

**Screen printing ink for 3C applications
(3C = Computing, Communication, and
Consumer Electronics)**

**Silicone-free, high opacity, 2 component
ink system**

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Field of Application

Field of use

MG3C is designed for 3C applications on special glass materials such as:

- Soda-lime glass
- Borosilicate glass
- Gorilla® glass
- Xensation® glass

Ideal printing conditions include a room temperature of 20-25° C and 45-60% humidity, and equal surface tension of at least 40 mN/m ensures good adhesion, ink flow, and surface homogeneity. Furthermore, the glass surface must be clean and absolutely free of graphite, silicone, dust or grease (e.g. finger prints). Flame 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.

Characteristics

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

Recommendation

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

Before printing, it is essential to add the correct hardener to the ink. We recommend an addition of:

Epoxy-based colour shades:
5% MGLH

For highest mechanical and chemical resistances (Ethanol, MEK, or Acetone), the addition of Hardener MGLH can be increased to up to 6%.

Acrylate-based colour shades:
15% HT 1+ 10% UV-HV 7

Pre-reaction time

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

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.

Pot life

The ink/hardener mixture is chemically reactive and must be processed within 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.



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 following values, related to the object temperature, concerning progressive cross-linking reactions (hardening) of the ink film (thickness 5-12µ) are recommended (for black ink build-up with 188, 181, 180, or white ink build-up with MG3C 170 and MG3C 78435183RSZ):

Intermediate drying: Overprintable after
Black build-up: 100 °C/3-5 min.
White build-up: 165-180 °C/3-5 min.

Final drying:
Black build-up: 140 – 180 °C/20-30 min.
White build-up: 155 – 165 °C/30 min.

Stress resistance

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

The following resistances were tested:

- Cross Hatch Test: DIN EN 2409, ASTM 3359-02
- Heat Soak Test: Dwell for 72 h at 65 °C / 95 % RH
- Boiling Water /60 min.
- Thermal Cycling Test: 6 cycles, High: 65°C at 90% RH / Low: -20°C, RH uncontrolled
- 100 double rub strokes (850 g): MEK
- Ink adhesion after frost test at -18° C
- Resistivity survey Teraohmmeter TO 3

Range

High-opaque shades for black ink build-up (epoxy-based)

171	Opaque White, glossy
180	Opaque Black, glossy
181	Opaque Black, matt
188	Deep Black, glossy

High-opaque shades for white ink build-up (acrylate-based)

170	Opaque White, glossy
78435183	Barrier Black, glossy

Barrier Black MG3C 78435183 RSZ is not a stock item yet.

Miscibility

Owing to the resistances required for this application like temperature resistance, light fastness, and brightness value for White, the colour shades differ in their formula as to binders, pigments, and amount and type of hardener to be added. The acrylate-based shades can therefore **not** be **mixed** with the epoxy-based shades! Combination printing is possible.

The epoxy-based MG3C shades can be mixed and combined with the Mara® Glass MGL basic shades (also epoxy-based).

Mixing with other ink types or auxiliaries must be avoided in order to maintain the special characteristics of this ink range.

Auxiliaries

Attention: Only the auxiliaries recommended for the respective base must be used. The cleaners can be used universally.

HT 1	Hardener, for acrylate-base	15%
UV-HV 7	Adhesion Modifier, for acrylate-base	10%
MGLH	Hardener, for epoxy-base	5-6%
MGLV	Thinner, for epoxy-base	2-5%
SV 5	Retarder, for acrylate-base	2-5%
SV 11	Retarder, for epoxy-base	2-5%
SV 12	Retarder, for acrylate-base	2-5%
VM 1	Levelling Agent, for epoxy-base	0.5-2%
UR 3	Cleaner (flp. 42°C)	
UR 4	Cleaner (flp. 52°C)	
UR 5	Cleaner (flp. 72°C)	

Shortly before use, Hardener MGLH (for epoxy-based colour shades) or Hardener HT 1 + Adhesion Modifier UV-HV 7 (for acrylate-based colour shades) should be stirred into the ink. The hardeners are sensitive to humidity and are always to be stored in a sealed container. The mixture ink/hardener is not storable and must be processed within pot life.

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 the epoxy-based shades to rectify flow problems. An excessive amount of VM 1 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. A suitable mesh count for thin ink films is 100-40 - 165-27.

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:

- 1 year for Opaque Black 181
- 2.5 years for all other MG3C 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 Mara® Glass MG3C 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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