Glass Ink GL

Marabu

Screen Printing Ink for glass, ceramics, metals, aluminium, chrome-plated parts, coated substrates, and thermosetting plastics

Satin-gloss finish, semi-opaque, fast drying 2-component-ink-system, dishwasher-proof

Vers. 6
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Field of Application

Substrates

The screen printing ink Glass Ink GL is excellently suitable for printing onto glass but it is also very well suited for ceramic items, as well as metals, chrome-plated parts, coated surfaces, anodized aluminium, and thermosetting plastics.
Since all the print substrates mentioned may be different in their printability even within an individual type, preliminary trials are essential to determine suitability for the intended use.

Field of use

Glass Ink GL is designed for indoor decoration prints onto promotional items of glass or ceramics such as pre-printed glass panes, bottles, and tiles.

Glass Ink GL is not suitable for permanent outdoor use or direct exposure to UV light indoors due to the characteristics of the binder.
After proper drying, GL is also suited for metal-coating with dark mirror protection varnishes.
Glass Ink GL also adheres very well onto a variety of metals, such as chrome-plated writing instruments.

This ink is also used in pad printing. For such applications, please see the separate Glass Ink GL technical data sheet.
Glass Ink GL can also be processed with a spray gun, preliminary trials are, however, necessary for this process.
We recommend to filter the thinned ink (25 µm screen) before processing as, otherwise, there could be bubbles in the ink film.

Printing Conditions

Ideal printing conditions include a room temperature of 20-25° C and 45-60% humidity. Equal surface tension of at least 38 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 pre-treatment right before the start of the printing process generally improves adhesion.

Characteristics

Mixing ratio

Before the ink is printed, it is essential to add Hardener GLH in the correct quantity. This ink/hardener mixture must be stirred homogeneously and adjusted to the right printing viscosity by adding thinner and/or retarder in a correct quantity (stir again). This will slow down the immediately occurring hardening reaction taking thus the pot life to acceptable values. The two different ratios are:

1) + 5% Hardener (GLH)
20 parts by w. of ink + **1** part by w. of hardener

2) + 10% Hardener (GLH)
10 parts by w. of ink + **1** part by w. of hardener

The second variation must be applied if high chemical resistance (e.g. rub resistance against chemicals like Ethanol, MEK oder Acetone) is required.

Exception:
Only add 5% hardener to White GL 070 or ink mixtures containing more than 50% White.

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If the ink was mixed with 10% hardener and the drying process takes place at room temperature, the water resistance of the ink film may be reduced. Preliminary trials are essential.

Pot life (processing period)

The pot life of the ink/hardener mixture is chemically reactive and can only be processed within a few hours. Higher temperatures reduce pot life.

Room temperature 20°C:

5% hardener GLH	12h pot life
10% hardener GLH	6h pot life

Room temperature 30°C:

5% hardener GLH	8h pot life
10% hardener GLH	4h pot life

If the room temperature (>30° C) or the mentioned times are exceeded, the ink's adhesion and chemical resistance may be reduced even if the ink is still fluid and therefore seems processable.

Drying/Hardening

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 (ink film 5-12µ) are as follows:

Extent of drying	temperature	time
touch-dry	20°C	approx. 20 min
ready for overprinting	20°C	approx. 50 min
final hardness	20°C	approx. 4-6 days
	140°C	approx. 30 min

Chemical cross-linking will be accelerated and improved by higher temperatures. For very high demands for water-resistance (dishwasher, etc.), 10% hardener must be added (except for GL 070 White = 5% hardener) and the ink GL must be baked at 140°C for 30 min.

Attention

GL 022 has a limited temperature resistance (up to 80° C) and should, therefore, not be used for mixtures of sensitive colour shades as a colour shift may arise due to the baking process. As an equivalent substitute, a mixture of yellow and red can be used. Preliminary trials are always recommended.

For multi-colour prints, the different ink layers should be surface-dried only. The entire ink structure should be baked after the completion of the print. The ink film achieves its final adhesion and scratch resistance only 24 hours after the baking process.

The processing and curing temperature should not be lower than 15° C within the first 12 hours as irreversible damage can occur.

Also avoid high humidity for several hours after printing as the hardener is sensitive to humidity. After the print, until the hardening of the ink film, high air humidity (>60%) or direct contact with water (rain) must be prevented categorically for otherwise the linkage between the ink and the substrate will be impaired significantly.

Fade resistance

Only pigments of high fade resistance are used in the Glass Ink GL range. Please note, however, that GL is not suited for outdoor applications with direct sun irradiation or humidity contact as the epoxy resin tends to chalk and as a consequence, the shades will change their original colour soon. The pigments used are resistant to solvents and plasticizers.

