

# Where high density colours meet transparency is:

# Sublistyle

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## Introduction

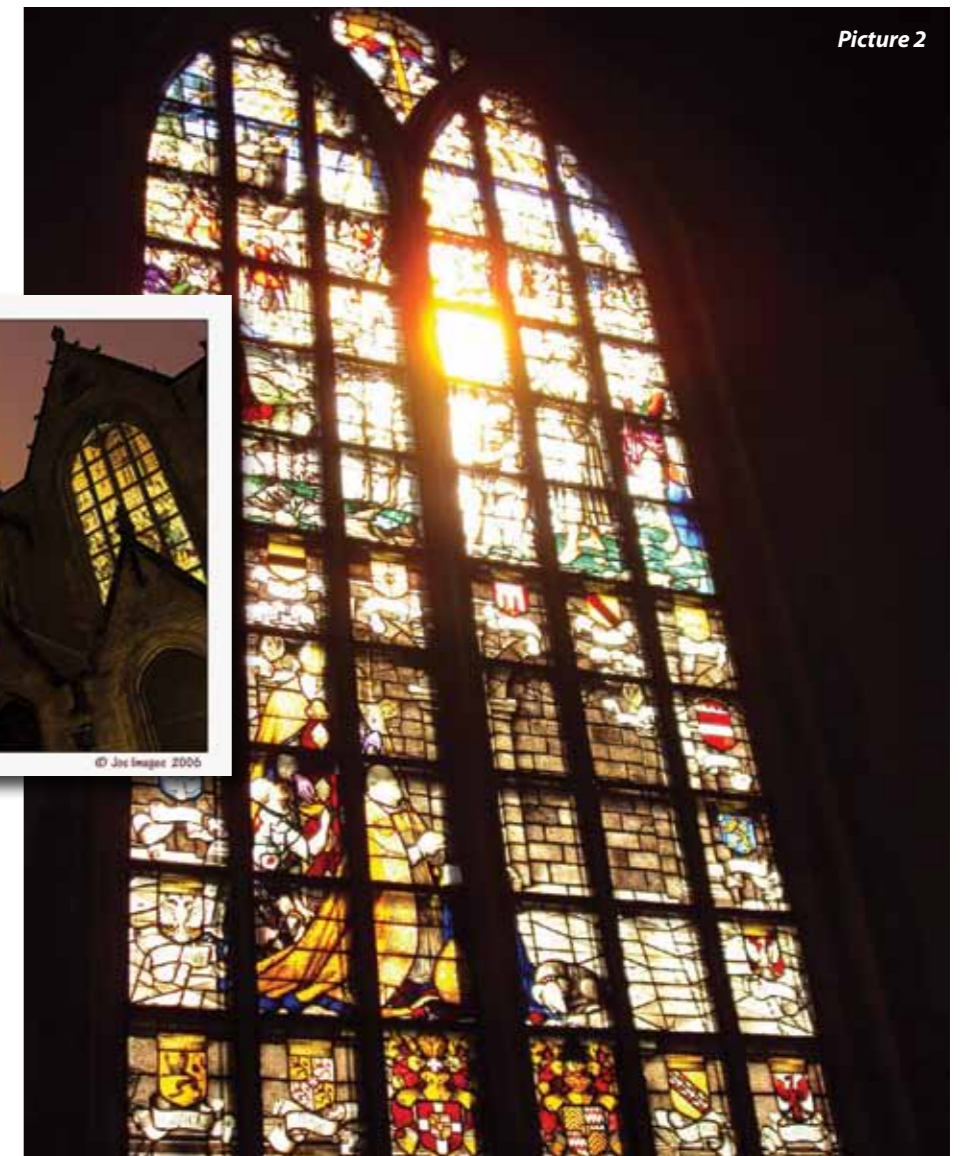
Through the ages Functionality, Color, Personalisation and Emotion have been an important part of the keynotes in architecture, both outdoor and indoor.

Through the ages, Glass has always been an important material to support these keynotes.

