

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

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

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## Field of Application

### Substrates

Marapoly P is a 2-component screen printing ink which is suitable for printing onto pre-treated polyethylene (PE) and polypropylene (PP), polyurethane, polyamide, PVC, as well as top-coated and powder-coated substrates.

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

### Field of use

Marapoly 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.

### Substrate and pre-treatment

Marapoly P is only suited for printing onto new PE and PP with max. 20% of regenerated material in the granulated material. With an excessive percentage of up to 100%, the grade of contamination of the granulated material cannot be calculated and the ink adhesion may decrease. Due to this, preliminary trials are essential.

Furthermore, the substrate surface of PE or PP must be pre-treated once by flaming directly before printing. This increases the surface tension and a sufficient ink adhesion can be achieved with a minimum of 42-48 mN/m.

The surface treatment can be tested either by appropriate test inks in the usual way or by a water test where a wetted PE or PP surface must hold the closed water film for about 20 sec.

## Characteristics

### Hardener

Marapoly P is a 2-component ink and has to be mixed with Hardener H 1 before printing.

### Mixing ratio

Prior to printing, it is necessary to add Hardener H 1 to the undiluted ink in the proper mixing ratio. The proper mixing ratios are:

#### All basic shades except Overprint Varnish:

8 parts of P + 1 part of Hardener H 1  
800 gs of P + 100 gs of Hardener H 1

#### Overprint Varnish P 910 or P 410 73 911:

5 parts of P + 1 part of Hardener H 1  
500 gs of P + 100 gs of Hardener H 1

For ink mixtures of basic shades with Overprint Varnish P 910, the proper addition of hardener must be calculated in the correct ratio.

### Pot life (processing period)

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

Increased processing temperatures of more than 20°C reduce the pot life. If the mentioned times are exceeded, the ink's adhesion and resistance may be reduced even if the ink characteristics show no noticeable change.

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By continuously adding freshly mixed ink plus hardener, the pot life can be extended up to 24 hours in the 3-shift operation with few ink consumption.

## Drying/Hardening

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

The standard values for the progressive cross-linking (hardening) of the ink film on a 90-55 fabric, simple print, are indicated below:

Ext. drying	temperature	H 1
ready to be	20°C, air drying	20 min
overprinted	hot air drying (Leister)	4 min
scratch resist.	20°C	3 hours
cured	20°C, air drying	8 days
cured	80°C, oven drying	60 min

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

If multi-colour 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 the extreme stress for bottle crates and ink, we do not recommend flame drying.

When drying with enforced heat of more than 150°C, the heat influence must not exceed 5 min as otherwise there will be a yellowing, especially with White 970. Generally an extended drying time is necessary when overprinting the ink.

Processing and hardening temperature should not be below 15°C during printing and 8 hours after printing, otherwise the characteristics and the flow of the ink film could be irreversibly destroyed.

Please also avoid exposure of the ink to high air humidity or directly to water (rain) during and after printing, for 8 hours at 20°C or 12 hours at 15°C since adhesion between ink and substrate will be strongly affected.

## Overprinting

Please bear in mind that the ink film underneath must not be chemically cured when overprinted. If the ink film is dried at a room temperature of 20°C, overprinting must be carried out with Hardener H 1 in the course of 8 hours, at the latest.

We recommend to carry out the overprinting as soon as possible in order to guarantee a good adhesion between the ink layers.

## Fade resistance

Marapoly P ink type includes a very weather-resistant binder which is highly fade resistant in all colour shades (blue wool scale 7-8 and weather resistance between 4 and 5).

The basic shades of Marapoly P plus overcoating with Varnish P 910 or P 410 73 911 (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 moderate Central European climate.

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

Shades mixed with more than 20% of Overprint Varnish P 910, and/or other standard shades (especially white) show a lower fade and weather resistance. The outdoor resistance is also reduced if the density of the printed ink film decreases due to the use of finer fabric.

All pigments used are resistant to solvents and plasticers.

