

Screen Printing Ink

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



Marabu

Marapoly P

**For pre-treated polyethylene (PE)
and polypropylene (PP), top-
coated substrates and powder-
coatings**

Field of Application

Substrates

Marapoly P is a 2-component screen printing ink which is suitable for printing on pre-treated polyethylene (PE) and polypropylene (PP), polyurethane, polyamide, PVC, and 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 for 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 (for more information, please see our Aweta Info No. 1/97).

Substrate and Pre-treatment

Marapoly P is only suited for printing on new PE and PP with a max. percentage of 20 % regenerated material in the granulated material. With an excessive percentage of regenerated material up to 100 %, the grade of contamination of the granulated material cannot be calculated, and the ink adhesion may decrease. Therefore, 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 surface tension of 42 - 48 mN/m. The surface treatment can be tested by appropriate test inks in the usual way, or a water test, where a wetted PE or PP surface must hold the closed water film for about 20 sec.

On non pre-treated PP, the ink adhesion can also be achieved by a coat of our colourless Special Primer P 2, without flaming.

Marapoly P can also be processed with a spray gun, but preliminary trials are absolutely necessary for this process. We recommend to filter the thinned press-ready ink (25 µm screen) before processing it, as otherwise you could have bubbles in the ink film.

Characteristics

Hardener

Marapoly P is a 2-component ink and has to be mixed with hardener PH before printing. For long-term outdoor use, we recommend hardener PUH instead of PH for varnish PL, as this will yellow in the sunlight.

Mixing ratio

Prior to printing it is necessary to add the hardener PH to the undiluted ink in the proper mixing ratio.

The proper mixing ratios are:

All basic shades except Varnish PL or PT

8 parts by weight of P + 1 part by weight of hardener PH
800 g Marapoly P + 100 g hardener PH

Varnish PL and Transparent Base PT:

5 parts by weight of P + 1 part by weight of hardener PH
500 g Marapoly P + 100 g hardener PH

If the prints are used outdoors for a long term, the following change is applicable for Varnish PL, as regards hardener:

Varnish PL for outdoor use

5 parts by weight of P + 1 part by weight of hardener PH
500 g Marapoly P + 100 g hardener PH

For ink mixtures of basic shades with varnish PL or transparent base PT, the proper addition of hardener must be calculated in the correct ratio.

Immediately after addition of hardener, the ink is mixed and then diluted to printing viscosity by adding thinner and/or retarder, and so the hardening reaction is somewhat reduced. Before printing, the finished ink mixture should rest for 10 min., to allow the air bubbles which are stirred in to rise and burst.

Pot life (processing period)

The mixture ink/hardener is chemically reactive and must be processed within the following periods (if stored at 20 °C):

Hardener PH: 8-12 hours
Hardener PUH: 8 hours (with varnish)

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.

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 following standard values for the progressive crosslinking (hardening) of the ink film are indicated below:

(Fabric 90-55 [T], simple print)

Extent of drying	Temperature	PH	PUH (varnish)
ready for overprinting	air drying at 20 °C	15 min	20 min
ready for overprinting	hot air drying (Leister)	3 min	4 min
cured	20 °C, air drying	6 days	8 days
cured	80 °C, oven drying	45 min	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 multicolour prints are dried with enforced heat between printing sequences (by hot air or infra-red), the time for overprinting is reduced to approx. 3-4 min.

Due to the extreme high 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 070.

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, because adhesion between ink and substrate will be affected strongly.

Overprinting

Please bear in mind that the ink film underneath must not be chemically cured when overprinted. If the ink film is dried at room temperature 20 °C, overprinting must be carried out with hardener PH 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 contains a highly weather-resistant binding agent which is pigmented highly fade-resistant. Therefore, the basic shades of Marapoly P plus overcoating with PL are suitable for long-term outdoor use up to 5 years (referred to the moderate Central European climate). Therefore, the ink must be processed properly, the printed layer thickness (fabric 77-55 [T] to 90-48 [T]) must be appropriate, as well as the adhesion and scratch resistance of the substrate, and the pre-treatment and substrate quality.

Shades mixed with more than 20 % of printing varnish PL, 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. For outdoor use, we recommend for varnish PL the non yellowing hardener PUH instead of PH. All pigments used are resistant to solvents and plasticizers.

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

Marabu-mix colour matching system includes 17 basic shades as per Maracolor which are intermiscible. The Marapoly P ink should not be mixed with other types of ink, to maintain the special characteristics of this outstanding ink range.

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.

Basic shades

See shade card "System Maracolor, Marapoly P, Marapoxy Y"

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		

By using these 17 basic shades in accordance with the mixing ratios given in the Marabu-ColorManager software, it is possible to produce shades of the ink systems Marabu system 21, RAL, and HKS.

Press-ready bronzes as basic shades

P 191	Silver
P 193	Rich Gold

Additives

Bronze binder:	PL (500 grams)
Printing varnish:	PL (500 grams)
Transparent base:	PT (500 grams)



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Bronzes (to be mixed with PL)

These are bronze powders to be stirred into the bronze binder PL. All bronze shades are shown in a special bronze shade chart.

S 181 Aluminium	S 184 Pale Gold
S 182 Rich Pale Gold	S 186 Copper
S 183 Rich Gold	S 190 Aluminium (rub-resistant)

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

High-gloss bronzes, pastes

Furthermore, 3 high-gloss bronze concentrates are available as pastes, to be used by mixing them with bronze binder PL, mixing ratio 5:1 - 10:1 (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:	PH
Hardener for PL:	PUH
Thinner:	PV
Jet Thinner:	7037
Retarder:	SV 10
	SV 5, for fully autom. print. sequences
Special Primer for PP:	P 2
Matting Powder :	MP (0.5 - 4 %)
Printing Modifier:	VM 2 (0.5 - 1 %)
Cleaner:	UR 3

The hardener PH (for varnish PUH, too) is weighed into the undiluted ink and stirred. Subsequently, 10-20 % thinner and/or retarder are added directly, a high percentage of thinner ensuring a faster drying (PV) and a high percentage of retarder improving 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.

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

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

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

We recommend 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 (T) and 90-48 (T), for the print of finest details 100-40 (T) to 120-34 (T).

Labelling

For our ink type 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 health and safety data may also be obtained from the respective label.

The ink has a flash point between 21 °C and 100 °C. Since the ink is not considered as a flammable liquid due to its pastous nature, any specific regulations for the handling of flammable liquids do not apply for the ink.

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.