Stress resistance

After proper and thorough drying, the ink film exhibits outstanding adhesion, as well as rub, and scratch resistance. If 10% hardener is added and the finished print is baked at 140° C for 30 min., the ink film will withstand 300 household dishwasher cycles (65° C main program, with customary cleaner Type B/ low alkaline

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detergent). The chemical resistance against MEK and alcohol will withstand 50 double rub strokes (450 g weight) after thorough drying (140° C, 30min.).

For higher demands to rub-resistance (dry abrasion), we recommend to overcoat with Overprint Varnish GL 910 or Marapoly P 910. Bright colour shades, e.g. white, may darken if the print is constantly exposed to temperatures >40° C.

Range

Basic shades

Refer to colour chart 'TP'

GL 020	Lemon	GL 055	Ultramarine Blue
GL021	Medium Yellow	GL 057	Brilliant Blue
GL 022	Yellow Orange	GL 058	Deep Blue
GL 032	Carmine Red	GL 064	Yellow Green
GL 035	Bright Red	GL 068	Brilliant Green
GL 036	Vermilion	GL 070	White
GL 045	Dark Brown	GL 073	Black

All shades are intermixable. To maintain the special characteristics of this outstanding ink range, Glass Ink GL should not be mixed with other ink types.

The basic shades are included in our Marabu-ColorFormulator. 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 RAL®, and Marabu System 21. All formulas are stored in the Marabu-ColorManager 2 (MCM 2) software.

Further shades available

GL 273	High-Gloss Black

Etch imitation effects

GL 913	milky-matt
GL 914	satin-gloss, transparent
GL 915	semi-structured
GL 916	structured

Transparent shades

GL 525	Transparent Yellow
GL 535	Transparent Red
GL 555	Transparent Blue
GL 565	Transparent Green

All etch imitation effects are intermixable and can be modified further in their structure and colour shade by adding the GL transparent shades (1-5 %).

Shades for 4-colour process prints

GL 429	Process Yellow (Yellow)
GL 439	Process Red (Magenta)
GL 459	Process Blue (Cyan)
GL 473	Process Black (Black)

Press-ready gold and silver shades

GL 191	Silver
GL 192	Rich Pale Gold
GL 193	Rich Gold

The pigments used in the above mentioned standard shades, based on their chemical structure, correspond to the EEC norm EN 71/part 3, safety on toys - migration of specific elements. All colours are suitable for printing onto toys.

Additives

Clears

GL 409	Transparent Base
GL 910	Overprint Varnish, also suitable as bronze binder

Bronzes

(to be mixed with printing varnish GL 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)

Please generally prepare mixtures for one working day only as they cannot be stored and must be processed within 8 h. Pale Gold S 184 and Copper S 186 have a reduced processing time due to their chemical structure.

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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 Overprint Varnish 910 to bronzes whereas the first figure is standing for the parts by weight of Overprint Varnish 910. Due to the larger grain size of bronze pigments, we recommend a fabric of 120-34 or 120-31 or even coarser. Bronze shades are always subject to an increased abrasion which can only be reduced by an appropriate over-varnishing with GL 910.

High-Gloss Bronzes
Three further high-gloss bronze concentrates are available to be used by mixing them with Overprint Varnish GL 910.

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 work with finer fabrics of 140-31 to 150-34 at an acceptable price. Bronze shades of high-gloss bronze concentrates are highly weather-resistant and have a very small dry abrasion.

Auxiliaries

Thinner:	GLV
	GLTPV
Retarder:	SV 1
	SV 9 (slow print speed)
Hardener:	GLH
Cleaner:	UR 3
Printing modifier:	ES (Add. max. 1%)
Matting powder:	MP (1-3 %)

Shortly before use, the hardener should be stirred into the ink. GLH is sensitive to humidity and is always to be stored in a sealed can.

To adjust the printing viscosity, it is generally sufficient to add 5-10% Thinner GLV. For slow printing sequences and especially when printing fine motifs, the use of Retarder SV 1, resp. SV 9 may become necessary which can be added to the Thinner GLV. For an additional thinning of the ink containing retarder, only thinner without retarder should be used.

Printing modifier ES can rectify flow problems on critical substrates by adding up to 1% 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.

GL can additionally be matted by adding 1-3% of Matting Powder MP.

Fabrics and stencils

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 90-48, for printing fine details 100-40 to 120-34.

Labelling

For our ink type Glass Ink GL and its additives and auxiliaries, there are current Material Safety Data Sheets according to EC-regulation 1907/2006 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 obtained from the respective label.

The ink has a flash point between 50° C and 100° C.

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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.

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