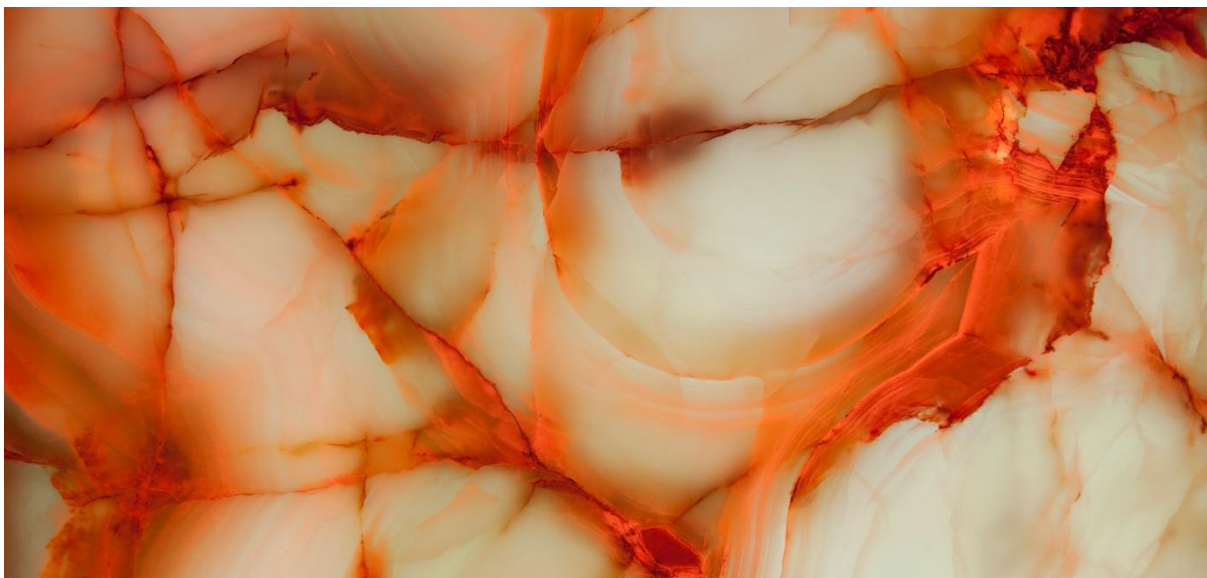


# White paper. Backlight of marble

This white paper is focused on the LED backlight of stone materials.

## Materials

Material like onyx, alabaster or marble are quite used in interior and outdoor design and furnishing thanks to themselves natural characteristics; their colors, brilliances, veins can be additionally emphasized thanks to light.



*Backlit veins. Particular.*

***“Backlighting allows to emphasize veins, colors, depth and amplify onyx and marble texture.”***

In the past the common way to lighting these stone materials was direct light, however the LED fixture introduction allowed to switch to backlighting: put the LED fixture behind the stone material taking advantage its translucency.

Before the LED revolution, onyx and other stone materials backlighting applications could rely on the use of fluorescent tubes, however the dimensions of tubes and fixtures imposed a lightbox thickness of several centimeters and for this reason the final result was not always acceptable:



*Backlighting with fluorescent tubes: missing homogeneity.*

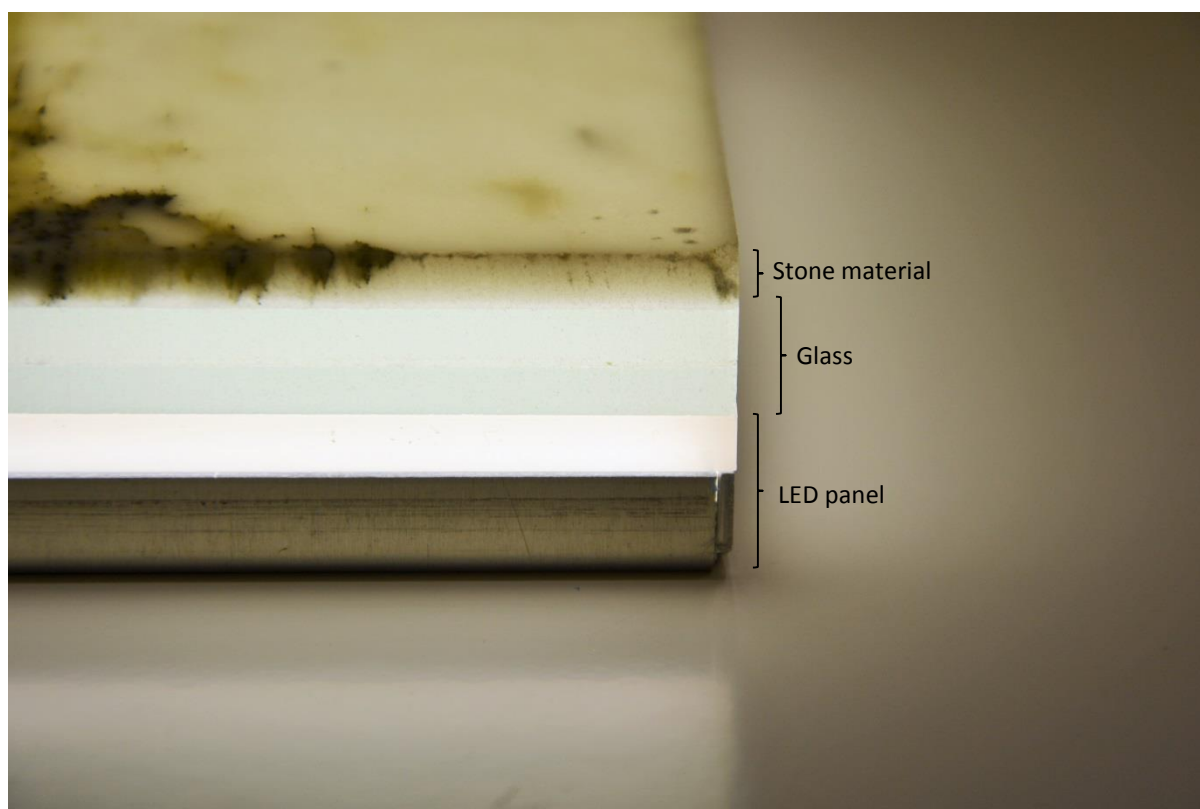
In addition to this also the fluorescent tubes reliability was limited: around 5000 hours, which required frequently maintenance of fixtures and lightboxes where tubes were installed. This drawback increases the cost and complicates the system.

