

Screen Printing Ink for PVC self-adhesive foil, rigid PVC, ABS, SAN, acrylic, polycarbonate, pre-treated polyester foils, thermo-setting plastics, coated substrates

High gloss, high opacity, very fast drying, good resistance to petrol, weather-resistant, suitable for moulding

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Field of Application

Substrates

Mara® Star SR is designed for the following substrates:

- Rigid PVC and PVC self-adhesive foil
- ABS / SAN
- Acrylic (PMMA)
- Polycarbonate (PC)
- Pre-treated polyester foils
- Corrugated board and paper
- Wood

An addition of hardener H 1 extends the range of suitable substrates as below:

- PETG / PETA
- Thermosetting plastics
- Thinly anodized aluminium*
- Coated substrates*

*we suggest pre-treatment with PLR

Addition of Hardener H 1 and post-treatment is necessary for these substrates:

- Polyamide (PA), post-treatment with hot air
- Polyacetal (POM), post-treatment with flame

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® Star SR is a high gloss ink, and best suited for printing onto high-quality labels, stickers, displays, industrial letterings of all kinds, scales, and membrane switches.

As a high-gloss ink, Mara® Star SR is highly block-resistant and excellently suited for fast printing machines such as flat-bed presses or fully automatic cylinder machines (up to 2500 prints/h) but can also be used for manual printing or on semi-automatic machines.

Mara® Star SR can also be processed with a spray gun, but preliminary trials are necessary for this process. In order to avoid surface irregularities, we recommend to filter the thinned ink (25 µm screen) before processing.

Characteristics

Recommendation

The ink should be stirred homogeneously before printing and if necessary during production.

Use as 2-component ink

Depending upon the substrate and the requirements, hardener can be added to the ink before printing. 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 minutes.

Pot life

The ink/hardener mixture is chemically reactive and must be processed within 12 h (referred to 20-25 °C and 45-60 % RH).

Higher temperatures and an addition of SR 170 Opaque White or SR 070 White will reduce the pot life (approx. 6-8 h). We recommend, therefore, to use SR 270 High-gloss White for a maximum 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.

Gloss level

Mara® Star SR is a high-gloss ink with the following measured values (angle 60°, fabric



120-34, white self-adhesive foil). The value 100 stands for high-gloss while value 1 indicates deep-matt.

Colour prints: 70-80 gloss units
 Print Varnish SR 910: 80-90 gloss units

Drying

Physically very fast drying, at 20 °C air temperature overprintable within 5-10 min, when put at 50° C in a tunnel dryer stackable within 20-30 sec. With high dryer capacity and good ventilation provided, the drying temperature can be reduced to 40 °C for less material distortion. If SR is mixed with Hardener H1, the print will take longer to dry, and therefore the block resistance will be delayed.

The times mentioned above vary according to the substrate, the ink film thickness, drying conditions and the auxiliaries used. Generally, an extended drying time is necessary when overprinting the ink.

SR 270 High-gloss White dries slightly slower than the other SR colour shades. A hot air tunnel drying immediately after printing is recommended for multi-colour prints, as well as for overvarnishing in order to avoid a possible reduction of the high-gloss quality.

An extended drying time is necessary when Softener WM 1 (2-5%) has been added to the ink.

Fade resistance

Pigments of excellent fade resistance (blue wool scale 7-8) are used for Mara® Star SR except SR 520, 536, 568, 832 and 839. Therefore, all basic shades are suitable for outdoor use of up to 3 years referred to the middle European climate. Prerequisite for this is the appropriate and professional processing, as well as a max. addition of 50% varnish or white to the standard shades. A coat of Printing Varnish SR 911 onto the whole surface will extend the possible time for outdoor use to 4 or 5 years, especially when using the highly fade-resistant range of colour shades. As Opaque White SR 170 is highly pigmented, it is not suited for long-term outdoor use. For this purpose, please use SR 070. In countries with higher exposure to sunlight (between the 40th parallel

north and 40th parallel south), as well as thinner printed ink films (fabric 140-34 and finer), the outdoor resistance will decrease accordingly. The pigments used are resistant to plasticizers and solvents.

Stress resistance

After proper and thorough drying, the ink film exhibits outstanding adhesion as well as rub, scratch, and block resistance. Mara® Star SR colour shades have a high chemical resistance to petrol (except SR 170). Due to its high pigmentation, SR 170 Opaque White is not suitable for moulding. Please use SR 070 White or SR 270 High-gloss White instead. To achieve a maximum rub resistance, SR can be overvarnished with Varnish SR 910 or SR 911.

In all cases requiring higher surface stability, chemical resistance, and adhesion, we recommend to add 10% Hardener H 1.

SR plus Hardener H 1 achieves its total chemical and mechanical resistance after 7 days when air-dried (20° C). If the drying temperature is maintained at 40° C, resistance will be achieved after 24 hours. Highest resistance is obtained with the drying method of 140° C for 30 min. Temperature resistance of the substrate must be taken into account.

