



Screen printing ink for directly injected plastic parts by using the in-mold technology (second surface), printed onto polycarbonate foils

Satin gloss, 1 or 2 component ink, good mouldability, high temperature resistance, excellent adhesion to injection-moulded materials

Field of Application

Mara® Mold MPC is a solvent-based screen printing ink. It is best suited for printing onto the reverse side of PC decorating foils, and use as **two-component ink** provided, for direct injection with PC or PC/ABS.

Technical recommendation

The IMD/FIM process is a combination of several tasks like printing, deformation, cutting, punching, and injection-molding technology. The molding of printed films is a very complex process that involves parameters such as temperature, gate and tool geometry, cycle times, and washout. 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

For this process, polycarbonate foils or congeneric PC blend foils are used.

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 IMD/FIM process is mostly involved when it comes to products such as:

- Automotive industry: manufacturing of flip switches, buttons, turning knobs or panels
- mobile phones (housings, lenses)
- housing parts for various uses
- household appliances/ medical products

Characteristics

Ink Adjustment

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

Use as 2-component ink

Depending upon the substrate and the requirements, hardener can be added to the ink before printing.

As soon as parts printed with MPC are further processed using the in-mold process, the ink must be used as a 2-component ink.

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 minutes.

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

The print should be dried as good as possible in order to limit the risk of residual solvents.

We recommend tunnel drying with two hot-air zones at 60-75° C (depending on the substrate) followed by a circulation or cooling

Mara® Mold MPC



zone, and post-tempering of the prints for 4 hours at a temperature of 80 °C.

If hardener was added to the ink, the prints will not be stackable right after tunnel drying, and should therefore be stored in a drying rack.

The processing window for films printed with two-component ink is six weeks.

Fade resistance

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

Range

Basic Shades

| | |
|-----|------------------|
| 920 | Lemon |
| 922 | Light Yellow |
| 924 | Medium Yellow |
| 926 | Orange |
| 930 | Vermilion |
| 932 | Scarlet Red |
| 934 | Carmin Red |
| 936 | Magenta |
| 940 | Brown |
| 950 | Violet |
| 952 | Ultramarine Blue |
| 954 | Medium Blue |
| 956 | Brilliant Blue |
| 960 | Blue Green |
| 962 | Grass Green |
| 970 | White |
| 980 | Black |

Press-Ready Metallics

| | |
|-----|--------|
| 191 | Silver |
|-----|--------|

Further Products

| | |
|-----|-------------------|
| 910 | Overprint Varnish |
|-----|-------------------|

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

All basic shades are included in our Marabu-ColorFormulator (MCF). They build the basis for the calculation of individual colour matching formulas, as well as for shades of the common colour reference systems HKS®, PAN-

TONE®, and RAL®. All formulas are stored in the Marabu-ColorManager software.

Auxiliaries

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

| | | |
|-------|------------------------|--------|
| UKV 1 | Thinner | 10-15% |
| H 1 | Hardener, UV resistant | 5-10% |
| H 2 | Hardener, fast | 5-10% |
| UR 3 | Cleaner (flp. 42°C) | |
| UR 4 | Cleaner (flp. 52°C) | |
| UR 5 | Cleaner (flp. 72°C) | |
| SV 1 | Retarder, mild | |
| SV 10 | Retarder | |

Thinner is added to the ink to adjust the printing viscosity. For slow printing sequences and fine motifs, it may be necessary to add retarder to the thinner.

Hardener H 1 and H 2 are sensitive to humidity and 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 cleaners UR 3 and UR 4 are 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 (1:1 plain weave quality) and solvent-resistant stencils can be used. For MPC 191 Silver, we recommend a mesh count of 90-120 threads/cm.

Shelf Life

Shelf life depends very much on the formula/reactivity of the ink system as well as the storage temperature. It is 3.5 years for an unopened ink container if stored in a dark room at a tem-

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perature of 15-25°C. Under different conditions, particularly higher storage temperatures, the shelf life is reduced. In such cases, the warranty given by Marabu expires.

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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 MPC* 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.