

Screen Printing Ink

Glossy, high opaque, fast hardening two-component ink system, resistant to chemicals



Marabu

Marapoxy Y

For bottle crates of pre-treated polyethylene (PE) and polypropylene (PP)

Field of Application

Substrates

The 2-component screen printing ink Marapoxy Y is used for the print on pre-treated polyethylene (PE) and polypropylene (PP).

Since all the print substrates mentioned above may be different in printability within an individual type, due to different producers, the purity of the used granulated material, and the processing parameters, preliminary trials are essential to determine suitability for the intended use.

Field of use

Marapoxy Y is mainly used for the printing onto bottle crates and transport containers of polyethylene (PE) and polypropylene (PP). The ink can be processed manually, on 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

Best ink adhesion is achieved on sprayed crates made of new granulated material of PE or PP. With a percentage of more than 20 % up to 100 % of regenerated plastic material added to the new material, 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.

Characteristics

Hardener

For the Marapoxy Y, two hardeners are available, i.e. YH and YH 9. These two vary in their reactivity and consequently in their drying speed, pot life and processing time. The hardener YH is less reactive and has a longer pot life, whereas YH 9 is higher reactive and has a shorter pot life. Generally, we recommend to use hardener YH. Only in case of drying problems between the printing stations for multiple colour printing, hardener YH 9 should be used. For the finishing print, however, we recommend to use hardener YH.

Mixing ratio

Prior to printing, it is necessary to add the hardener YH or YH 9 to the undiluted ink in the proper mixing ratio.

The proper mixing ratios are:

All basic shades except black 980 and varnish YL

800 grams of ink + 200 grams of hardener YH
800 grams of ink + 120 grams of hardener YH 9

Black 980

500 grams of ink + 300 grams of hardener YH
500 grams of ink + 185 grams of hardener YH 9

Varnish YL

300 grams of varnish + 200 grams of hardener YH
300 grams of varnish + 120 grams of hardener YH 9

For ink mixtures of basic shades with varnish PL or black, the proper addition of hardener must be calculated in the correct ratio. The hardener quantity 185 grams YH 9 for black 980 is no standard size and must be weighed exactly.

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 YH: 24 hours
Hardener YH 9: 16 hours

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.

Drying/Hardening

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

The following standard values concerning the progressive cross-linking reaction (hardening) of the ink film can be assumed:

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

Extent of drying	Temperature	YH	YH 9
ready for overprinting	air drying at 20 °C	30 min	20 min
ready for overprinting	hot air drying (Leister)	5 min	3 min
cured	20 °C, air drying	8 days	5 days
cured	80 °C, oven drying	60 min	40 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. 3-5 min. Due to extreme stress on crates and ink, we do not recommend flaming.

Generally an extended drying time is necessary when overprinting the ink.

Processing and hardening temperature should not be below 15 °C during printing and 12 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 12 hours at 20 °C or 24 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 YH in the course of 24 hours, with hardener YH 9 in the course of 16 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

We are using pigments of excellent fade resistance for all shades of our Marapoxy Y which are resistant to solvents and plasticizers as well. Due to the used binder, however, weather resistance of prints for outdoor use is limited, and the ink tends to chalk when exposed to UV radiation (sunlight). The printed ink film will be decomposed on the surface, pigments and filling materials will be released, the print's gloss is reduced and becomes whitish. Therefore, Marapoxy Y is only suitable for indoor and short-term outdoor use.

When applied onto bottle crates, a possible beginning chalky effect will be washed off by washing the crates regularly before refilling them.

If bottle crates printed with Y are stored outdoors for more than one month, they have to be covered with a protecting tarpaulin. This must not be done before the ink is totally hardened.

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 12 basic shades which are intermiscible. The Marapoxy Y 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 Y, Marapoxy Y"

Y 920	Lemon	Y 950	Violet
Y 924	Medium yellow	Y 952	Ultramarine blue
Y 926	Orange	Y 954	Medium blue
Y 930	Vermilion	Y 960	Blue green
Y 932	Scarlet red	Y 970	White
Y 934	Carmine red	Y 980	Black

Additives

Printing varnish: YL

Bronzes

For the print onto bottle crates, we recommend silver and gold bronzes of the ink type Marapur PU.

Auxiliaries

Hardener, slow:	YH (unit 200 gs, 300 gs)
Hardener, fast:	YH 9 (unit 120 gs)
Thinner:	YV
Thinner, fast:	UKV 1
Retarder:	SV 5
Retarder for slow printing sequences:	SV 3
Cleaner:	UR 1
Printing Modifier:	VM 1 (0.5-2 % max.)

The hardener YH (exceptionally YH 9, too) is weighed into the undiluted ink and stirred well. Subsequently, 5-10 % thinner and/or retarder are added directly, a high percentage of thinner ensuring a faster drying (UKV 1) 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 3 could be necessary.

0.5 - 2 % 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 to use our UR 1 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 Marapoxy Y 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.