Range

Basic Shades

020	Lemon
021	Medium Yellow
022	Yellow Orange
026	Light Yellow
031	Scarlet Red
032	Carmine Red
033	Magenta
035	Bright Red
036	Vermilion
037	Purple Red
045	Dark Brown
055	Ultramarine Blue
056	Turquoise Blue
057	Brilliant Blue
058	Deep Blue
059	Royal Blue
064	Yellow Green
067	Grass Green
068	Brilliant Green
070	White
073	Black

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980 Black, low on PAH

Pantone® Shades

829	PANTONE Yellow
832	PANTONE Rubine Red
836	PANTONE Warm Red
839	PANTONE Rhodamine Red
850	PANTONE Purple
851	PANTONE Violet
852	PANTONE Reflex Blue
859	PANTONE Process Blue
868	PANTONE Green

Highly Fade-Resistant Shades

720	High Fade Resistant Lemon
721	High Fade Resistant Medium Yellow
722	High Fade Resistant Yellow Orange
726	High Fade Resistant Light Yellow
731	High Fade Resistant Scarlet Red
732	High Fade Resistant Carmine Red
735	High Fade Resistant Bright Red
764	High Fade Resistant Yellow Green

High Opaque Shades

170	Opaque White
172	Opaque White, Offset Base
273	Opaque Black

Transparent Shades

520	Transparent Yellow
536	Transparent Red
552	Transparent Blue
568	Transparent Green

Press-Ready Metallics

191	Silver
193	Rich Gold
291	High Gloss Silver

Further Products

182	Block-out Silver
270	High Gloss White
409	Transparent Base
910	Overprint Varnish
911	Overprint Varnish, with UV-Absorber

SR 172 is the Mara® Star SR Offset Base, opaque white.

By using the 9 SR Pantone® basic shades together with SR 270, SR 073, and Printing Varnish SR 910, more than 1000 colour shades of the Pantone® Color Formula Guide can be mixed (see also text inside Marabu's Pantone® colour fan).

The highly fade-resistant shades are suited for high demands in long-term outdoor use. We recommend a finishing coat on the entire surface with UV-Absorber Printing Varnish SR 911.

Owing to their comparatively good light fastness, the basic shades 033/036/055/056/058/059/067/068/070/073 should be used for combinations with the highly lightfast colour shades 720 - 764.

The transparent shades are designed for prints onto polycarbonate or pre-treated polyester foils.

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-ColorManager software.

Metallics

Metallic Pastes

S 191	Silver	15-25%
S 192	Rich Pale Gold	15-25%
S 193	Rich Gold	15-25%
S 291	High Gloss Silver	12-30%
S 292	High Gloss Rich Pale Gold	12-30%
S 293	High Gloss Rich Gold	12-30%

Metallic Powders

S 181	Aluminium	12-17%
S 182	Rich Pale Gold	17-30%
S 183	Rich Gold	17-30%
S 184	Pale Gold	17-30%
S 186	Copper	30-50%
S 190	Aluminium, rub-resistant	12-30%

These metallics are added to SR 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

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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 larger 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 overvarnishing.

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

Auxiliaries

UKV 1	Thinner	10-15%
UKV 2	Thinner, mild	10-15%
SV 1	Retarder, mild	10-15%
SV 5	Retarder, fast	10-15%
SV 10	Retarder, slow	10-15%
H 1	Hardener	10%
H 4	Hardener	10%
VP	Retarder Paste	5-20%
SV 12	Retarder, slow	5-10%
SA 1	Surface Additive	3-5%
WM 1	Plasticizer	2-5%
ABM	Matting Base	1-20%
MP	Matting Powder	1-4%
ES	Printing Modifier	0.5-1%
SV 9	Retarder, slow	0-5%
UR 3	Cleaner (flp. 42°C)	
UR 4	Cleaner (flp. 52°C)	
UR 5	Cleaner (flp. 72°C)	
7037	Spray Thinner	

Thinner is added to the ink to adjust the printing viscosity. For slow printing sequences and fine motifs, it may be necessary to add retarder to the thinner.

Hardener H 1 is sensitive to humidity and is always to be stored in a sealed container. Hardener H 1 can be added for increased resistance and adhesion. Shortly before use, the hardener is added to the ink and stirred homogeneously. The mixture ink/hardener is not storable and must be processed within pot life.

Compared to H 1, the hardener H 4 is highly tolerant to high humidity and achieves signifi-

cantly better (water) resistance and adhesion, and it does not yellow.

The degree of gloss can be reduced by adding Matting Paste ABM or Matting Powder MP (white shades max. 2 % MP), decreasing the opacity at the same time.

The addition of surface additive SA 1 can increase the resistance against abrasion and other mechanical stress (max. addition 10%).

Plasticizer WM 1 is recommended if high flexibility is required from the printed ink film. This is important for thin substrates with a natural tendency to roll, as well as for applications involving cutting or die-cutting of the printed surface. The use of Plasticizer WM 1 reduces the drying speed.

Printing Modifier ES contains silicone and can be used to rectify flow problems on critical substrates. If an excessive amount is added, flow problems are increased and adhesion may be reduced, especially when overprinting. The use of ES may reduce the degree of gloss.

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.

For spray coating, fast Spray Thinner 7037 should be used (on parts sensitive to tension cracks, preliminary trials are essential).

Printing Parameters

All types of commercially available fabrics and solvent-resistant stencils can be used.

Shelf Life

Shelf life depends very much on the formula/reactivity of the ink system as well as the storage temperature. The shelf life for an unopened ink container if stored in a dark room at a temperature of 15 - 25 °C is:

- 2.5 years for SR 182/191/193/273/291



- 3.5 years for all other SR colour shades

Under different conditions, particularly higher storage temperatures, the shelf life is reduced. In such cases, the warranty given by Marabu expires.

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® Star SR 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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