

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

Marapoly P is suitable for printing onto:

- pre-treated polyethylene (PE)
- pre-treated polypropylene (PP)
- polyurethane
- polyamide
- PVC
- coated and powder-coated substrates

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

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-automats 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

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

All basic shades except Overprint Varnish:
800 g Marapoly P + 100 g (= 12,5 %) H 1

Overprint Varnish P 910
500 g Marapoly 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.

Pre-reaction time

It is recommended to allow the ink/ hardener mixture to pre-react for 15 minutes.

Pot life

The mixture ink/hardener is chemically reactive and must be processed within 8-12 hours (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 used solvents, the actual hardening of the ink film is caused by the chemical cross-linking reaction between ink and hardener.

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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 processing and curing temperature should not be lower than 15°C within the first 8 hours as irreversible damage can occur.

High air humidity (> 60%) or direct contact with water (rain) must be prevented categorically during the first 8 h (at 20 °C) or 12 h (at 15 °C) for otherwise the linkage between the ink and the substrate will be impaired significantly.

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 within 8 hours. We recommend overprinting as soon as possible, in order to guarantee a good adhesion between the ink layers.

Fade resistance

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

The basic shades of Marapoly 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 hours
- oils, greases and diluted acids
- other usual fillers (preliminary trials!)



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

Metallics

Metallic Pastes

S 291	High Gloss Silver	10-25%
S 292	High Gloss Rich Pale Gold	10-25%
S 293	High Gloss Rich Gold	10-25%

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 to be added to P 910 in the recommended amount, whereat 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. 78°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, see 1st page. 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.

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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.

cluding labelling according to the present EEC regulations as to health and safety labelling requirements. Such health and safety data may also be derived from the respective label.

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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.

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 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 Marapoly 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 in-