

Technical Information
4/2007

Basic Colors Varnish

Yellow

Orange

Red

Violet

Blue

Green

White

Black

Important

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 the inks.

In general please refer to our technical leaflet "General Information on Screen Printing Inks" which may be downloaded from our website www.proell.de, click Download ⇒ Screen Printing Inks ⇒ General information on screen printing inks.

Fabrics

We recommend yellow polyester fabric.
NoriPET[®] standard colors:
90 – 150 threads/cm (230 – 380 threads/inch).

Standard Silver colors:

NoriPET[®] 770 – max. 120 threads/cm (305 threads/inch)
NoriPET[®] 780 – max. 77 threads/cm (195 threads/inch)
NoriPET[®] 790 – max. 100 threads/cm (255 threads/inch)

Auxiliaries

Catalyst

Catalyst NoriPET[®] 005 has to be mixed to the ink thoroughly prior to printing.

Amount: 1 – 3 %

Mixtures of NoriPET[®] ink and Catalyst NoriPET[®] 005 have a pot life of 8 – 12 hours in closed cans depending on temperature and humidity.

Thinner/Retarders

Thinner NoriPET® 090 (fast drying)
Retarder NoriPET® 097 (medium drying)
Retarder NoriPET® 097/001 (slow drying)

They can be mixed in any ratio to achieve an optimized printing and drying result.

Thinning Percentage

NoriPET® inks can be printed with high viscosity. Depending on equipment and printing parameters thinning may be necessary:

NoriPET® Color No.	Thinning (Thinner, Retarder or mixtures)
093, 109, 171, 213, 308, 318, 412, 472, 570, 669, 770, 780, 945, 952	approx. 5 %
790	press ready

Special Colors: Please refer to the label on the can for thinner quantity.

Defoamer

Depending on process speed and thinning percentage additional defoamer may be necessary.

Quantity: 0,2 – 0,5 % Defoamer 9319

Cleaning

For cleaning screens and equipment Retarder NoriPET® 097 or UNI-REIN A III can be used.

Drying

NoriPET® is drying by evaporation of solvents. To speed up this process warm air tunnel dryers are highly recommended!

Drying Hints

To achieve optimum results, drying in a jet-dryer should be done immediately after printing.

Drying speed can be increased by:

- 1.) drying at higher temperatures
- 2.) using dryers with good air exchange to remove the solvents.

When using a tunnel dryer with different sections, recommendations can be given as below:

- The first sections should have 80 °C (176 °F).
- The last section with high air exchange is for cooling the printed films to room temperature to avoid blocking in the stack.

The drying result depends on a lot of parameters like ratio of thinner/retarder, thickness of ink film layer and efficiency of dryer.

Post Curing

For maximum heat resistance and a good long term adhesion of the injection molded parts, NoriPET® **must be post cured**.

For this reason post curing of the printed films prior to the molding process is strongly recommended. The best results are found when post curing is done directly after jet drying.

Highest efficiency is achieved when printed films are put on drying racks after tunnel drying to be placed in a box oven having good air circulation as well as sufficient air exchange.

Post curing conditions:

80 °C (176 °F) for 0,5 hours.

The forming and injection molding step should be made shortly after printing and post curing.

Adhesion

Most important factors for adhesion and peel strength of injection molded parts are:

- Amount of Catalyst NoriPET[®] 005
- Time gap between drying and molding
- Post drying conditions
- Resin type and quality
- Resin temperature
- Film quality

Figure 1:

Process frame (time gap between drying and injection molding) for save adhesion depending on amount of catalyst and resin temperature:

