

**Screen Printing Ink for pre-treated polyethylene (PE) and polypropylene (PP), coated and powder-coated substrates**

**Glossy, high opacity, fast drying 2-component ink system, resistant to chemicals, weather resistant, insensitive surface**

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## Field of Application

### Substrates

Mara® Poly P is suitable for printing onto:

- Pre-treated polyethylene (PE)
- Pre-treated polypropylene (PP)
- Polyurethane
- Polyamide
- Rigid PVC
- Coated and powder-coated substrates
- Aluminium, with/without pre-treatment

Before printing onto PE and PP, please keep in mind that the substrate surface must be pretreated by flaming. With this process, surface tension will rise and a very good adhesion from 44 mN/m is possible.

The surface treatment can be tested by appropriate test inks or a water test, where a wetted PE or PP surface must hold the closed water film for about 20 sec. The substrate surface must be absolutely free of contaminating residues such as grease, oil, and finger sweat.

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

Mara® Poly P is a versatile and highly resistant 2-component ink which is used for high quality-prints at long-term outdoor use, as well as for bottle crates or transport containers of PE and PP.

The ink can be processed from semi-automatics to fully automatic printing lines with ink pump operation.

Best ink adhesion is achieved on items made of PE or PP pellets containing max. 20 % regrind. Adhesion may be decreased if more than 20 %

regrind is added due to an unpredictable degree of contamination. Therefore, preliminary trials are essential.

## Characteristics

### Ink Adjustment

The ink should be stirred homogeneously before printing and if necessary during production. Prior to printing, it is necessary to add hardener to the undiluted ink in the proper mixing ratio:

**All basic shades except Overprint Varnish:**

800 g Mara® Poly P +  
100 g (= 12,5 %) H 1

**Overprint Varnishes P 910/911/913:**

500 g Mara® Poly P +  
100 g (=20 %) H 1

If basic shades are mixed with Overprint Varnish P 910 the proper addition of hardener must be calculated in the correct ratio.

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 mixture ink/hardener is chemically reactive and must be processed within 8-12 h (if stored at 20 °C). Higher processing 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.

By continuously adding freshly mixed ink plus

hardener, the pot life can be extended up to 24 hours if working in 3 shifts with rather low ink throughput.

### Drying

Parallel to physical drying, i. e. evaporation of solvents used, the actual hardening of the ink film is caused by the chemical cross-linking reaction between ink and hardener.

The following standard values can be assumed concerning the progressive cross-linking reaction (Mesh 90-55, single print):

Dryness degree	Temperature	Time
overprintable	20 °C	20 min
	air drying	
overprintable	hot air drying	4 min
scratch resist.	20 °C	3 h
cured	20 °C	8 days
	air drying	
cured	80 °C	60 min
	oven drying	

The mentioned drying times are only guidelines as they depend on the printed ink film thickness, air humidity, drying conditions, and the selection of auxiliaries such as thinner and/or retarder.

If multicolour prints are dried with enforced heat between printing sequences (by hot air or infrared), the time for overprinting is reduced to approx. 3-4 min.

Due to extreme stress on crates and ink, we do not recommend flaming.

When drying with enforced heat of more than 150 °C, the heat influence must not exceed 5 min in order to avoid yellowing, especially with White 970. Generally an extended drying time is necessary when overprinting the ink.

The ink film underneath must not be completely cured when overprinted. If the ink film is dried at room temperature 20 °C, overprinting must be carried out within 8 h. We recommend overprinting as soon as possible, in order to guarantee a good adhesion between the ink layers.

### Fade resistance

Mara® Poly P includes a very weather-resistant binder which is highly fade resistant (blue wool scale 7-8).

The basic shades of Mara® Poly P, over-varnished with P 910 (in the case of bottle crates no over-varnishing!) are therefore suited for a long-term outdoor use of up to 5 years, referred to the Central European climate.

The ink, however, must be processed properly, the ink film thickness (fabric 77-55 to 90-48) must be appropriate, as well as adhesion and scratch resistance of the substrate, pre-treatment, and substrate quality.