## Backlighting and issues

The designer involved in a backlight project of stone materials must take into account issues related to the translucency of the material itself. Translucency of stone material is obtained reducing the material thickness up to 4-5mm, however the final result depends by material density: for example onyx thickness cannot be too much reduced to avoid veins and depth loss and color flattening.

Another constraint to keep in mind is the surface area to backlighting. Wall mounting installation of large stone material slab, must guarantee the heavy weight in order to satisfy the security constraints. For this reason normally the lightened marble is preferred: the stone material is mounted on a glass support with adequate thickness.

Glass could be laminated or tempered, it depends by surface area application, in this way the safety requirements are satisfied.



*Lightened marble application. The stack is made of marble-glass-LED lamp.*

Space available for backlighting lamp is another constraint. As already stated the introduction of LED lamp has reduced the thickness of fixture from around 10cm to less than 10mm.

Also the light homogeneity is another issue. Often in applications such as walls or floors you must merge several marble slabs up to compose the total area .



*Seamless merging of LED panels for backlighting.*

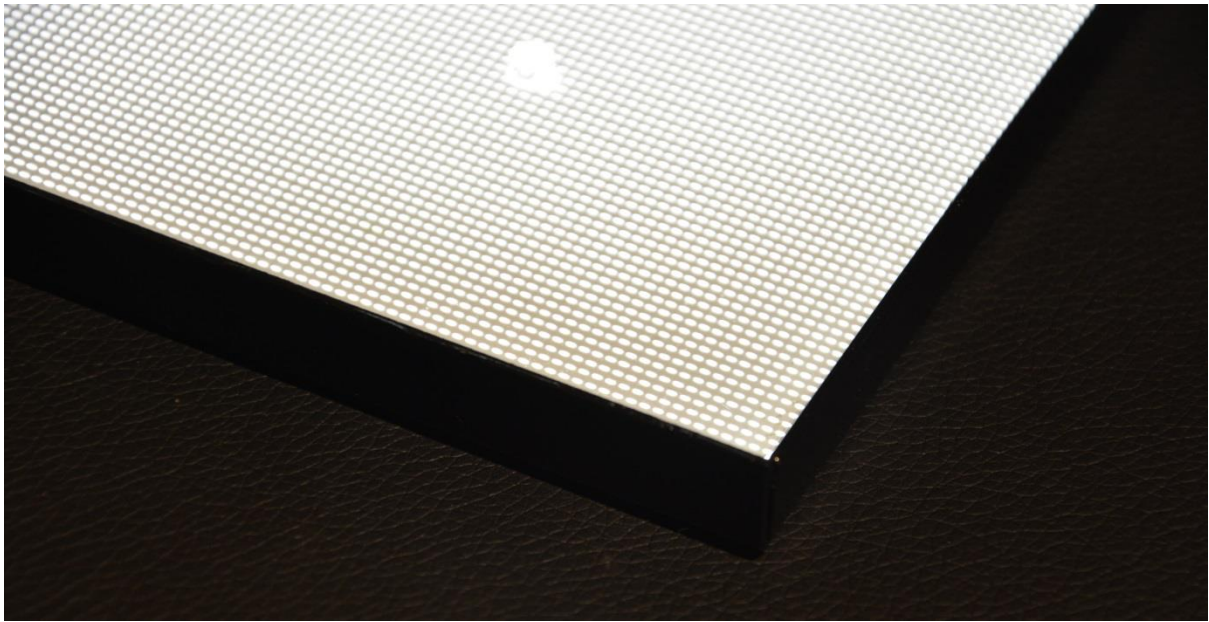
Panels merging must avoid the frames effect instead achieve a gapless final result. For this reason the LED light panel used, as backlighting lamp, must be borderless to achieve a constant homogeneous light without halos even near the pair of panels.



