for scratches. Unlike scratches, limestone residues can be easily removed using some steel wool or a razor's blade (for VETRITE with the Satin finish, see the dedicated paragraph). Before starting the procedure for the removal of scratches, make sure that those identified as scratches are indeed scratches.
Always follow the instructions provided by the manufacturer of the scratch removal system, explaining how to use it properly and how it works. The principle used by the manufacturers of scratch removal system is that of removing the part of glass around the damaged area until the maximum depth of the scratch is reached.
This operation is carried out using abrasive tools with different granularity.
After the scratch has been removed, the VETRITE surface will lose its glossy finish and will be opaque.
The glass will then have to be restored to its original condition by treating the surface by abrasion with gradually finer grain in order to obtain a shiny finish.The granularity normally used for this operation are 100, 180, 240, 320, 400…… up to the very finest size depending on the manufacturer of the scratch removal system for glass.
For this purpose, the surface must also be polished using pastes containing cerium oxide or mixtures of rare-earth oxides.

Scratches on VETRITE can be:

- Slight, with a depth of < 0.05 mm. In this case, the scratch is visible but not perceivable to the touch with a finger nail. This type of scratch can be removed by simply polishing the surface with pastes containing cerium oxide or mixtures of rare-earth oxides.
- Medium. In this case, the scratch is visible and is perceivable to the touch with a finger nail. Merely polishing the surface is no longer sufficient in this case, and it is necessary to abrade the surface of the glass. We recommend starting with a granularity of 240.
- Serious. In this case, if a finger nail is passed over the scratch, it will go inside the groove and a granularity of 100 is required.

In order not to compromise the final result, it is necessary to follow all the abrasion stages without skipping any step. In the case of doubt regarding the right grain size to choose, use the finest. For example, if grain 240 does not work, try with 180. Never use tools with thicker grain to remove scratches that can be repaired with finer grain.

The abrasion of the surface and the subsequent polishing can create an optical warped effect on the glass, which will be more evident the deeper the scratch. After removing any scratches, this distortion may cause an unpleasant appearance on VETRITE.

During the various phases, ensure that:

- The scratched area is identified and circled, for example using two L-shaped strips of adhesive tape, placed together to form an upturned T. This operation also serves to create an area to catch any residues during abrasion.
- Keep the abrasives flat and parallel to the surface of VETRITE.
- Apply a correct amount of pressure. Help yourself with the noise of the tool: if the pressure is too low (little noise), this will compromise the effectiveness of the removal system, if it is too high (loud noise), it may damage the abrasives and VETRITE itself.
- Keep the temperature of the glass under control, in order to make sure that VETRITE does not crack because of thermal shock and that VETRITE's inner decoration does not undergo any color variation (especially when particularly light VETRITE colors are concerned).

28. GLASS REPAIR KIT

Glass repair kits are very easy to find and purchase, both in shops and on the internet. These kits, originally designed for repairing the glass of cars' windscreen, are also used for repairing the smartphones' screens. They are based on very fluid resins with refraction indexes similar to the glass they adhere to and make harden due to the action of UV rays. These kits (fig. 36) have been successfully used to repair VETRITE.

Fig 36 Example of glass repair kit.

These kits are useful for intervening on broken or chipped glass, minimizing the impact of the damage with no need to replace the glass. Follow the instructions provided in the kit's manual. Use the applier to spread the resin onto the cracked glass's surface, making sure that the resin fills the crack. A simple UV lamp can be used to reduce the resin's polymerization process. In this phase, use the transparent curing strips that come with the glass repair kit. Not using the curing strips might compromise the resin's polymerization and therefore its effectiveness.
Once the resin has hardened, remove the resin in excess using a razor blade (often provided with the kit). Repeat this operation several times, if necessary.

