DiPaMat Legend Ink Ye 04

UV-curable yellow inkjet ink for legend printing

Technical Datasheet:
June 2018
## PRODUCT overview

<table>
<thead>
<tr>
<th>Description</th>
<th>Order code</th>
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</thead>
<tbody>
<tr>
<td>DiPaMat Legend Ink Ye 04</td>
<td></td>
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<tr>
<td>2 x 0,9 L</td>
<td></td>
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<tr>
<td>DiPaMat Cleaning Solution 01 02</td>
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<tr>
<td>2 x 1 L</td>
<td>4NQRK</td>
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DiPaMat Legend Ink Ye 04 is a yellow UV-curable legend, marking and nomenclature ink. The ink is designed for application on soldermask of a PCB by means of inkjet technology. The DiPaMat Legend Ye 04 is a non toxic, opaque yellow ink with low sedimentation behaviour.

FEATURES
- Opaque yellow UV-curable ink.
- High cure speed for curing with mercury bulb and LED.
- Excellent image quality.
- Good jetting performance on industrial print heads.
- Excellent adhesion and hardness on a broad range of solder masks, both semi and fully cured.
- Low sedimentation behaviour with high recovery power.
- Non toxic.
- Long shelf life.
- Low odor.
- No Volatile Organic Components (VOC’s).

INK PROPERTIES
- Static Surface Tension: 21.0 – 24.0 mN/m @ 25°C (Krüss K9 Tensiometer)
- Viscosity : 8.0 – 10.0 mPa.s (45°C @ shear rate 1000 s⁻¹) (Haake Rotovisco 1)
- Dynamic viscosity (AR2000 Rheometer):

![Viscosity vs Temperature](image)

- Average Particle Size (PSS Nicomp 380 – Method : Light Scattering D50): 230-330 nm
- Density (25°C): 1.16 g/cm³ (Paar DM60/DMA602)
**DiPaMat Legend Ink Ye 04**

### CURING

DiPaMat Legend Ye04 ink can be cured by both LED’s and Hg Lamps:
- Suitable to cure with Hg bulb, metal halide UV lamp or iron doped mercury lamp:
  - After each printing pass a pin cure of about 50 mJ/cm² total UV energy is required. An excess in pin cure can lead to bad adhesion results.
  - Final cure can be applied after multi pass printing.
- Suitable to cure with LED 395 nm, 385 nm and 365 nm with similar curing conditions.
- After UV cure a thermal cure is required: 150°C for 20 min to 60 min

### ADHESION

- DiPaMat Legend Ink Ye 04 printed on different types of semi and fully cured solder masks (supplied from different suppliers) which are thermally cured during 30 – 60 minutes @ 150°C shows excellent adhesion.
- The adhesion is evaluated by cross hatch + tape test method according to standard ISO2409.

<table>
<thead>
<tr>
<th>0</th>
<th>Excellent</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Bad</td>
</tr>
</tbody>
</table>

- On a wide variety of semi and fully cured solder masks test results were obtained between 0 and 2. The adhesion on fully cured solder mask is more critical and improves when the thermal curing time is prolongued. 60 minutes at 150°C is the optimal condition for thermal curing.

### PENCIL HARDNESS

- DiPaMat Legend Ink Ye 04 printed on different types of solder masks (from different suppliers) which are thermally cured during 30 minutes @ 150°C shows a pencil hardness of 7H–9 H.
- Pencil hardness is tested according standard ASTM D3363-05.

### PRINTER / PRINTHEAD PLATFORM

- Suitable in single and multiple pass printing systems equipped with industrial piezo print heads
- Recommendations and/or approval programs in evaluation for several systems/print heads.
## PRINTING MODE

Typical printing mode for DIPAMAT Legend inks includes:
- Jetting temperature: broad window, typical jetting at 38°C to 50°C
- Printing mode: suited for binary printing and grey scale printing

**Important note:** These settings are shown as example. The operation mode is not limited to these settings. Furthermore, the printing mode depends on the choice of the substrate, printing resolution, etc.