*Marble backlighted with more LED light panels. Translucency is homogenous.*

The more critical issue is the installation. Pairing the stone material panels without gap and the way to fix them to backlighting panels is crucial for safety reasons.

As already stated large stone material areas implement the marble lighted technique. This method provides a glass support where glue the stone material reduced thickness. Glass thickness should be in the range of 5-10mm. Normally the glue used is bi-component epoxy type. The obtained stack (stone material – glass) must be mounted over the LED lamp: basically a LED metacrylic panel with border edge technology. The metacrylic panel surface is laser machined in order to obtain a homogenous light diffusion. This is fundamental in order to obtain a good stone material translucency.



*Metacrylic panel laser grid machined. Particular.*

The LED curtain lamps can be used to reduce the weight and complexity of installation.



*Velarium™ the LED curtain lamp.*

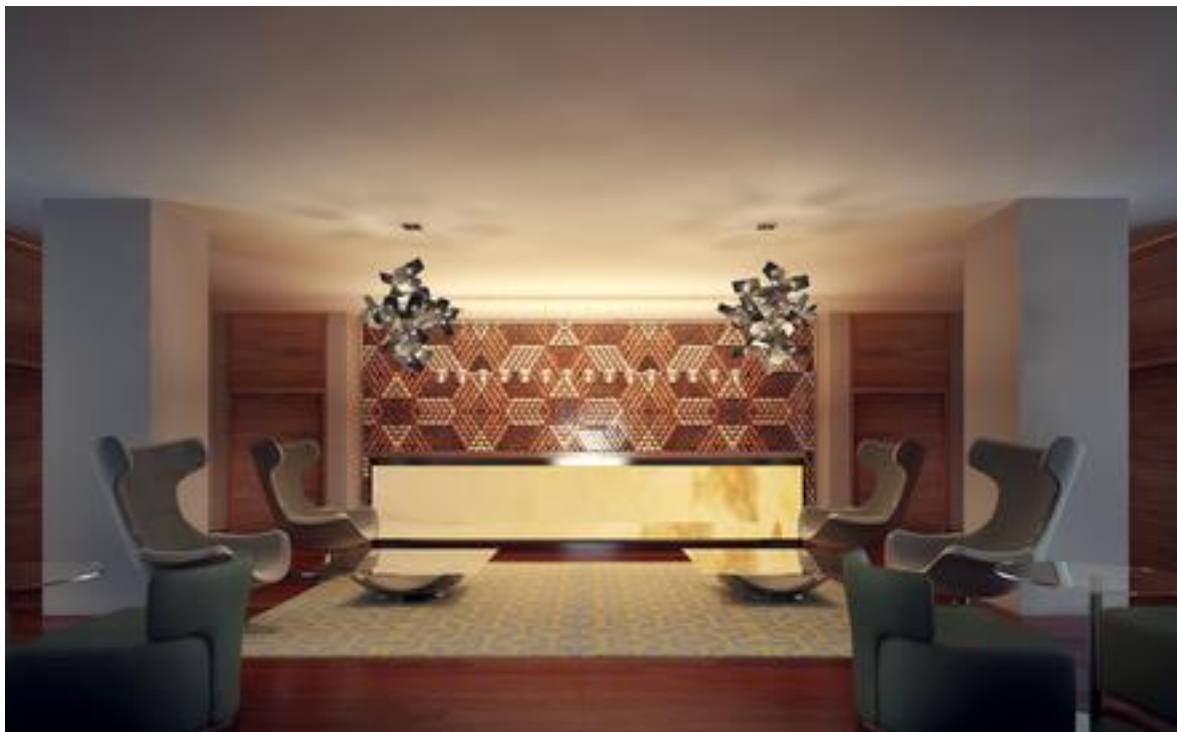
The LED lamp is the leading-edge technology for backlighting today.



*Marble backlighted with LED curtain Velarium. Particular.*

The stack made of stone material-glass-LED panel is mounted on desk, on the floor or to the wall. Normally to do this ironware like screws or inserts are used.

An adequate vane should be provided to place the wiring. Electrical wires should converge to one or more power supplies, it depends by total power consumption; and even if the LED lamp lifetime is greater than 50000 hours the installation should be easily maintenance.



*Hotel marble desk backlighted.*

## AvanBrite knowledge

AvanBrite designs manufactures and installs LED backlight systems for advertising applications and interior design.

The AvanBrite knowledge helps the customer to realize the application. AvanBrite LED lamp suitable for backlighting application are Lumio™ and Velarium™. The Lumio LED Light Panel represents the state-of-the-art of solid-state lighting. It can be customized in many shapes and sizes and offers amazing versatility.

Velarium is the cutting-edge solution. Velarium is a modular LED curtain lighter than LED metacrylic panel, and easy to use.

AvanBrite is the technological partner for stone material backlighting able to provide a complete support for designing and manufacturing.





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