

**Screen printing ink for front or back-printed, direct-molded polycarbonate films**

**Silicone-free, glossy, 2-component ink, high flexibility, high temperature resistance, excellent adhesion to injection-molded resins (PC)**

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## Field of Application

Mara® *Mold* MPX is a solvent-based screen printing ink. It is suited for printing onto the front or reverse side of PC decorating foils, and for direct injection with PC or PC/ABS (85 % PC / 15 % ABS).

### Technical recommendation

The FIM/IMD process is a combination of several tasks like printing, deformation, cutting, punching, and injection-molding technology. Specialized knowledge of the complete process is required to achieve good results, and preliminary tests are essential to establish a working process. Subsequent projects may need different parameters for optimizing different designs.

### Substrates

Polycarbonate films are used for this process.

Since all the print substrates mentioned may be different in printability even within an individual type, preliminary trials are essential to determine the suitability for the intended use.

### Field of use

The FIM/IMD process to produce molded components is a key technology for different applications, e. g. in the automotive, medical, household sector.

## Characteristics

Mara® *Mold* MPX is a **silicone-free** ink system. For silicone-free products it is important to use only thoroughly cleaned stencils and squeegees.

If cleaning is carried out with automatic screen washing systems, we recommend prior to printing an additional manual cleaning with a fresh cleaner not having had any contact with

ink residues containing silicone. Care should be taken with some adhesive tapes, used to protect the outer areas of the print region, as the release agent of the tape may be silicone.

### Ink Adjustment

The ink should be stirred homogeneously before printing and if necessary during production.

Mara® *Mold* MPX is a 2-component ink system. Prior to printing, it is essential to add hardener in the correct quantity and to stir homogeneously.

When using hardener, the processing and curing temperature must not be lower than 15°C as irreversible damage can occur. Please also avoid high humidity for several hours after printing as the hardener is sensitive to humidity.

### Pre-reaction time

It is recommended to allow the ink/hardener mixture to pre-react for 15 min.

### Pot life

The ink/hardener mixture is chemically reactive and must be processed within 8 h (referred to 20-25 °C and 45-60 % RH). Higher temperatures reduce the pot life. If the mentioned times are exceeded, the ink's adhesion and resistance may be reduced even if the ink still seems processable.

### Drying

To achieve best results in forming and molding processes, a proper drying process is essential. The prints should have very low levels of residual solvents.

We recommend tunnel drying with three hot air zones at 80 °C / 175 °F followed by an active cooling zone. The tunnel dryer should have a high air exchange rate. If available in the tunnel



dryer, also IR lamps can be added after the second hot air zone with typically 50 % power. After printing is completed, the prints are put on a drying rack and stored in a box oven for 3 h at 80 °C / 175 °F for the final tempering process. Wickett dryers may also be an option. Taking the number of layers (resp. layer thicknesses) and the type of drying equipment in consideration, an intermediate drying can be necessary in the drying rack for 5 min at 80 °C / 175 °F, or alternatively an additional tunnel drying process. The processing window for the printed films is 3 months (storage at room temperature).

## Fade resistance

Only pigments of high fade resistance (blue wool scale 7-8) are used for the production of the Mara® Mold MPX range.

## Range

### Basic Shades

920	Lemon
922	Light Yellow
924	Medium Yellow
926	Orange
932	Scarlet Red
934	Carmin Red
936	Magenta
950	Violet
952	Ultramarine Blue
956	Brilliant Blue
962	Grass Green
970	White

### High Opaque Shades

180	Opaque Black
181	Opaque Black, non-conductive
188	Deep Black, non-conductive

### Transparent Shades

585	Transparent Black
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### Press-Ready Metallics

191	Silver
197	Medium Silver

### Further Products

910	Overprint Varnish
912	Overprint Varnish

Compared to the basic shades, lower peel values are achieved with metallics. When back molding metallic shades, the orientation of the pigment particles may change.

During the molding process, Overprint Varnish MPX 912 is more resistant to heat than 910, but less flexible and **not** suited for mixing with basic shades.

All shades are intermixable (except MPX 912). Mixing with other ink types or auxiliaries must be avoided in order to maintain the special characteristics of this ink.

## Auxiliaries

For FIM/IMD applications, other than the below mentioned additives **must not** be used.

H 5	Hardener	2-9%
UKV 1	Thinner	0-15%
SV 5	Retarder	0-10%
UR 3	Cleaner (flp. 42°C)	
UR 5	Cleaner (flp. 72°C)	

The final quantity to be added can only be determined in the individual process and is also highly dependant upon the produced part. The less hardener, the better for a higher degree of forming, the more hardener, the better the wash-out and adhesion to the injection molding compound.

Our recommendations:

- Metallics: 6 %

Basic shades / Black:

- 2 % for a high degree of deformation
- up to max. 9 % for direct injection with a low degree of deformation

Hardener H 5 is sensitive to humidity and is always to be stored in a sealed container. Shortly before use, the hardener must be added to the ink and stirred homogeneously. The mixture ink/hardener is not storable and must be processed within pot life.

The combined addition of Thinner UKV 1 and Retarder SV 5 is needed for full area prints.

For slow printing sequences and fine motifs, we recommend the addition of SV 5.

The cleaner UR 3 is recommended for manual cleaning of the working equipment. Cleaner UR 5 is recommended for manual or automatic cleaning of the working equipment.

## Printing Parameters

All types of commercially available polyester fabrics and solvent-resistant stencils can be used. We recommend mesh counts between 90-40 and 140-30 threads/cm.

## Shelf Life

Shelf life depends very much on the formula/reactivity of the ink system as well as the storage temperature. The shelf life for an unopened ink container if stored in a dark room at a temperature of 15 - 25 °C is:

- 1 year for 188/926/950/956
- 1.5 years for 924
- 3 years for 910/970
- 2 years for all other color shades

Under different conditions, particularly higher storage temperatures, the shelf life is reduced. In such cases, the warranty given by Marabu expires.

## Note

Our technical advice whether spoken, written, or through test trials corresponds to our current knowledge to inform about our products and their use. This is not meant as an assurance for certain properties of the products nor their suitability for each application.

You are, therefore, obliged to conduct your own tests with our supplied products to confirm their suitability for the desired process or purpose. The foregoing information is based on our experience and should not be used for spec-

ification purposes. All characteristics described in this Technical Data Sheet refer exclusively to the standard products listed under "Range", provided that they are processed in accordance with their intended use and only when used with the recommended auxiliaries. The selection and testing of the ink for specific applications is exclusively your responsibility. Should, however, any liability claims arise, they shall be limited to the value of the goods delivered by us and utilised by you with respect to any and all damages not caused intentionally or by gross negligence.

### Labelling

For Mara® *Mold* MPX and its auxiliaries, there are current Material Safety Data Sheets available according to EC regulation 1907/2006, informing in detail about all relevant safety data including labelling according to EC regulation 1272/2008 (CLP regulation). Such health and safety data may also be derived from the respective label.

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