Picture 1



Picture 2



**Picture 1 and 2, Saint Jan Church, Gouda, NL**

## Explanation of Picture 1 and 2:

As you can see on the pictures, all of the characters, Functionality, Emotion, Color and Personalisation you find on this church were built in 1280. This church is the Saint Jan Church in Gouda, my hometown and it is famous because of its stained glass windows. The production of the glass started in 1550.

The functionality of the glass is to let daylight into the church.

The emotion of the glass you find on the expressions on the glass, which will have an immediate impact on you when you stand there.

The colors of the glass are important to reproduce the expressions of the artist and to create the emotion through their reflections. Personalisation - each window in this church was sponsored by a different family and/or institute.

It took about 25 years to produce these 70 windows, nowadays this is not very efficient.

Today there are faster ways to produce such characters on glass for example:

- Printing enamel coatings, Diptec, the advantage of this technique is that the colors are baked onto the surface of the glass.
- A disadvantage is that the printed particles are quite big, which makes it impossible to produce high resolution and transparent images.
- Flatbed solvent printing, advantages of this technique is that it is a cheap and fast way to produce high-resolution images on glass. Important disadvantages are durability of the print and the adhesion of the inks on the glass.
- Solvent printing on PVB, for example: Sentry Glass Expressions, a big advantage of this technique is that the solvent ink is printed directly onto the pvb and so captured for UV between pvb and glass. Other advantages are the large sizes and the many possibilities for different graduations of transparency/translucency. It is always laminated with PVB, which can be a disadvantage, the density of the inks is not very strong and the transparency is not 100%.
- Sublistyle, a transfer printing technique for glass which I will introduce to you.

Sublistyle is a brand name for a range of different printed flat glass and bent glass products, all done by one printing technique, dye sublimation. Sublistyle is a transfer printing technique developed to get:

- High resolution images on or in between glass
- Solid areas or faded coloring on or in between glass



Picture 3

- High density and transparency on or in between glass

**Sublistyle, the technique:**

- Images and color files made up in programs like Photoshop and Illustrator are used as a base and sent to rip software which feeds the printer.
- The image or color is printed on transfer paper
- The image or color is transferred either into a coating which is sprayed on the glass or into a pet which will be laminated between the glass. In the range there are also 2 self-adhesive films, which are layed behind the glass.
- The transfer is done via heat and pressure. They dye is tattooed into a coating or into a PET.

Sublistyle can provide 5 different solutions:

- Sublicoat
- Sublicoat Backpainted
- Subliclear
- Sublibacklit
- Sublilam

**The Sublistyle Range, explained one by one:**

**Sublicoat**, with the help of a special mat translucent coating on tempered glass, Sublicoat makes scratch resistant prints for internal applications. Tests for external purposes are currently being run. Until now the tests have shown positive results.

By using this transfer technique it is possible to provide monolithic tempered glass with images, the glass is always translucent, never transparent.

Some examples of different purposes where Sublicoat has been used:

**Picture 3:** Photo Bathroom, private client, the sliding doors are used as carrier of art. The original is called "the Kiss" from Gustav Klimt and Photo shopped. The combination of translucent glass with the image and the light adds an extra dimension to the bathroom.



Picture 4



Picture 5

**Picture 4:** Photo toilet doors in production hall.

**Picture 5:** Artwork on the wall at the Ministry of foreign affairs, in The Hague. Glass is a very durable material and acts as a protector for the art.

**2. Sublicoat Back painted**, the basic of this technique is the same as Sublicoat, but after transferring the print into the translucent coating - the coating is provided with a (white) coating, the glass is no longer translucent. Sublicoat backpainted is specially designed for purposes like wall coverings and worktops.

Photos of Sublicoat Back painted in use:

**Picture 6:** Wall cladding in Hospital, Onze Lieve Vrouwen Gasthuis, in Amsterdam



Picture 6

**Picture 7:**

Wall cladding in a Portuguese take away.

**Picture 8:**

A floor tile in the lobby at the Hilton, The Hague, 1300mm x 1300mm, partly back painted, partly translucent with LED lights underneath.

