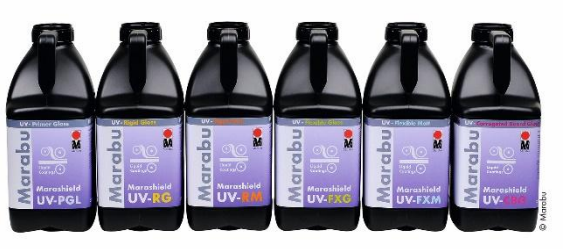
Technical
Data Sheet

Marabu

Mara® Shield Liquid Coatings

UV-curable liquid coatings for full-surface coating using the roller coating process. For various applications, matt/glossy, high chemical and mechanical resistance.



Field of application

Mara® Shield Liquid Coatings are applied using the roller coating process. In this process, a coating layer is applied to the substrate using a smooth or grooved application or transport roller, serving as a primer, finish, or protective coating.

Substrates

Glass

Mara® Shield UV-PGL is a UV primer for liquid coating of flat glass. The transparent pre-coating applied via the roller coating process significantly improves the adhesion of UV-curable digital printing inks on glass.

Application notes:

- On float glass, better adhesion on the fire side (side determination possible with handheld testing devices)
- Required surface tension: > 44 mN/m
- Surface must be clean and free of grease, dust, silicone, and graphite
- Pre-cleaning with glass cleaner and demineralized water is recommended
- Flame pretreatment increases adhesion
- Digital printing is possible immediately after UV curing
- Optionally, a full-surface topcoat can be applied to increase protection or achieve a uniform gloss level

UV-PGL is **silicone-free**. When switching from silicone-containing systems, a complete machine cleaning is required.

Rigid substrates

UV-RG/-RM and UV-RGX/-RMX were designed for the protective coating of materials that have been digitally printed and are suitable for

- Rigid PVC (including foamed)
- PS/ABS
- PC
- PETG
- Wood and plywood materials
- Aluminum composite panels (Dibond®)
- Corrugated cardboard and cardboard packaging

UV-PMMA 170 offers excellent adhesion to

- Plexiglas/PMMA

The UV-curing anti-graffiti coating UV-AG is suitable for

- Rigid PVC
- ABS
- PC
- PET-G
- Aluminum composite panels

The coating protects against dirt, writing, and graffiti; contamination can be easily removed.

Flexible substrates
UV-FXG and UV-FXM are suitable for

- Self-adhesive PVC films
- Soft PVC tarpaulin materials

Ink adjustment

UV-RG/-RM, UV-RGX/-RMX, UV-FXG/-FXM, UV-PMMA 170, and **UV-AG** are ready for use but should be stirred thoroughly before and, if necessary, during production.

UV-PGL Primer must be homogeneously mixed with the UV-HV 8 adhesion modifier immediately before processing. Addition: 2 %.

Pre-reaction time
Allow the ink/hardener mixture to rest for 15 min before processing.

Pot life
The mixture must be processed within 8 h at 20 °C and 50 % RH. Higher temperatures will shorten the pot life. After the pot life has expired, adhesion and resistance may decrease, even if the primer still appears usable.

Resistance

All Mara® Shield Liquid Coatings are resistant to water and alcohol-based cleaning agents. Chemical and mechanical resistance increase with increasing film thickness. UV-AG is additionally highly resistant to paints, varnishes, and graffiti.

Curing

Digital prints
Preliminary tests under production conditions are required before coating digital printing inks. Complete curing of the digital printing ink is necessary to prevent ink transfer to the application roller; therefore, we recommend regularly checking the UV lamps on the digital printing press and roller coater.

At room temperature (22 °C, 55 % RH), the following post-curing times are required:

- Rigid UV inks: at least 24 h
- Hybrid/flexible UV inks: 3–4 days

Hybrid and flexible UV digital prints can be coated immediately, provided that complete curing is ensured through additional UV curing. For solvent-based prints, a waiting period of at least 24 h must always be observed.

Liquid Coatings
Mara® Shield Liquid Coatings are cured using a UV dryer with 1–2 medium-pressure mercury lamps (80–120 W/cm) at speeds of 5–20 m/min. Dark motifs (area coverage 250–400 %) require higher curing energy.

Quality inspection: After UV curing and cooling to room temperature, the ink film (primer or varnish + digital print) must pass a standardized Tesa or cross-cut test. Final chemical resistance and adhesion are achieved after 24 h.