## PACKAGING

DiPaMat Legend Ink Ye 04 is available in 1 L Agfa bottles. The bottles are filled with 0,9 l of ink, leaving some space for best agitation.

One order code is one shipping carton that contains 2 x bottles of 1 L i.e 1,8 l of legend ink.

## SHELF LIFE

12 Months from production date when stored under recommended conditions.

## STORAGE

Recommended storage conditions (in Agfa bottles)
- 4°C to 23°C (39°F to 75°F)
- Out of direct sunlight
- Away from heat and (UV)-radiation sources

## RECOMMENDATIONS FOR BEST PERFORMANCE

Instructions for use:
- Check the compatibility of the ink / IJ-head / IJ-printer with the supplier.
- When converting to Agfa ink from a different ink supplier it is mandatory to flush the IJ-system with the designated cleaning chemical.
- Keep the ink in the sealed and closed bottle inside the cardboard box until usage.
- 12 Hours before use the ink must be preconditioned at room temperature.
- Verify the expiry date of the ink.
- For best recovery of the sediment agitate the bottle of ink for at least 1 minute before adding in the printer.
- Your printer is equipped with a maintenance program that protects the heads from clogging. This is done by spitting some ink with a given time interval. The ink is fully recycled. During the spitting process the ink can be contaminated by airborne particles. This contamination builds up over time. As a result the print performance may decrease. With a normal ink consumption of 1 litre per month or more there is no issue. With extreme low ink consumption it is advised to only load the printer with as much ink as will be consumed during 6 weeks. Doing so prevents the too high build up of contamination.
- Protect the ink from unintended UV exposure.
- Best adhesion and pencil hardness of the ink on the solder mask is obtained by: UV-curing with an Iron doped Mercury UV lamp or LED.
Baking step of 60 minutes at 150°C.

- Good adhesion and pencil hardness can be reached also by pin curing the ink on the fly with UV-LED followed by another UV-bump after printing.

Solder mask types / conditions:

- DiPaMat Legend Ink Ye 04 was tested on different brands and types of solder mask at different curing levels. The solder masks can be applied with different techniques (curtain coating, screen print, spray, ED, dry film).
- The adhesion and pencil hardness of the applied legend ink is better on semi cured versus fully cured solder masks. On semi cured solder masks the cross linking between ink and solder mask is better.
- When a UV-bump of the solder mask - for achieving a better solder ball resistance afterwards - is required, it is better to give this treatment after applying the legend ink for a better adhesion.

Guidelines for optimal conditions of ink and system:

- Agfa strongly advices to keep the ink maximum 2 months in the system, after this period it is recommended to clean the system and refresh the ink. This will improve the stability of the ink and the lifetime of your system.

ENVIRONMENTAL, HEALTH & SAFETY

The DiPaMat Legend inks have been developed in accordance with Agfa’s environmental policy and responsibility for its products. The ingredients used in these UV curable inks have been specifically selected to have no toxicity and can be safely handled as long as routine precautions are taken. For information on ingredients as well as on recommendations or information on environmental, health and safety issues, we refer to the Material Safety Data Sheets (MSDS) of these inks.

The MSDS is available for download from our EHS website via this link: www.agfa.com/sp/global/en/internet/main/products services/msds/index.jsp

DiPaMat is a trademark of AGFA. Ink development and manufacturing processes are executed according to the Quality Management System of Agfa, which is ISO9001 certified.

Disclaimer:

The information and recommendations contained in this Technical Datasheet are based on AGFA in-house testing of the products, according to our knowledge. However, no guarantee is given regarding the applicability for any specific application of these products, because the results may vary with variation in the substrates and specific conditions. All users should therefore make their own tests to verify that any particular requirement for the printing process and for the end-user are fully met when using the AGFA products. While all information in this Technical Datasheet is provided in good faith the users bear sole responsibility for the use of the AGFA products for their specific user applications.

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