**Technical specifications:**

- Glass thicknesses : 4mm/12mm tempered glass
- Maximum glass dimensions: 3200mm x 1500mm
- Possible on flat glass, not on bent glass

The coating on the glass is tested at TUV; the report maintains the following tests:

- Definition of the coating thickness following DIN EN ISO 2808:2007.
- Lattice cut according to DIN EN ISO 2409: 2007
- Mechanical strength test, measured in Newton.
- Test for adhesiveness ability of the coating on the glass according to DIN EN ISO 4624: 2003.
- Definition of possibility to scratch of the coating of the glass through friction according to DIN 53754: 1977.

**3.Subliclear** is a self adhesive crystal clear multi layer film that is applied to the back or the front of the glass. The features of transparency are the same as Sublilam, but never laminated. The film consists of 3 layers, the outer layer is a uv blocker, the 2nd layer is the carrier for the dye/ print and the 3rd layer is again a uv blocker first then the adhesive layer follows.

The Subliclear film is a permanent durable film but it can be removed if necessary, this technique can be found on a project completed for Schiphol Airport, Amsterdam:

**Picture 9:**

Frame Magazine, HQ Amsterdam. Frame is THE international professional interior design magazine. For Frame it is most important to use new materials and techniques in their own office, so a requirement was for it to be possible to change the image every few years.

**Technical specifications:**

- Maximum glass thicknesses: NA
- Maximum glass sizes: 3200mm x 1200mm, bigger glass sheets are possible, but the film will show a seam.
- Very good results on tests for fire resistance.



Picture 7



Picture 8



Due to the good results of tests done to know the characteristics/reactions of the film during a fire, this high quality film can be used at every airport. Reaction to fire classification: B-s1, d0

**4. Sublibacklit**, for a situation with a light source behind the glass, this high quality, white film provides the best solution to diffuse and spread light. The image is uniformly lit and therefore stands out more. Sublibacklit is a high quality multi layer film, the same as Subclear, but has an extra opal layer.

Bar Hilton Hotel, The Hague

**Technical specifications:**

- Maximum glass thicknesses: NA
- Maximum glass sizes: 3200mm x 1200mm, bigger glass sheets are possible, but the film will show a seam.



**5. Sublilam**, the print is transferred into a crystal clear PET. Due to using the dye sublimation technique, it makes it possible to provide transparent prints between laminated flat and bent glass. This transparent characteristic gives possibilities which were not able before. Next to transparent images with a high density, it is possible to produce any PMS color almost as transparent as looking through coloured glasses. Perfect transparent color graduations belong also to these possibilities. By using different glass combinations the images can be provided in different graduations of transparency and translucency.

Restaurant terrace, Las Palmas Rotterdam. A famous restaurant in Rotterdam. Around the terrace the view of the direct neighborhood is very boring, as well as the functionality of using glass as a windscreen, the glass has been used to bring color into the neighborhood without losing sight of what is happening on the street.

Off shore company in Harbor of Rotterdam. Due to the transparency of the print, the glass doors keep their 'open' feel, but because of the high density of the printed colors, you really have the feeling you have a view of the harbor at work.



The lamination of the glass is done using EVA from S-Lec, Sekisui. The glass is tested according to following procedures at the laboratory of S-Lec:

- Bake test
- Cook and boil test
- Pendulum test
- Xenon test (still running)

The glass/print/EVA is laminated autoclave free. For outdoor purposes the printed interlayer is 3mm smaller than the glass. During the lamination process the glass and the films are annealed.

**Technical specifications:**

- Minimum glass thicknesses: 2x4mm glass + EVA+PET
- Maximum glass thicknesses: 2x10mm glass + EVA+PET
- Maximum glass dimensions: 3200mm x 1450mm
- Bent glass is possible (see booth of Glasid & Van Dijken Glas).

Sublilam is certainly not the only glass printing technique, the advantages lie in the:

- High density colours
- Durability
- Transparency
- High resolution
- Flexibility