UV-PGL on glass
The curing time can be shortened by:

- Oven drying (140 °C / 30 min): after cooling
- IR continuous dryer (e. g., 140 °C / 30 sec): 8 h

The curing process depends on several factors:

- Design of the curing unit (e. g. reflectors)
- Number, age, and performance of the UV lamps
- Processing speed of the curing unit
- Substrate and its distance from the UV lamps
- Color shade and ink deposit

Lightfastness

UV-PGL and UV-PMMA 170 are suitable for outdoor use for up to 3 months.

UV-RM, UV-RMX, and UV-FXM are primarily designed for indoor use. When used outdoors, only limited resistance can be expected.

All other liquid coatings offer pigments of high fade resistance which enable a 3-year vertical outdoor exposure, refered to the middle European climate and suitable substrates. The actual outdoor resistance also depends on the digital printing ink used and the substrate.

Range

- UV-AG Anti-Graffiti
- UV-FXG Flexible Gloss
- UV-FXM Flexible Matt
- UV-PGL Primer for Glass
- UV-RG Rigid Gloss
- UV-RM Rigid Matte
- UV-RGX Rigid Gloss Anti-Ghosting
- UV-RMX Rigid Matt Anti-Ghosting
- UV-PMMA 170 PMMA White

	GE	MW
UV-AG		
Anti-graffiti coating	85	60°
UV-FXG		
Glossy coating for flexible substrates	85	60°
UV-FXM		
Matt coating for flexible substrates	35	60°
UV-PGL		
Glossy coating/primer for glass	80	60°
UV-RG		
Glossy coating for rigid substrates	80	60°
UV-RM		
Matt coating for rigid substrates	35	60°
UV-RGX		
Glossy coating for rigid substrates Anti-Ghosting	85	60°
UV-RMX		
Matt coating for rigid substrates Anti-Ghosting	50	60°

GE = Gloss Units / **MW** = Measurement Angle

Auxiliaries

UV-HV 8	Adhesion promoter, for UV-PGL	2 %
UVV 1	Thinner	1–5 %
UR 3	Cleaner (flp. 42 °C)	
UR 4	Cleaner (flp. 52 °C)	
UR 5	Cleaner (flp. 72 °C)	

UV-HV 8: prior to printing, stir well and homogeneously into the primer **UV-PGL**. The mixture must be used within the specified pot life.
UVV 1: reduces ink viscosity. Excessive use may lower curing speed and surface hardness. May also alter the inherent odor of the print.

For UV-RM/-FXM, the addition of thinner affects the gloss level.
UR 3 / UR 4: for manual cleaning of work equipment.
UR 5: for manual or automatic cleaning of work equipment.

Printing parameters

Roller Coater settings
The settings for the application, transport, and doctor rollers, as well as the regulation of the dosing unit, must be adjusted to the application and production speed. A speed ratio of 4:1 between the application and doctor rollers has proven effective. For further information, refer to the machine manufacturer's specifications.
The viscosity of Mara® Shield Liquid Coatings is optimized for standard coating systems; the target viscosity is only reached after a few minutes, which is why a warm-up period of approx. 5 min is required before production begins.

Coating thicknesses
The achievable coating thickness depends, among other factors, on the application roller (smooth or grooved), the regulation of the dosing unit, roller pressure, and machine speed. Chemical and mechanical resistance generally increase with increasing film thickness.

For **UV-PGL** as a primer, a smooth or very finely grooved application roller and a coating thickness of 3–10 µm are recommended.

For **UV-RG/RM, UV-RGX/RMX, UV-FXG/FXM, UV-PMMA 170**, and **UV-AG**, grooved application rollers with a coating thickness of 15–25 µm have proven effective.

If **UV-PGL** is used as an optical finish or protective coating, 15–25 µm is also recommended.

Shelf life

The shelf life for an unopened ink container if stored in a dark room at a temperature of 15-25 °C is:

- 9 months for UV-PMMA 170
- 1 year for UV-RMX, UV-RM, UV-FXM
- 2 years for all other coatings

The ambient temperature may fall below this value only once for max. 2-3 days. Under different conditions, particularly other storage temperatures, the shelf life will be reduced. In such cases, the warranty given by Marabu expires.

Recommendation

For smooth production, always follow the guidelines provided by Marabu and the machine manufacturer. We recommend replacing filters annually and performing regular maintenance and service intervals.

Labeling

For Mara® Shield Liquid Coatings 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.

Safety rules for UV printing inks

UV inks contain substances which may irritate the skin. Therefore, take utmost care when working with UV-curable printing inks. Contaminated skin areas must be cleaned immediately with water and soap. Please follow the instructions on the labels and in the safety data sheets.

Note

All statements made here refer exclusively to standard color shades. For custom inks, the described features may deviate. For comprehensive legal information regarding the use of our products, please refer to our General Terms and Conditions (GTC) at www.marabu.com.

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Version 05 - 05/2026