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## Stress resistance

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

- water
- water mixed with 10 % alcohol
- 2% natron liquor (up to 70 °C) for 30 min.
- 2% Teepol solvent (up to 80 °C) for 3 hours
- oils, greases and diluted acids
- other usual fillers (preliminary trials!)

## Range

### Basic shades

See shade card "System Maracolor, Marapoly P"

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

All shades are intermixable. Mixing with other ink types should be avoided in order to maintain the special characteristics of this outstanding ink range.

The basic shades according to System Maracolor are included in our Marabu-ColorFormulator. They build the basis for the calculation of individual colour matching formulas, as well as for shades of the common colour reference systems Marabu System 21, HKS®, and RAL®. All formulas are stored in the Marabu-ColorManager 2 (MCM 2) software.

The pigments used in the below mentioned standard shades, based on their chemical structure, correspond to the EEC regulations EN 71/part 3, safety of toys - migration of specific elements. All colours are suited for printing onto toys.

## Additives

Bronze Binder:	P 910 (500 gs)
Overprint Varnish:	P 910 (500 gs)
Varnish (UV-Absorber):	P 410 73 911

### Bronzes (to be mixed with P 910)

These are bronze powders to be stirred into Bronze Binder P 910. All bronze shades are shown in a special bronze shade chart.

S 181	Aluminium (6:1)
S 182	Rich Pale Gold (4:1)
S 183	Rich Gold (4:1)
S 184	Pale Gold (4:1)
S 186	Copper (3:1)
S 190	Aluminium, rub-resistant (8:1)

Bronze ink mixtures are instable and have a processing time of 8 hours. For processing bronzes, we refer you to our separate Technical data sheet 'Screen Printing Bronze Inks'.

When printing bronze inks onto bottle crates, we recommend to use our ink type Marapur PU.

### High-gloss bronzes, pastes

Furthermore, 3 high-gloss bronze concentrates are available as pastes which are to be mixed with Bronze Binder P 910 (mixing ratio 5:1-10:1). Please also see separate Technical Data Sheet 'High-Gloss Bronze Concentrates'.

S 291	High-gloss Silver
S 292	High-gloss Rich Pale Gold
S 293	High-gloss Rich Gold

## Auxiliaries

Hardener:	H 1
Thinner:	PV
Retarder:	SV 10
(for fully automatic printing sequences)	SV 5
Special Primer for PP:	P 2
Matting Powder :	MP (0.5-4 %)
Printing Modifier:	VM 2 (0.5-1 %)
Cleaner:	UR 3

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Hardener H 1 is weighed into the undiluted ink and stirred. 10-20% thinner and/or retarder are then directly to be added whereas a high percentage of thinner will ensure a faster drying (PV) and a high percentage of retarder will improve the mesh opening at a slower drying.

For finest details or slow printing sequences, the addition of pure Retarder SV 5 or SV 10 could be necessary.

Prior to printing, the finished ink mixture should rest for 10 min in order to allow the air bubbles stirred in to rise and burst.

On non pre-treated PP, it is possible to achieve an equally good adhesion of the ink without flaming by manually applying the Special Primer P 2.

Marapoly P can be matted by adding 0.5-4% Matting Powder MP to the ink (for P 970 White 2% max.), reducing also its opacity.

0.5-1% of (silicone-free) Printing Modifier VM 2 can be added to rectify flow problems. An excessive amount of VM 2 reduces the intercoat adhesion.

## Cleaning

We recommend our Cleaner UR 3 to clean the screens immediately after use.

## Fabrics and stencils

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 the print of finest details 100-40 to 120-34.

## Labelling

For our ink series Marapoly P and its additives and auxiliaries, there are current Material Safety Data Sheets according to EC-regulation 91/155, informing in detail about all relevant safety data including the labelling according to the present EEC regulations as to health and safety labelling requirements. Such data may also be obtained from the respective label.

The ink has a flash point between 55 °C and 100 °C.

## 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 selection and testing of the ink for specific application is exclusively your responsibility. Should, however, any liability claims arise, such claims 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.