



# NORIPHAN® HTR N 990 NC

Non-conductive opaque **black** ink for use within IMD/FIM Technology

## Area of Application

**NORIPHAN® HTR N 990 NC is based on NORIPHAN® HTR N ink system and inorganic black pigment for combined high opaque decoration and high electrical resistance in capacitive sensors.**

### Note:

- production quantities under licensing
- pending patent application by Continental Automotive GmbH

## Films

**PC film:** Makrofol®<sup>1</sup>

**PC blend film:** Bayfol®<sup>1</sup>

## Finish

Glossy

The gloss level is influenced by the structure of the substrate.

## Color Shades

990 NC	Black HF	<i>HF = halogen free</i>
990/010 NC	Deep Black HF	
990/011 NC	Deep Black opaque HF	

## Mesh Count

Polyester mesh 77-48 threads/cm to 150-31 threads/cm (195-48 threads/inch to 380-31 threads/inch).  
A stainless steel mesh may be used for special requirements.

## Stencil

Solvent resistant emulsions must be used. Excellent results during long production runs are achieved by using Pröll Diazo-UV-Polymer Emulsion Norikop 10 HQ.

## Processing

Processing is recommended under same conditions as described in Technical Information NORIPHAN® HTR N.

NORIPHAN® HTR N 990/010 NC and 990/011 NC are not recommended for back printing of white.

## Auxiliaries

All of the auxiliaries mentioned below are free of halogens (HF).

## Thinner and Retarder Pastes

Thinner F 013 (fast)  
Thinner M 201 (medium)  
Thinner S 403 (slow)

<sup>1</sup> Makrofol® and Bayfol® are registered trade marks used by Covestro AG, Germany

## NORIPHAN® HTR N 990 NC

### Retarder Pastes:

NORIPHAN® HTR N 097/005 (fast)

NORIPHAN® HTR N 097/006 (medium)

NORIPHAN® HTR N 097/007 (slow)

Auxiliaries may be mixed with each other in any desired proportions.

Only Thinner F 013 and Thinner M 201 should be used for large printing areas.

### **Recommended addition of thinner:**

<b>0 – 10 %</b>	<b>990/011 NC</b>
<b>5 – 15 %</b>	<b>990/010 NC</b>
<b>10 – 20 %</b>	<b>990 NC</b>

To print fine details, Thinner S 403 can be used alone or in combination with retarder pastes

NORIPHAN® HTR N 097/005, 097/006 respectively 097/007.

The following proportions are recommended:

10 – 20 % Thinner S 403

5 – 10 % NORIPHAN® HTR N 097/007

NORIPHAN® HTR N 097/008: Retarder Paste ready to use mixture of Thinner M 201 and Retarder Paste  
NORIPHAN® HTR N 097/007 (mixing ratio 1 : 1)

### **Cleaning of Screens and Utensils**

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#### **Note:**

The color shades 990/010 NC and 990/011 NC are tinting the printing squeegee. Consequently, a separate squeegee for these black colors is recommended.

### **Drying**

NORIPHAN® HTR N is a physically curing ink system which dries through evaporation of the solvent in a tunnel dryer.

#### **Note:**

To protect PC films from extensive solvent attack, tunnel dryers should be used also for small trial runs. Rack drying is not recommended (cracking!).

### **Tips on Drying**

Drying performance can be improved by:

- drying at higher temperatures
- use of infrared rays (from second heating compartment on)
- completely opened exhaust air valve – good air exchange.

The following settings are recommended for use with 3 zone dryers:

- First Zone: 80 °C (175 °F).
- Second Zone:  
In the second zone, the maximum temperature for processing heat sensitive Bayfol® films is 80 °C (175 °F).  
The maximum drying temperature for processing pure PC films (Makrofol®) is 100 °C (210 °F). If additional infrared emitters have been installed in the second compartment, they may be used to increase the efficiency of the drying operation.
- Third Zone: For cooling down to ambient temperature.

Drying results depend on the combination of thinner and retarder paste along with the thickness of the ink layer.

## Conditioning / Post-curing

Complete evaporation of solvent residues in ink and film is necessary for further processing of printed films in the IMD/FIM process.

Thinner residues can lead to washout during the back molding process, or damage during the climatic test or use of the end product.

Fully benefiting from NORIPHAN® HTR N's superior properties (adhesion, suitability for back molding, etc.) requires guaranteeing an absolute minimum of solvent residues.

Post-curing is done after printing the last ink layer; the ideal conditions for each product must be determined individually. For best results, dry separately on a rack in a well ventilated box oven with air exchange.

### Conditions:

Post-curing at 75 – 90 °C (165 – 195 °F) for 1 – 5 hours.

Maximum temperature 70 – 80 °C (160 – 175 °F) for processing heat sensitive films of PC blends such as Bayfol® CR.

In case of an application of too high temperatures with Bayfol® CR a change into bluish coloring of the film could be observed.

## Bonding Strength

The adhesion of a film/ink/plastic bonding system depends on a number of variables (production, process, and structure of compound). For this reason, specific tests with respect to individual requirements are essential.

For good adhesion, at least **2 fully covering layers of NORIPHAN® HTR N** should be printed. The first layer can be composed of almost fully covering graphic motifs.

## Safety Precautions

NORIPHAN® HTR N inks are inflammable. Smoking or open flames are strictly prohibited during use of these products.

Processing NORIPHAN® HTR N inks requires normal hygiene in the workplace.

Please see recommendations on label and read the material safety data sheets before use.

## Shelf Life

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).

## Important

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

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 prior to 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 can contain sliding agents, antistatics or other additives which will impair the adhesion of the inks.

It is not always possible to produce a given part using IMD/FIM technology.

The resins used for back molding IMD/FIM ink systems are supplied as commercial technical products. They are different in chemical composition as well as the content of additives. Process parameters will also influence the quality of the finished IMD/FIM parts.

This is a test product which is still in development. For this reason, no assurances are currently given as to type conformity, processability or long-term performance characteristics. Therefore, the customer uses the product entirely at their own risk with no guarantee.

Before starting a production run, it is necessary to test samples of each newly designed part systematically with regard to the specifications for the intended use (e.g. climatic chamber, 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.

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