

**Solvent-based Screen Printing Ink, designed for the manufacturing of ID-Cards**

**Suitable for laminating and embossing, offset-overprintable, satin ink film, very flexible**

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## Field of Application

### Substrates

Mara® Flex FX is suited for printing onto

- rigid PVC
- PVC films
- extruded ABS blanks

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

### Field of use

Mara® Flex FX is suitable for printing on single and multi-layered identity cards such as customer loyalty cards, club cards, bank cards, telephone cards, smart cards, or ID system cards. FX excels through particularly good laminating characteristics. FX can also be used in combination with other printing methods such as waterless or UV offset printing.

Suited for other applications as well that require a highly flexible ink film as provided by FX.

### Attention:

FX 170 opaque white, and mixtures with the Metallics S 191 - S 193 are not suited for laminating.

## Characteristics

All colour shades are brilliant with medium opacity. This ensures excellent lamination (except for FX 170 opaque white) with high outputs and allows the mixing of very pure colour shades.

### Ink Adjustment

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

If Mara® Flex FX is used for applications that do not require a lamination process, it can also be used as a **2-component ink** (depending on the substrate or requirements).

When using hardener / adhesion modifier, 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

Physically very fast drying; dries at 20°C ambient temperature within 10 min. ready for overprinting, at 50°C in a tunnel dryer (2 warm – 1 cold section) within 30 - 40 sec.

The times mentioned above vary according to the substrate, the ink film thickness, drying conditions and the auxiliaries used.

When overprinting, an increased drying time is required due to the rewetting of the previous print layer. When printing both sides of cards, careful checks are necessary, so as to ensure adequate block resistance.



Good final drying properties and a check for residual solvents in the printed ink film are essential for successful lamination, good overprintability, and high peel resistance. Here, “Wicket” dryers have proven to be most effective, due to the long dwell time of 10-20 min. in the tunnel. Too much residual solvent content in the ink generally degrades the laminating result.

## Fade resistance

Pigments of excellent fade resistance (blue wool scale 6-8) are used for our ink series Mara® Flex FX.

## Stress resistance

After proper and thorough drying, the ink film is very flexible and laminable. Furthermore, its surface is resistant to scratching and bending. Due to the gloss levels required for good offset overprintability, the dry abrasion and rub resistance properties are somewhat lower. Mara® Flex FX shows good resistance against alcohol and finger sweat.

## 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

### Transparent Shades

520	Transparent Yellow
536	Transparent Red

### Press-Ready Metallics

191	Silver
195	Fine Silver

197	Medium Silver
199	Coarse Silver

### Further Products

170	Opaque White
903	Offset Base
904	Special Binder
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 outstanding ink range.

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®, PANTONE®, and RAL®. All formulas are stored in the Marabu-Color Manager software.

Due to the high amount of pigments contained, FX 170 opaque white cannot be laminated.

Libra *Matt* LIM 170 can be used for signature fields.

### Metallic Mixing System

Metallic colour shades on ID cards are a core strength of screen printing. Thanks to the Marabu Metallic Mixing System including 4 silver shades with different pigment sizes, 2 transparent shades, and 17 FX standard shades almost any metallic hue can be mixed.

FX 191	mesh 77-55 - 90-48
FX 195	mesh 90-48 - 100-40
FX 197	mesh 77-55 - 90-48
FX 199	mesh 43-80

All metallic shades mixed with FX 191 - 199 can be laminated and are storable for 1 year.

## Metallics

### Attention:

Mixtures with the Metallics S 191 - S 193 are not suited for laminating.



## Metallic Pastes

S 191	Silver	15-25%
S 192	Rich Pale Gold	15-25%
S 193	Rich Gold	15-25%

These Metallics are added to FX 904 in the recommended amount, whereas the addition may be individually adjusted to the respective application. We recommend preparing a mixture which can be processed within a maximum of 8 h since metallic mixtures usually cannot be stored. Owing to the smaller pigment size of Metallic Pastes it is possible to work with finer fabrics like 140-31 to 150-31. All metallic shades are displayed in the Marabu "Screen Printing Metallics" colour chart.

## Auxiliaries

UKV 1	Thinner, fast	10-15%
UKV 2	Thinner	10-15%
H 4	Hardener	10%
ES	Printing Modifier	0.5%
UR 3	Cleaner (flp. 42°C)	
UR 4	Cleaner (flp. 52°C)	
UR 5	Cleaner (flp. 72°C)	
SV 5	Retarder, fast	
SV 10	Retarder, slow	

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 (max. 1:1).

Hardener H 4 is sensitive to humidity and is always to be stored in a sealed container. Hardener H 4 can be added for increased resistance and adhesion. The mixture ink/hardener must be stirred well and homogeneously. The mixture ink/hardener is not storable and must be processed within pot life.

Printing Modifier ES contains silicone and can be used to rectify flow problems on critical substrates. If an excessive amount is added, flow problems are increased and adhesion may be reduced, especially when overprinting. The use of ES may reduce the degree of gloss.

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.

To ensure good laminating characteristics, no other auxiliaries should be added to the FX.

## Printing Parameters

All types of commercially available fabrics and solvent-resistant stencils can be used. The fabric recommendation for standard shades is 90-48 to 120-34, for metallics please refer to the chapter Metallic Mixing System.

### Laminating parameters

The following laminating parameters have proven to work for PVC on the market.

Laminating temperature:	140°C to 150°C
Pressure:	1 ton for sheet sizes of 35x50cm
Laminating time:	approx. 15 min

## 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:

- 2 years for FX 195
- 3.5 years for all other standard shades

We recommend our products to be stored in a dark, dry and well-ventilated surrounding, providing an ambient temperature of 5 ° - 35 °C. Please protect from heat and direct sunlight. If storage conditions do not comply with this recommendation, the 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® *Flex* FX 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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