Mara® *Glass* MGLA

Marabu

Solvent-based baking ink for printing onto flat glass (Second Surface)

Silicone-free, glossy, high opacity, 2-component ink system, resistant to chemicals, high weather resistance, suitable for lamination

Vers. 1
2018
18. Oct

Field of Application

Substrates

Mara® G*lass* MGLA is suited for screen printing onto flat glass like:

- Soda-lime glass
- Optiwhite (white glass)
- Borosilicate glass
- Gorilla® glass (Corning)
- Xensation ™glass (Schott)

Ideal printing conditions include a room temperature of 20-25°C and 45-60% humidity. Equal surface tension of at least 40 mN/m ensures good adhesion. Furthermore, the glass surface must be clean and absolutely free of graphite, silicone, dust or grease (e.g. finger prints). Flame or silane pre-treatment right before the start of the printing process generally improves adhesion.

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® *Glass* MGLA is used for second surface decoration on glass for flat input systems used outside, or partly outside. This may include intercommunication systems, ship control systems, or vending machines. MGLA is also suited for the making of laminated glass, e. g. with PVB or EVA.

Characteristics

Mara® *Glass* MGLA is made without the use of BPA/ BPS, and is silicone-free. For silicone-free products it is important to use only thoroughly cleaned stencils, squeegees, ink pumps, tubes (in the case of an automatic ink supply), and injectors for the manual ink filling of the stencil, etc.
If cleaning is carried out with automatic screen washing systems, we recommend prior to printing an additional manual cleaning with a fresh cleaner not having had any contact with ink residues containing silicone.

Ink Adjustment

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

Mara® *Glass* is a 2-component ink system. Prior to printing, it is essential to add hardener / adhesion modifier in the correct quantity and to stir homogeneously.

The mixing ratio is as follows:
MGLA + 10% Hardener HT 1 + 10% Adhesion Modifier UV-HV 7

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 6 - 8 h (referred to 20-25°C and 45-60% RH). Higher temperatures reduce the pot life. If the mentioned times are exceeded, the ink's adhesion and resistance may be reduced even if the ink still seems processable.

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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 crosslinking reaction between ink and hardener. The drying times vary according to substrate, ink deposit, humidity, drying conditions, and the auxiliaries used.

For multi-colour printing, please note that the previously printed ink films should not be entirely cured before the consecutive ink film is printed on it. Only after all ink films have been applied, they should be baked.
The following values, related to the **object temperature,** concerning progressive cross-linking reactions (hardening) of the ink film (thickness 4 -12 µ) are recommended:

Intermediate drying: Overprintable after 3-5 min. / 160 -170°C
Final drying: 20 - 30 min. / 180 - 200°C

Fade resistance

Mara® *Glass* MGLA contains a highly weather-resistant binder and pigments of high fade resistance (blue wool scale 7-8). MGLA is used for second surface printing and suited for a 5-year vertical outdoor exposure, referred to the middle European climate. The outdoor durability is reduced in climates with a higher level of sunlight exposure.
The above mentioned resistance values are applicable provided that the ink is processed correctly, leading to proper adhesion and scratch resistance after cross-hatch tape tests.

Stress resistance

After proper and thorough drying, the ink film exhibits outstanding adhesion as well as rub and scratch resistance.

Float glass decorated with multi-layered prints has been tested internally as below:

Cross Hatch Test: DIN EN 2409, ASTM 3359-02

Humidity resistance:
- Condensation Water Test 70°C / 100% RH / 30 min.
- Cold Water Immersion Test / 24 h
- Composite temperature / humidity cyclic test according to IEC 60068-2-38 (10 cycles)

Resistivity survey Teraohmmeter TO 3
Mara® *Glass* MGLA 180: > 10^{+12}Ohm

Weather resistance:
Xenon test, compliant with DIN EN ISO 4892-2, incl. weathering
Test device: Q-Sun XE-3-HS
Spectral irradiance: 340 nm / 0.51 W/m²
Radiant energy density: 100 h = 183.6 kJ/m²
Material: Float glass / printed on air side
Application: Second Surface

Delta E-deviation after 5000 h (DE 2000):

Glass quality:	**Optiwhite**	**Greenish**
Opaque Black 180	1.04	0.67
Opaque White 170	0.58	-

Range

High Opaque Shades

170	Opaque White
180	Opaque Black

Auxiliaries

PV	Thinner	10-20%
SV 1	Retarder	10-15%
UV-HV 7	Adhesion Modifier	10%
HT 1	Hardener	10%
VM 1	Levelling Agent	0.5-2%
UR 3	Cleaner (flp. 42°C)	
UR 4	Cleaner (flp. 52°C)	
UR 5	Cleaner (flp. 72°C)	

Hardener HT 1 and Adhesion Modifier UV-HV 7 must be added to the ink shortly before use. The Hardeners are sensitive to humidity and are always to be stored in a sealed container.
The recommended mixing ratio may be adjusted according to the requirements: HT 1 pro-

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motes the chemical and mechanical resistance of the ink film, while UV-HV 7 promotes the adhesion.

Thinner and/or retarder is added to the ink/hardener mixture to adjust the printing viscosity. For slow printing sequences and fine motifs, it may be necessary to add retarder to the thinner. For an additional thinning of the ink containing retarder, only pure thinner should be used.

Printing Modifier VM 1 (silicone-free) can be added to rectify flow problems. An excessive amount reduces the intercoat adhesion.

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

All types of commercially available polyester fabrics and solvent-resistant stencils can be used. For a good opacity on coloured substrates, we recommend a mesh count between 68-64 and 100-48, for printing fine details 120-34 to 140-31. A suitable mesh count for thin ink films is 165-27.

Shelf Life

Shelf life depends very much on the formula/reactivity of the ink system as well as the storage temperature. It is 2 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. 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® *Glass* MGLA 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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