

Marastar SR



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

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

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Field of Application

Substrates

Marastar SR is designed for applications onto rigid PVC, PVC self-adhesive foils, ABS, SAN, acrylic (PMMA), polycarbonate (PC), pre-treated polyester foils, and heavy paper grades. The adhesion of Marastar SR can be extended to many more substrates such as coated substrates, thinly anodized aluminium or thermosetting plastics (e. g. melamine resin), or polyamide (PA) and POM with after-treatment (flame) and by adding hardener H 1 in order to achieve excellent adhesion.

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

Field of use

The high-glossy Marastar SR is best suited for printing onto high-quality labels, stickers, displays, industrial letterings of all kinds, scales, and membrane switches.

As a high-gloss ink, Marastar 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.

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

Characteristics

Drying

Physically very fast drying, when 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 drying time and block resistance of the ink will be reduced.

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 more slowly 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.

Gloss level

Marastar SR is considered high-glossy with the following measured values (angle 60 °, fabric 120-34, white self-adhesive foil). Value 100 is high-glossy while value 1 is deep-matt.

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

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Fade resistance

Pigments of excellent fade resistance according to DIN 16525 (blue wool scale 7-8) are used for the shades of our Marastar SR ink type except SR 520, 536, 568, 832 and 839.

Therefore, all basic shades as per System 21 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 very 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 and is weldable (SR 173 Black). 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 Printing Varnish SR 910 or SR 911.

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

The pot life (processing period) of the mixture is approx. 12 h at room temperature (20 °C). 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.

SR plus Hardener H 1 achieves its total chemical and mechanical resistance after 7 days when air-dried (20 °C). If a drying temperature of 40°C is maintained, 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.

Processing and hardening temperature must not be lower than 15 °C as irreversible damage may occur when the ink film is formed. Also avoid high humidity for 8 hours after printing as the hardener is sensitive to humidity.

Yield

One litre of Marastar SR yields about 70 m² of printed surface when diluted with 15 % and using a 120-34 mesh.

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Range

The following basic shades are all 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 Pantone®, HKS®, and System 21. The below mentioned formulas are all stored in the Marabu-Color Manager 2 (MCM 2) software.

All shades are intermixable. Marastar SR 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 as per System 21 and RAL®

(see shade card Marastar SR or System 21)

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

Shades for HKS®* colour matches

(see HKS screen printing colour fan K)

SR 020	Lemon	SR 652	Medium Blue
SR 021	Medium Yell.	SR 058	Deep Blue
SR 022	Yellow Orange	SR 059	Royal Blue
SR 026	Light Yellow	SR 659	Cyan
SR 032	Carmine Red	SR 067	Grass Green
SR 033	Magenta	SR 068	Brilliant Green
SR 035	Bright Red	SR 270	High-gloss White
SR 636	Red Orange		White
SR 651	Blueish Violet	SR 073	Black

*registered trade mark of HKS® Trade Mark Union (Hostmann Steinberg, K+E, Schmincke)

86 colour shades of the HKS colour fan K can be mixed from 13 SR basic shades and 4 additional SR-HKS® shades plus Printing Varnish SR 910 (see Marabu's HKS® colour fan).

In the case of colour shades with a high percentage of white, it is possible to use SR 270 High-gloss White or SR 070 White.

Shades for Pantone®* colour matches

(see Marabu PANTONE® colour fan from)

SR 829	PANTONE®* Yellow
SR 832	PANTONE®* Rubin Red
SR 836	PANTONE®* Warm Red
SR 839	PANTONE®* Rhodamine Red
SR 858	PANTONE®* Purple
SR 851	PANTONE®* Violet
SR 852	PANTONE®* Reflex Blue
SR 859	PANTONE®* Process Blue
SR 868	PANTONE®* Green
SR 270	High-gloss White
SR 073	Black
SR 910	Printing Varnish

*Pantone® Inc.'s check standard trade mark for colour reproduction and colour reproduction materials.

By using these 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).

Highly fade-resistant shades

Shade range for high demands in long-term outdoor use. For this, we recommend a finishing coat with UV-Absorber Printing Varnish SR 911 over the whole surface.

SR 720	Lemon	SR 055	Ultramarine Bl.
SR 721	Medium Yell.	SR 056	Turquoise Blue
SR 722	Yellow Orange	SR 058	Deep Blue
SR 726	Light Yellow	SR 059	Royal Blue
SR 731	Scarlet Red	SR 764	Yellow Green
SR 732	Carmine Red	SR 067	Grass Green
SR 033	Magenta	SR 068	Brilliant Green
SR 735	Bright Red	SR 070	White
SR 036	Vermilion	SR 073	Black

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Further shades available

SR 170	High-opaque White
SR 270	High-gloss White
SR 172	Offset Base (Opaque White)
SR 273	Opaque Black
SR 173	Welding Black
SR 182	Silver (Sandwich)

3067 Special shades for membrane switches

For the printing of decorating foils made of coated PET used for the manufacturing of membrane switches, there are the following optimized white and opaque shades to be used instead of Marastar SR (for further information, see our separate TechINFO "Update for membrane switches"). Approx. 10-15% of Thinner UKV 2 is to be added.

