Mara® *Sign* TS

Marabu

Screen Printing Ink for retro-reflective traffic sign sheeting

High gloss, transparent, 2-component-ink, resistant to chemicals and weathering

Vers. 5
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Field of Application

Substrates

The screen printing ink Mara® *Sign* TS for traffic signs is a solvent-based two-component ink which is suited for printing onto self-adhesive retroreflective sheetings of the categories RA 1, RA 2, and RA 3. If sheetings of different manufacturers or types are used, the colour specification, reflection value, and adhesion properties may change.
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

Reflective traffic signs are safety products for traffic information, standardized in Germany according to DIN EN 12899-1, DIN 6171 (colour specification) and DIN 67 520 (retroreflection values). Mara® *Sign* TS is perfectly suited for this application if correct processing and material selection is provided.

Material Approval
The colour shades of Mara® *Sign* TS for traffic signs have been internally tested according to the European Standard (according to DIN EN 12899-1) and comply with all stipulated test criteria. Nevertheless, each manufacturer needs an approval for each country prior to the production start.

Characteristics

Ink Adjustment

Prior to printing, Hardener must be added in the correct quantity:
800 g ink + 200 g Hardener

After having stirred well, the ink/hardener mixture is press-ready and you must not add any other auxiliaries such as thinner.

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

Pot life
The pot life of the ink/hardener mixture is chemically reactive and can only be processed within 8 h. Higher temperatures reduce the pot life. If the room temperature or the mentioned times are exceeded, the ink's adhesion and chemical resistance may be reduced even if the ink still seems processable.

Drying

Parallel to physical drying, i. e. the evaporation of the solvents used, the actual hardening of the ink film is caused by the chemical cross-linking reaction between ink and hardener. The standard values concerning progressive cross-linking reaction (hardening) of the ink film are as follows (single printing, mesh 61-64):

Extent of drying	temp.	time
ready to be overprinted	22 °C	30 min
	60 °C	5 min
	120 °C	2 min
stackable	22 °C	5 h
	60 °C	40 min
	120 °C	20 min
final hardness	22 °C	8 days

The indicated drying times refer to single prints and are very much dependant upon the room temperature, air humidity, and drying conditions. The above mentioned times can only be considered as guidelines. If the prints are overcoated and ink is printed on ink, the drying speed will be reduced.
The processing and curing temperature should not be lower than 15° C as irreversible damage can occur.

Overprintability
For best 'ink to ink' adhesion, overprinting must be carried out within 24 hours at room temperature 22° C. If the first layer is pre-dried

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in a hot air tunnel at 80° C/1 min. and subsequently rack-dried, overprinting must be done within 12 hours. This guarantees that the ink layer beneath will not be totally cured and the subsequent print will be able to anchor well by dissolving the lower layer.

Fade resistance

All colour shades of Mara® *Sign* TS ink are based on a weather resistant binder and pigments of high fade resistance (blue wool scale 7-8), and are suited for 3 years outdoor use if placed vertically and referred to the middle European climate (north of the 40th degree of latitude).

Stress resistance

After proper and thorough drying (for example air drying for 8 days at 22°C), the ink film has an excellent mechanical resistance to cleaning brushes.

It is chemically resistant to aromatics, esters, and car exhaust fumes, and common cleaning agents such as alcohol, or petrol.

Range

Basic Shades

521	Transparent Yellow
536	Transparent Red
552	Transparent Blue
568	Transparent Green
573	Black, opaque

Auxiliaries

H 1	Hardener	25-33%
UR 3	Cleaner (flp. 42°C)	
UR 4	Cleaner (flp. 52°C)	
UR 5	Cleaner (flp. 72°C)	

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 mixture ink/hardener is not storable and must be processed within pot life.

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.

Printing Parameters

The stipulated specifications are only achieved with standardised printing and processing parameters as below:

Ink:	Mara® *Sign* TS (800 g)
Hardener:	H 1 (200 g)
Viscosity:	press-ready
Printing:	mechanical
Mesh type:	PET-fabric 61-64
Screen tension:	> 15N
Squeegee:	65 – 75 shore
Squeegee angle:	75 – 80°

Shelf Life

Shelf life depends very much on the formula/reactivity of the ink system as well as the storage temperature. It is 3,5 years for an unopened ink container if stored in a dark room at a temperature of 15-25°C. 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,

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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® *Sign* TS 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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