Repairing VETRITE using one of these glass repair kits is easier if the operations carried out on a not-yet-laid slab, as this way it is possible to lay the slabs in a horizontal position and slightly move the slab in order to make the crack open wider and fill it with resin. The same operation will result slightly more challenging if the slab is already installed. Satisfying results have been achieved even when using the glass repair kit to repair slabs destined to be backlit that have a crack on their back. The correct application of resins such as those used by this kind of kit on VETRITE's edges have the effect of slightly improving the edges' strength. These resins can thus be a useful solution for VETRITE slabs/tiles to be used for applications marked by a relatively high risk of breaking.
Considering how these kits are generally very inexpensive, trying to use one of them to repair a slab instead of replacing it right away might turn out to be worthy.

29. GENERAL OBSERVATIONS

The standard production of VETRITE slabs makes it possible to manufacture a great amount of VETRITE slabs maintaining high quality standards in terms of reduced tolerance and precision in the slabs' sizes. The high degree of flexibility that SICIS provides when supplying custom products, even for very limited amounts of small size products, entails that the technologies and machines used for custom productions necessarily have a different degree of precision from those deployed for standard production. For bespoke productions, a higher degree of tolerance in the VETRITE pieces' sizes and in the way the two glass layers that compose VETRITE coincide must be accepted as characteristic of the product. Nonetheless, such variations can be easily adjusted by polishing the slabs' edges and/or foreseeing gaps among them that compensate for the aforementioned variations. Tutorial videos are available on the internet, such as the following: https://www.youtube.com/watch?v=kwhP4Tx0s8Q&t=91s.
Pieces of VETRITE cut using the Waterjet (that performs the cut using a jet of pressurized water and abrasive) may leave small scratches on VETRITE's surface that might be visible if looking at VETRITE from very close.
Inside of VETRITE, especially in *extra large* slabs (slabs measuring more than 120x280 cm) and inside of VETRITE Mouldings, small air bubbles, impurities and/or reflections may be visible. Nonetheless, refer to the dedicated paragraph for the quality assessment of VETRITE.

Substances non-compatible with VETRITE
VETRITE is a glass-based product that encompasses different technologies and components that can undergo damages if exposed, even accidentally, with the substances included in the following list. For this reason, we advise always making sure that laid VETRITE is grouted in a timely manner and that VETRITE's surface and edges are effectively protected when further on-site working is required.

Contamination of VETRITE can happen in two possible ways:

- superficial contamination: the contaminating substance only makes contact with VETRITE's glass surface, without reaching VETRITE's inner decoration. In this scenario, VETRITE is safe. Cases in which superficial contamination may occur: VETRITE laid and grouted, with all the joints/slots/notches sealed;
- peripheral contamination: the contaminating substance reaches VETRITE's inner decoration and make contact with it. Cases in which peripheral contamination may occur: non-grouted VETRITE, VETRITE having joints/slots/notches that have not been sealed yet, not-yet-laid VETRITE that is being kept on the construction site waiting for installation to take place.

The following is the list of substances that, when making contact with VETRITE, may alter its aesthetic.

Sulfur
- Sulfuric acid can be used in detergents and is a component of batteries.
- Bituminous coating used for waterproofing purposes have relevant percentages of sulfur.
- Vulcanized rubber-based coating used for sound insulation purposes include sulfur.
- Sulfur may be present in other substances that are not mentioned in this list.

Superficial contamination: no consequence.
Peripheral contamination: sulfur may alter VETRITE's aesthetic by creating red halos.

Tin

- Thermohydraulics and air conditioning: tin is used in sanitary installations and air conditioning for connecting copper tubes using the braze-soldering technique.
- Tin is used for welding electricity wires.
- Mechanics: alloys that include tin (such as white metal) are used for manufacturing gears and mechanic components such as powertrains. Machines and tools used to work materials on the construction site might be made of such alloys.
- Anticorrosion: tin easily binds with iron; there are instances of tin being used for coating lead, zinc and steel in order to prevent their corrosion.
- Tin may be present in other substances that are not mentioned in this list.

