Mara® Mold MPX

Marabu

Screen printing ink for front or back-printed, directmolded polycarbonate films

Silicone-free, glossy, 2 component ink, high flexibility, high temperature resistance, excellent adhesion to injection-moulded 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 mold 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

2-component system

- The ink must be stirred homogeneously before and, if necessary, during production
- Add hardener in the specified amount and mix thoroughly before printing
- Allow the ink/hardener mixture to rest for 15 min before processing.
- Maintain an ambient temperature of at least 15 °C during processing and curing to avoid irreversible curing issues
- Avoid high humidity during the first few hours after printing

Pot life

The mixture must be processed within 8 h at 20-25 °C and 45–60 % RH. Higher temperatures will shorten the pot life. After the pot life has expired, adhesion and resistance may decrease, even if the ink still appears usable.
Exception **Deep Black 188** see chapter **Auxiliaries.**

Drying

A proper drying process is essential for best forming and molding results. Prints should contain minimal 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 provide a high recirculating air volume. Optionally, IR emitters operating at approximately 50 % power may be used after the second hot-air zone.

After tunnel drying, the prints should be tempered for three hours at 80 °C / 175 °F in a drying rack within a convection oven.

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The processing window for the printed films is 3 months (storage at room temperature).

Fade resistance

Pigments of excellent fade resistance (blue wool scale 7-8) are used.

Range

Basic Shades

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

High Opaque Shades

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

Transparent Shades

585	Transparent Black

Press-Ready Metallics

191	Silver
197	Medium Silver

Further Products

910	Overprint Varnish
912	Overprint Varnish

Resistance values of high-opacity shades (mesh 120-30, single print):

MPX 181
Opaque Black, non-conductive → $10^{11}\,\Omega$
MPX 180 Opaque Black → $10^{08}\,\Omega$
MPX 188 Deep Black → $10^{08}\,\Omega$

Note: For applications requiring a non-conductive deep black, a combination of MPX 188 and MPX 181 may be used.

Metallics: Since the orientation of pigment particles may change during back molding, lower peel values are achieved compared to the base shades.
MPX 912: During the molding process, MPX 912 is more heat-resistant than MPX 910, but less flexible and not suitable for mixing with basic shades.

All color shades (except MPX 912) can be mixed with each other, but not with other ink systems or their auxiliaries.

Auxiliaries

For FIM/IMD applications, only the auxiliaries listed below may be used. **No other** auxiliaries are permitted.

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 optimal hardener amount depends on the process and final product. Less hardener increases formability, while more hardener improves washout and adhesion to the injection molding compound.

Recommended addition of Hardener H 5:
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
Deep Black 188: max. 6 %
• Pot life with 2 %: 6 h
• Pot life with 6 %: 3 h

H 5: sensitive to humidity, must be stored in a sealed container. Improves resistance and adhesion. Stir homogeneously into the ink shortly before use. The mixture is not storable and must be processed within pot life.
UKV 1 / SV 1: combined addition recommended for full-area prints.
SV 5: recommended for slow printing cycles or

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particularly fine designs.
UR 3: for manual cleaning of working equipment.
UR 5: for manual or automatic cleaning of working equipment.

Printing Parameters

Mesh: 90-40 und 140-30, depending on printing conditions, speed, ink mileage and opacity.
Stencils: Commercially available capillary films (15-20 µm) or solvent-resistant photo emulsions or combined stencils.

Shelf Life

Shelf life depends very much on the formula/reactivity of the ink system as well as the storage temperature. For an unopened ink container it is

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

We recommend our products to be stored in a dark, dry and well-ventilated area at 5 °C - 35 °C, protected from heat and direct sunlight. If storage conditions do not comply with this recommendation, shelf life is no longer guaranteed.

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 specification 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, Material Safety Data Sheets are available according to EC Regulation 1907/2006, providing all relevant safety data and labeling details as per EC Regulation 1272/2008 (CLP Regulation). The health and safety data can also be found on the product labels.

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