



General Information on Screen Printing Inks

Screen Printing Inks for a Wide Range of Demands

Transparent or opaque, highly elastic or featuring an extremely hard surface, sealable and (thermo-)formable, removable or resistant to chemicals, to be applied in thick or thin ink layers etc. etc. No single ink can meet this wide scope of requirements. For this reason, Pröll KG produces many different ink systems. However, if inks are used for other than their intended purpose, secondary damage or subsequent problems may occur.

Example: Cracking

If a highly opaque ink is printed onto a layer of low pigmented ink, the difference in internal stress between the two layers may cause cracking. The same applies to a layer of a very "hard" (or rigid) ink system when printed onto a soft substrate.

Stress corrosion cracking falls into another category of cracking. It is caused by applying a rather "aggressive" ink to a solvent-sensitive substrate which is under considerable internal stress (e.g. molded parts). The aggressive solvents can cause or intensify stress cracks in the substrate.

Chemical Resistances

Often, screen printing inks should be resistant to chemicals and other aggressive media. A screen printing ink can meet such requirements only if the substrate itself is resistant to the aggressive test media. The dry ink film, which is only a few microns thick, cannot protect the substrate from the influence of such substances.

If specific chemical resistance demands are to be met (as it is the case especially in industrial applications), please contact Pröll in order to choose a suitable ink system.

Weather Resistance

For the most part, weather resistance is the greatest challenge to screen printing inks. Weather resistance of screen printing inks is influenced by the following parameters:

1. Quality of Screen Printing Ink

All ink systems recommended for long term outdoor use by Pröll are manufactured with raw materials of highest quality.

2. Pigment Volume Concentration

Pigment Volume Concentration means the pigment-binder ratio in the dry ink film.

In most cases, high opacity is required for a printing application; so the pigment volume concentration is often at the critical point. By adding more pigments to the ink and passing the critical point, the binder would be overloaded with pigments. This would lead to changes in the properties, such as poor resistance or lack of adhesion to the substrate. "White opaque" inks should therefore not be used when weathering is a concern.

3. Chalking

Regardless of the quality of the raw materials used for manufacturing the ink or of the methods of application, a certain amount of chalking will occur. This is due to a decrease in the binder material caused by humidity and prolonged exposure to UV light (sun light). As time goes by, the effects of weathering will be visible. A white chalking layer on the surface of the ink film will appear. This chalking layer can easily be removed by polishing the printed surface with a mild car polish.

Especially mixed colors containing blue and white are susceptible to chalking. Therefore, Pröll recommends that colors mixed for long term outdoor use should, if necessary, only contain a small amount of white in the formula.

4. Thickness of the Ink Layer

A basic rule says that the thicker the ink layer, the longer it takes to decompose.

The screen printing procedure makes it possible to apply thick ink layers. The thickness of the ink film is determined by the solid content of the ink as well as the coarseness of the printing mesh. In other words:

The selection of the mesh has an effect on the achievable thickness of the layer. Therefore, weather resistant prints should be produced using a relatively coarse mesh. A mesh of 60 – 80 threads/cm (152 – 210 threads/inch) is recommended to achieve a dry ink layer with a thickness of at least 15 microns.

5. Quality of the Substrate

Besides quality and thickness of the screen printing ink layer applied, the substrate also has an important influence on the weather resistance. Substrates exhibiting poor weather resistance will impair the resistance of the ink film noticeably. For example, prints on high quality self adhesive PVC films provide distinctly better weather resistance than prints on cheap self adhesive PVC films.

6. Outdoor Use: Influence of Climatic Conditions

Geographic location is a contributing factor to the effects of weathering on the ink film.

Detrimental effects can be caused not only by sunlight (the higher the altitude, the higher the proportion of harsh UV radiation), variations in temperature and humidity, or aggressive components of air in industrial regions or congested areas, but also by microorganisms.

The best solution to protect the ink film against exposure to weathering is to print on the second surface (reverse side) of a clear, transparent substrate. This method is recommended, for example, for manufacturing durable illuminated advertising elements, as the ink film is isolated from harmful, climate-induced influences.

This process provides the panels, for instance, used for filling station advertising, which maintain their brilliance up to 10 years, according to experience.

Technical Assistance / Application Charts

Technical Information Sheets as well as application charts provided by Pröll KG (please visit download area www.proell.de) will enable you to select suitable ink systems for your printing applications. Further, our ink specialists will assist you in solving any printing problems.

When submitting an inquiry, please furnish the following details:

1. Substrate: type, designation, color, shape, etc.
2. Drying conditions: tunnel or rack drying, drying at higher temperature, oven drying, temperature to be applied, maximum temperature the substrate will withstand (if applicable), etc.
3. Further processing: sealing, punching, grooving, forming / thermoforming etc.
4. Application: indoor or outdoor use, durability requirements etc.
5. Special demands: chemical resistances, mechanical stability, special testing requirements, testing methods (e.g. DIN standards), etc.
6. Characterization of finished product: self-adhesive label, toy, illuminated advertising etc.

A form for technical inquiries, referring to the above mentioned, can be downloaded from the website www.proell.de/download/Technical_questions_and_special_color_shades.pdf

Printing results, to a large extent, depend on the substrate as well as the printing and application conditions. We recommend checking your printing materials under your conditions of use before performing any production runs. Materials that are supposed to be identical may vary from manufacturer to manufacturer and even from batch to batch. Some substrates may have been treated with or contain sliding agents, antistatics or other additives which may impair the adhesion of screen printing inks.

Substrates must be absolutely grease-free in order to achieve good adhesion of the ink.

If necessary, our technicians will assist you in troubleshooting. Pröll's Application Technology is equipped with most modern screen printing machinery, hot air, IR, and UV dryers. Pröll can deal with printing problems not only under laboratory conditions, but also in real production situations.