Superficial contamination: no consequence.
Peripheral contamination: tin may alter VETRITE's aesthetic by creating red halos (see Fig. 37).

Fig 37 Example of contamination from tin

Hydrofluoric acid

Hydrofluoric acid is used in detergents and stain-removers, in light of how it can dissolve almost any oxide.

Superficial contamination: hydrofluoric acid may make the glass slightly opaque.
Peripheral contamination: hydrofluoric acid may aesthetically alter VETRITE's inner decoration.

Iron

Iron is a very commonly used element. The main possible causes of contamination from iron are:

- Iron residues deriving from working performed on the construction site: pieces of iron that fall to the ground as consequence of the working of iron/steel using utensils such as angle grinders, drills, etc.
- Presence of iron or iron-based minerals in the surface onto which VETRITE is laid that are dragged towards VETRITE by the water in the adhesive or in other substrates and react with oxygen and sunlight, resulting in the formation of red stains that aesthetically alter VETRITE (see the installation manual for SICIS's mosaic – rev. 9 – July 2019 available on SICIS's website: www.sicis.com).
- The use of rusty tools or pieces of equipment. Iron oxide (also known as "rust") can be easily removed from the surfaces onto which it forms.
- On the construction site, it is usually necessary to use water for the following purposes:
    - as component for hydraulic binders such as cement, leveling agents, adhesive, grout. The main international standards (such as UNI EN 12004, BS 3148, AS 3958.1) require clean and drinkable water to be used to this end;
    - as cooling water for the utensils used on the construction site;
    - as detergent liquid used for cleaning;

Fig 38 Example of contamination from iron

The water used on the construction site may result rich in iron as consequence of:

- the piping system used on the site has not been used for a long time prior to the beginning or the installation works;
- ordinary or extraordinary maintenance of the piping system used in the construction site;
- the chemical/physical composition of the water used on the construction site.

Superficial contamination: no consequence.
Peripheral contamination: iron may alter VETRITE's aesthetic by creating red halos (see Fig. 38).

As there are so many possible concrete scenarios involving VETRITE, this manual cannot be comprehensive of each and every of such scenarios. The guidelines provided by this manual are complementary to those provided by the installation manual for SICIS's mosaic, available on SICIS's website (www.sicis.com). For all that is not explicitly encompassed in this manual, refer to the installation manual for SICIS's mosaic, make reference to the sales manager in charge or the Sicis technical department.

30. VETRITE AND SAFETY

The European standard UNI EN ISO 12543-1:1998 at page 4, paragraph 3 DEFINITIONS, point 8 states: *3.8 Safety laminated glass: laminated glass in which, in case of breakage of the glass, the adhesive layer serves the purpose of withholding the glass fragments, limits the dimensions of the opening in the glass, provides resistance and reduces the risk of harm from cut or penetration* [our translation].
Both in terms of production process and of characteristics of the product, VETRITE complies with this definition.

All instructions contained in this document are given in good faith and on the basis of extensive research conducted by SISIC and LITOKOL in their respective laboratories. However, because conditions and methods of use are beyond our control, this guideline must not be intended as a substitution of necessary preliminary tests, it is crucial to ensure that all the materials are suitable and specifically required for the final singular application.
The partial or total use of different and/or alternative products, considered to be equivalent to those above suggested, as well as different application and/or installation process than those above described relieves Sicis and Litokol from all responsibility in case the final result does not achieve the minimum aesthetic requirement.
SICIS and LITOKOL do not accept responsibility for the results obtained using methods beyond our control. It is the responsibility of the final user to determine the proper suitability of materials for the desired application and to adopt all precautions for the safety of property and persons against any hazards that may be associated with the use of the product. We strongly recommend that each user carries out his own application test before final use. These guidelines shall not be taken as an incitement to infringe any rights under patent protection. All information contained in this document is subject to change without prior notice. Tests were conducted on materials produced and preserved in good condition and free from defects of any kind caused by an unsuitable transport and storage.

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