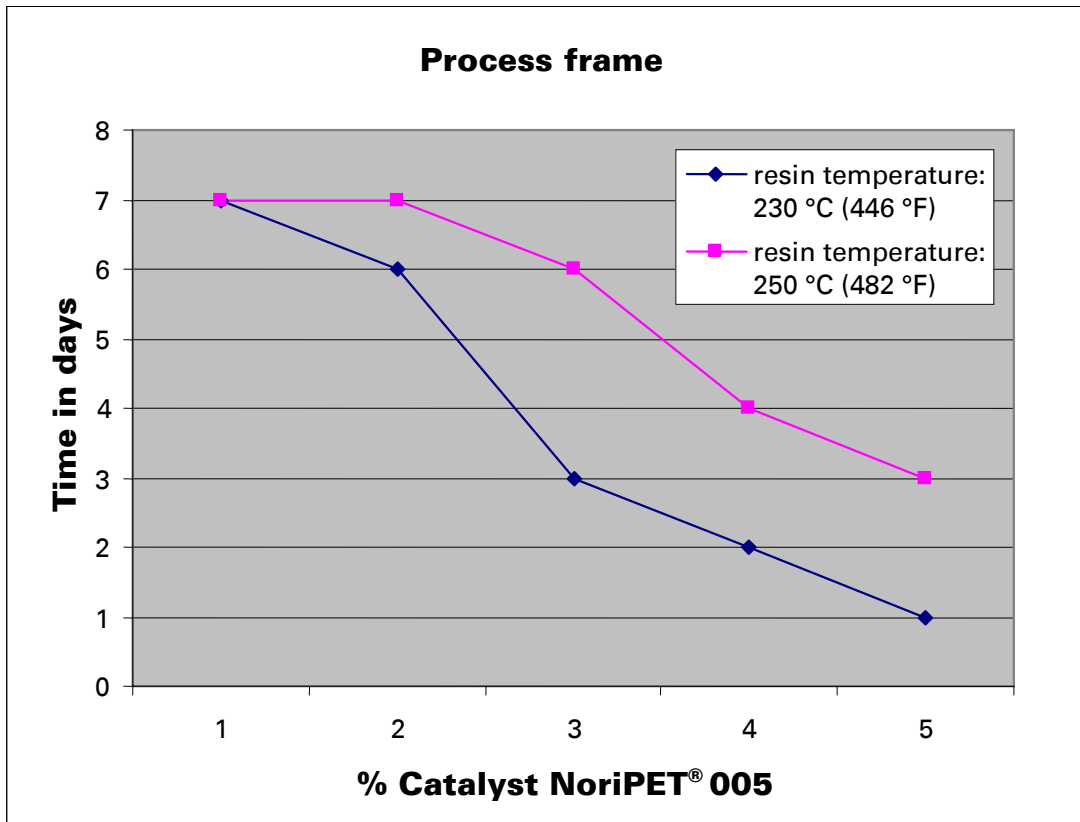
Ink: NoriPET[®] 952/NoriPET[®] 093 1:1
Printing mesh: 100-40 threads/cm
(255 threads/inch) – twice printed
Film: Autoflex[®] EBG 180 L
Resin: ABS Novodur P2H-AT
Post drying: 0,5 h at 80 °C (176 °F)

The best adhesion is achieved when injection molding is done at high resin temperature (e. g. 250 °C, 482 °F) generally.

With the addition of 1 – 2 % Catalyst NoriPET[®] 005 an optimum adhesion performance could be found within one week between printing/curing and injection molding. Additional amounts of Catalyst are decreasing the process window decisively, but a compensation is possible with increased resin temperature.

The post drying time and temperature should not exceed 30 minutes and 80 °C (176 °F).

Figure 1



The limitation by this process frame can be avoided by a final backing of one to two layers of NoriPET® 093 without Catalyst (screen mesh: 1 – 2 x 100-40). To improve the intermediate adhesion this backing should be done prior to the post drying process.

Safety Precautions

NoriPET® inks are flammable. Do not smoke while using these products.

Do not allow inks, solvents or residues to enter the sewer system. Follow the local waste disposal regulations.

Working with NoriPET® inks requires the same hygienic practice at the work place as any other solvent based ink system. Please follow the advice and the instructions on the label and read the material safety data sheets prior to use.

Shelf Life

Allow the ink as well as all the auxiliaries to be added to adjust to room temperature in the closed container before use.

The shelf life stated on the label assures the ink's quality and refers to unopened original cans stored in a dry place at temperatures between 5 °C (40 °F) and 25 °C (75 °F).

Advice for the use of

NoriPET®

for Inmold Decoration (IMD) Technology

IMD Technology – A System

IMD technology distinguishes itself by the interaction of four systems:

- ink
- forming
- cutting/trimming
- molding

Each individual system must be optimized and coordinated to successfully produce IMD parts.

The Ink System NoriPET®

NoriPET® is a solvent based ink system, which is designed for the IMD process. The ink system is suited for printing on polyester films such as Autoflex® EBG 180 L or Autotex® V 200. NoriPET® is formulated to be compatible with the injection molding process and ABS resins.

Each production batch of NoriPET® is subject to quality control before delivery. Upon request, the customer will receive a copy of the measured values.

Beyond that, certain characteristics regarding the durability of products produced with NoriPET® are not guaranteed by Pröll.

Forming

Matched metal can be used as well as High-Pressure Forming. Forming depth is limited by the polyester film.

Molding

Completely mastering the complex individual technologies is essential for the successful use of NoriPET® in the IMD process. Specific knowledge regarding different parameters such as:

- injection gates (number and geometry)
- temperature
- choice of the thermoplastic resin
- mold flow behavior of the thermoplastic resin
- pressure
- time
- molding temperature
- cooling

is necessary and must be gained.

Not every part can be produced successfully using IMD technology. Before starting a production series, it is necessary to check each individual part systematically with tests adapted to such demands as climate, resistance, etc.

The information contained in the technical information/instruction sheets or other product information sheets is based on product testing conducted by Pröll. Because printing and environmental factors critically affect each individual ink application, the above mentioned information and instructions represent only general recommendations concerning product characteristics and directions for use and should not be construed as representing express warranties regarding the product. The information and instructions in no way release the purchaser from his obligation to verify and test the inks and their application for the specific request, regarding: product characteristics, weather resistance, mixing proportions, gloss, thinning, special mixtures, printability, drying speed, cleaning, effects on or of other materials to be contacted and safety precautions. All details contained in the instruction sheet "General Information on Screen Printing Inks" are to be considered. The further manufacture and use of products containing our inks by the purchaser takes place beyond our control, and the responsibility for further application and use of our product resides solely with the purchaser. Pröll disclaims any warranties, express or implied.

This information supersedes all previous technical information.