3067/ 547 89 171	Opaque White
3067/ 547 90 170	High-opaque White
3067/ 547 88 970	Mixing White
3067/ 547 91 182	Block-out Grey
3067/ 547 92 904	Special Binder

Transparent basic shades

For the production of transparent prints onto polycarbonate or pre-treated polyester foils:

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

The pigments used for transparent shades are resistant to solvents and plasticizers.

Press-ready bronzes

SR 191	Silver
SR 193	Rich Gold
SR 291	High Gloss Silver
SR 292	High Gloss Rich Pale Gold
SR 293	High Gloss Rich Gold

Bronze powders

(to be mixed with SR 910)

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 mixtures cannot be stored and must be processed in the course of 12 hours. Due to their chemical structure, Pale Gold S 184 and Copper S 186 further reduce the processing time to 8 hours.

All figures in brackets are guidelines which can be varied according to opacity and ink price. The ratio figures in brackets refer to the mixture Bronze Binder SR 910 to bronze powder or bronze concentrate, the first figure standing for the parts by weight of bronze binder. Due to the larger grain size of bronze pigments, we recommend a fabric of 120-34 or 120-31 or coarser.

High-Gloss Bronzes, Pastes

Furthermore, 3 high-gloss bronze concentrates are available to be used by mixing them with Bronze Binder SR 910 (see technical data sheet "High-Gloss Bronze Concentrates").

S 291	High-gloss Silver (5:1 - 10:1)
S 292	High-gloss Rich Pale Gold (5:1 - 10:1)
S 293	High-gloss Rich Gold (5:1 - 10:1)

Due to the smaller pigment size compared to bronze powders, it is possible to print with finer fabrics of 140-31 to 150-34 at an acceptable price.

Bronze shades of high-gloss bronze concentrates exhibit a high weather resistance and are subject to a small dry abrasion.

All bronze shades are shown in a separate bronze colour chart.

Additives

SR 409	Transparent Base
SR 910	Bronze Binder and Printing Varnish
SR 911	Printing Varnish with UV protection

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Auxiliaries

Thinner:	UKV 1
Thinner, mild:	UKV 2
Spray Thinner:	7037
Retarder:	SV 5
Retarder, mild:	SV 1
Retarder, slow:	SV 9
Retarder Paste:	VP (5-20 %)
Cleaner:	UR 3
Hardener:	H 1 (10:1)
Matting Paste:	ABM (1-20 %)
Matting Powder:	MP (1-4 %)
Plasticizer:	WM 1 (2-5 %)
Printing Modifier:	ES (0.5-1 %)

To adjust the printing viscosity it is generally sufficient to add 10-15 % thinner and/or retarder to the ink. To produce a retarding effect for slow printing sequences, retarder is added to thinner proportionately (e. g. 50 %). For the printing of very fine details,

Retarder Paste VP (5-20 %) or Retarder SV 9 (max. 5 %, more for hand printing) may be added to the thinner. For an ink mixture already containing retarder, only pure thinner without retarder should be used for additional thinning during the print run.

For spray varnishing, our Spray Thinner 7037 should be used (addition 30-40 %) after preliminary trials.

By adding Matting Paste ABM (5-20 %) or Matting Powder MP (1-4 %, in the case of White SR 070, 170 or 270 max. 2 %) to the ink, the gloss effect of SR can be reduced decreasing the opacity at the same time.

Plasticizer WM 1 (2-5 %) is recommended for especially flexible ink films. This is important for thin substrates tending heavily to roll, as well as for PVC self-adhesive foils with removable backing (danger of edge curling) and in case of cutting or die-cutting the printed surface. The use of plasticizer WM 1 reduces the drying speed.

Printing modifier ES contains silicone. It can be used to rectify flow problems on critical substrates by adding 0.5 - 1 % max. by weight to the ink. If an excessive amount of printing modifier is added, flow problems are increased and adhesion may be reduced, especially when overprinting.

Cleaning

Cleaner UR3 is suitable to clean the screens and the working equipment. We recommend to clean the tools immediately after having finished the printing process, especially when hardener was added.

Fabrics and Stencils

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

Recommendation

Each printing ink must be stirred well and homogeneously. The additives will separate in the ink, especially when stored for a longer time.

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Labelling

For our ink type Marastar SR and its additives and auxiliaries there are current Material Safety Data Sheets according to EEC-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 derived from the respective label.

The ink has a flash point between 55 °C and 100 °C. Since the ink is not considered as a flammable liquid due to its pasty nature, any specific regulations for the handling of flammable liquids do not apply to 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.