

Screen printing ink for PVC self-adhesive foils, rigid PVC, polystyrene, ABS, SAN, acrylics, polycarbonate, paper, pasteboard, and cardboard

Glossy, vacuum-formable, highly block-resistant, very fast drying, very good mesh opening, medium opacity

## Field of Application

### Substrates

Libra Speed LIS is suited for the following substrates:

- Acrylics (PMMA)
- PVC self-adhesive foils
- Rigid PVC
- Polystyrene (PS)
- Polycarbonate (PC)
- ABS / SAN
- Paper, pasteboard, cardboard

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

Libra Speed LIS is highly suitable for the production of advertising panels and displays, or decals on fast running fully automatic machines.

LIS excels thanks to a hard ink film and a high block resistance but must be tested for its suitability on plasticized and highly flexible substrates (e. g. soft PVC) before printing.

For the production of double-sided stickers, we do not recommend LIS but more flexible ink systems such as Libra *Print* LIP or Libra *Gloss* LIG. Two basic colour shades of LIS are available for boards of polystyrene which can be written onto with chalk.

LIS 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

Very good mesh opening for standard and 4-colour process shades, i.e. printability of LIS is very simple and easy.

LIS is highly suitable for flat-bed or cylinder printing machines but can also be processed in manual printing or on semi-automatic machines.

Printing speed up to 2500 prints/ hour.

### Gloss level

Libra Speed LIS is glossy with the following gloss values (angle 60°, fabric 120-34, white self-adhesive foil). Value 100 means high-gloss whereas value 1 is deep matt.

Standard shades:	60-70 gloss units
Print Varnish LIS 910:	60-70 gloss units
4-colour process shades:	45-55 gloss units

### Ink Adjustment

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

### Drying

Physically fast drying, at 20 °C air temperature to be overprinted within 4-6 min, at 40 °C in a tunnel dryer stackable after 20-30 sec. Drying speed and block resistance are reduced by about 20 % when overprinting.

The times mentioned above vary according to the substrate, the ink film thickness, drying conditions and the auxiliaries used.

### Fade resistance

Pigments of excellent fade resistance (blue wool scale 7-8) are used for the Libra Speed LIS basic shades. Provided a professional processing and max. addition of 50% varnish or white to the standard shades, all basic shades are suitable for an outdoor use of up to 3 years referred

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to the middle European climate. A full-area coating with Print Varnish LIS 911 onto the whole surface will extend the possible outdoor exposure time to 4 years. When using the highly fade-resistant shades of the 7xx series, outdoor resistance can be increased to max. 5 years if placed vertically and referred to the middle European climate, north of the forty-fifth degree of latitude.

In countries with higher exposure to sunlight (between the 40th parallel north and 40th parallel south) the outdoor resistance decreases.

Due to the required brilliance, the PANTONE shades are more transparent than the basic shades and do, therefore, not achieve the above mentioned high fade resistance. The pigments used are resistant to solvents and plasticizers.

## Stress resistance

After proper and thorough drying, the ink film exhibits an outstanding adhesion as well as rub, scratch, and block resistance and can also be vacuum-formed.

LIS exhibits a normal chemical resistance of 20 double rubs with alcohol and other usual cleaners (e. g. window cleaner).

For a higher rub resistance to dry abrasion of the colour shades, we recommend to overcoat with Print Varnish LIS 910 or LIS 911. For a higher chemical resistance, the colour shades can be over-varnished with Print Varnish SR 910 or a suitable UV-curable varnish.

## 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

### 4-Colour Process Shades Standard

428	Process Yellow
438	Process Magenta
458	Process Cyan
488	Process Black

### 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

### Press-Ready Metallics

191	Silver
193	Rich Gold

### Further Products

409	Transparent Base
773	Board Ink Black
910	Overprint Varnish
911	Overprint Varnish, with UV-Absorber
971	White

By using the 9 SR Pantone® basic shades together with LIS 070, LIS 073, and Print Varnish LIS 910, more than 1000 colour shades of the Pantone® Color Formula Guide can be mixed.

Highly fade-resistant shades fulfil high demands for long-term outdoor resistance. If printed onto the top side of the material, we recommend a full-area over-varnishing with the UV-Absorber Print Varnish LIS 911.

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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.

If printed onto the reverse side of the substrate, the brightened white shade LIS 971 with an optimized degree of white is available for vertical or backlit illumination.

Furthermore, there is one shade available for printing onto polystyrene for chalk-writeable boards (fabric recommended 77-55 to 100-40).

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 191	Silver	15-25%
S 192	Rich Pale Gold	15-25%
S 193	Rich Gold	15-25%
S 291	High Gloss Silver	10-20%
S 292	High Gloss Rich Pale Gold	10-20%
S 293	High Gloss Rich Gold	10-20%

### 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 added to LIS 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 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 overvarnishing. All metallic shades are displayed in the Marabu "Screen Printing Metallics" colour chart.

## Auxiliaries

PSV	Thinner	15-20%
UKV 1	Thinner	15-20%
UKV 2	Thinner, mild	15-20%
VP	Retarder Paste	5-20%
WM1	Plasticizer	2-5%
ABM	Matting Base	1-20%
MP	Matting Powder	1-4%
ES	Printing Modifier	0.5-1%
UR 3	Cleaner (flp. 42°C)	
UR 4	Cleaner (flp. 52°C)	
UR 5	Cleaner (flp. 72°C)	
SV 1	Retarder, mild	
SV 10	Retarder	
SV 12	Retarder, slow	
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.

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.

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

Printing Modifier ES contains silicone and can

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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, Spray Thinner 7037 should be used, or for polystyrene PSV (addition approx. 30-40%) after preliminary trials.

## 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:

- 3 years for LIS 191, 193
- 3.5 years for all other LIS standard products

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.

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 our ink type Libra Speed LIS 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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