Mixed colour shades containing more than 20 % varnish and/or white show a reduced fade and weather resistance. The outdoor resistance is also reduced if the density of the printed ink film is decreased due to a finer fabric.

All pigments used are resistant to solvents and plasticers.

### Stress resistance

After proper and thorough drying (e. g. 8 days at 20 °C), the ink film exhibits outstanding adhesion as well as rub and scratch resistance and is resistant to:

- Water storage
- Water mixed with 10 % alcohol
- 2 % natron liquor (up to 70 °C) for 30 min
- 2 % Teepol solvent (up to 80 °C) for 3 h
- Oils, greases, and diluted acids
- Other usual fillers (preliminary trials!)

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## Range

### Basic Shades

920	Lemon
922	Light Yellow
924	Medium Yellow
926	Orange
930	Vermilion
932	Scarlet Red
934	Carmine 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

### Further Products

910	Overprint Varnish
911	Overprint Varnish, with UV-Absorber
913	Milky Matt Varnish

**Attention:** The colour shades P 920 - P 970 and the varnishes P 911 and P 913 are **silicone-free**.

For silicone-free products it is important to use only thoroughly cleaned stencils, squeegees, ink pumps, tubes (in the case of an automatic ink supply), and injectors for the manual ink filling of the stencil, etc. 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.

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-Color Manager software.

## Metallics

### Metallic Pastes

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

### Metallic Powders

S 181	Aluminium	17%
S 182	Rich Pale Gold	25%
S 183	Rich Gold	25%
S 184	Pale Gold	25%
S 186	Copper	33%
S 190	Aluminium, rub-resistant	12.5%

These metallics are added to P 910 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. Due to their chemical structure, the processing time of mixtures with Pale Gold S 184 and Copper S 186 is even reduced to 4 h.

Owing to the smaller pigment size of Metallic Pastes it is possible to work with finer fabrics like 140-31 to 150-31.

Owing to the bigger pigment size of Metallic Powders we recommend the use of a coarser fabric like 100-40. Shades made of Metallic Powders are always subject to an increased dry abrasion which can only be reduced by over-vernishing.

All metallic shades are displayed in the Marabu "Screen Printing Metallics" colour chart.

## Auxiliaries

H 1	Hardener	12.5-20%
PV	Thinner	10-20%
MP	Matting Powder	0.5-4%
VM 2	Levelling Agent	0.5-1%
UR 3	Cleaner (flp. 42°C)	
UR 4	Cleaner (flp. 52°C)	
UR 5	Cleaner (flp. 72°C)	
SV 5	Retarder, for fully automatic printing sequences	

SV 10 Retarder  
P 2 Primer

Hardener H 1 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 mixing ratio depends on the colour shade and the application, see page 1. The mixture ink/hardener is not storable and must be processed within pot life.

Thinner and/or retarder is added to the ink/hardener mixture to adjust the printing viscosity. For slow printing sequences and fine motifs, it may be necessary to add retarder to the thinner. For an additional thinning of the ink containing retarder, only pure thinner should be used.

By adding Matting Powder MP the ink film can be matted individually (preliminary trials in terms of adhesion and resistance are essential, white shades addition max. 2 %).

Printing Modifier VM 2 (silicone-free) can be added to rectify flow problems. An excessive amount reduces the intercoat adhesion.

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.

Special Primer P 2 is used for manual pre-cleaning and pre-treatment of PP substrates.

## Printing Parameters

All types of commercially available polyester and nylon fabrics and solvent-resistant stencils can be used. For a good opacity on dyed substrates, we recommend a fabric thickness between 68-64 and 90-48, for printing finest details 100-40 to 120-34.

## Shelf Life

Shelf life depends very much on the formula/reactivity of the ink system as well as the stor-

age temperature.

For an unopened ink container it is **3,5 years**.

We recommend our products to be stored in a dark, dry and well-ventilated surrounding, providing an ambient temperature of 5 °C - 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® Poly P 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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