GLASS

Edwin Tafelmeier,
Laboratory Manager

A VERY INTERESTING MATERIAL – ALSO FOR PRINTING APPLICATIONS

Industrialization of sheet glass took more than 100 years

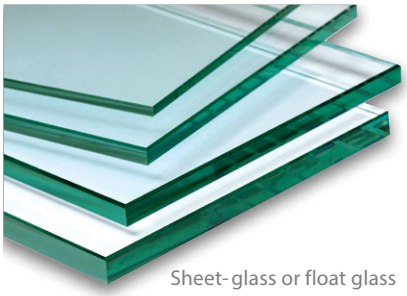
The glass market – versatile and interesting.
Glass and ceramics manufacturers in Germany had a turnover of almost 30 million Euros in 2017 [*source: statistica.com]. The producers of sheet glass mainly use the so-called float glass.

The original idea was already brought forward mid of the 19th century. Later, in 1902 a patent was filed and registered in the United States for the process of glass running over a fluid tin bath in order to produce an optical flat surface. At that time, however, there was no commercial interest in that process. It took until the 1960ies, when the British glass manufacturer Pilkington started to apply this method for industrial use.

Float glass as sheet glass version has been on the market for about 50 years now. It is manufactured in a continuous ceaseless process.

The fluid glass melt with a temperature of 1.100 °C is continually applied to one side of the fluid tin bath. As the specific weight of the glass melt is significantly lower than the specific weight of tin the molten glass floats on the surface of the tin and spreads evenly to form a smooth surface.

The glass will then solidify at the cooler end of the tin bath at a temperature of 600 °C. The glass is then taken out of the bath, cooled down and finally cut into sheets.



Sheet-glass or float glass

At present about 95% of sheet glass is float glass, windows, windshields and furniture glass are generally made of float glass.

For container glass there are various production processes. The fluid glass is blown into a form, then compressed air is blown in so that the molten glass attaches to the wall of the form and finally cools off to form a solid container.

There are various types such as glass containers, packaging glass like bottles, cans, cosmetic containers, containers for medicine and also drinking glasses, table ware, kitchen utensils, decorative glassware such as flower vases etc.

Container glass

ATTRACTIVE DESIGNS WITH ORGANIC INKS OF COATES SCREEN

There are various possibilities for decorative printing of sheet glass and glass containers. Although ceramic inks have a long tradition in glass decoration they have to be cured at temperatures of approx. 700°C, the ink sinters with the surface of the glass or ceramic substrate. This is a time and energy consuming process.

Coates Screen Inks GmbH offers various organic inks for screen and pad printing applications. Organic inks consist of a binder-pigment mixture. With the addition of adhesion promoters (mostly-silanes) these inks show good adhesion on the glass surface. Curing of the ink will be enhanced by drying or post-treatment at higher temperatures.

Contrary to ceramic inks curing temperatures will only be approx. 150 °C.

In the following we introduce some of our screen inks for glass printing:

Z/GL – WELL-TRIED TECHNOLOGY WITH FACE-LIFTING

Versatile – Reliable – Consistent

Our well-known solvent based ink range Z/GL has been successfully used for sheet glass as well as glass containers for many years.
In addition to excellent adhesion on glass and ceramics this ink also shows good resistance against many chemicals. Z/GL prints are also dishwasher resistant.

In line with current safety requirements Z/GL has now undergone “plastic surgery”. Resin technology, pigments, effects and other substances are absolutely identical. There was only a minor change of solvents so that now instead of 4 danger symbols you will only find 2 symbols on the containers. Prior to changing the revised formulation underwent thorough evaluation and many comparison tests. We are sure now: There is no difference in processing of the ink and properties of the cured ink film are the same. There is only a slight change of odour. With this solvent change danger potential has been significantly reduced resulting in even better work safety.

The whole colour range including all special colours and effects is available with the same product codes. Depending on application and requirements Z/GL inks can be processed with 3 types of hardeners. Also this ink can be either air dried or oven cured. For further details please refer to our product data sheet.

According to the regulation
(EG) Nr. 1272/2008 [CLP/GHS]

Product data sheet for further detailed information:
Download: www.coates.de Products

Continued on page 6

UVGS – WELL-TRIED UV-INK FOR PRINTING OF SHEET GLASS

Various Processing Options – Reliable

Reliable processing of UVGS is easy. Even without the addition of adhesion promoter UVGS will show excellent adhesion on glass with curing energies starting from 500 mJ/cm².
Generally, ink manufacturers recommend to print on the front (air) side of the float glass to achieve good adhesion. Float glass has an air and a tin side. However, you cannot see the difference unless using special short-wave UV lamps which will cause the tin side to show a slight grey fluorescence.

This is different with UVGS. You can achieve equally good results on both sides of float glass. Processed without adhesion promoter adhesion on glass is good, however, the ink layer will only show short term water resistance. In some cases this is of advantage as misprints of sheet glass can be put into water baths – the ink film will come off within 30-60 minutes.

With addition of 5% adhesion promoter UVGS/HS there will be a significant increase of water resistance. In this case you have no pot life as you usually have with other hardeners. The ink will not become solid when mixed with UVGS/HS, you can easily process the ink for longer periods (24-72 h).
This adhesion promoter will slowly react with air humidity and the ink film will reach very good water resistance after approx. 1 – 3 weeks meeting the requirements of bathroom furniture manufacturers, e.g. condensation water test climate KK according to DIN 50017.

VTGL – THE CELEBRITY AMONG THE UV-CURING INK RANGES FOR DRINKING GLASSES AND BOTTLES

Fast – Easy – Save!

Compared to printing of sheet glass, decoration of drinking glasses and bottles is an entirely different matter. Instead of slow running one-colour printing equipment mostly quick-running automatic multi-colour lines are used for container printing. Here up to 6 or more colours are applied by high speed printing and cured within short periods. These inks have to be adjusted to those conditions, like our VTGL.
VTGL inks show excellent printability and only require low energies to cure, starting from approx. 300 mJ/cm². With the essential addition of adhesion promoter ST-399 the resulting prints show very good adhesion and water resistance and meet industrial requirements.
However, it is necessary that the glasses and bottles are pre-treated (flame or Pyrosil) to remove any residues from the glass surface. Modern glass printing machines generally comprise such pre-treatment equipment.
In addition to the standard mixing colours we also offer a few opaque base colours enabling printers to achieve brilliant prints on transparent glass without pre-printing a white. VTGL is another well-tried UV ink system offering optimal solutions for printing of hollow glass materials.