

UV-curable Liquid Coatings for roller-coating onto various substrates

Suitable for diverse applications, matt / glossy, high mechanical and chemical resistance

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Field of application

Acting as a primer, finishing or protection, UV-curable Liquid Coatings are applied in a roller-coating process, utilizing either a smooth or grooved applying roller to coat the substrate.

Substrates / Field of use

Glass

The UV-Primer Marashield UV-PGL is suitable for roller-coating (priming) onto flat glass.

UV-curable Digital Printing Inks often fail to adhere to glass. Sufficient adhesion is provided by roller-coating the glass panes with primer UV-PGL.

In order to achieve additional protection for high-quality products and/or an even degree of gloss, the motive can be overprinted edge-to-edge with UV-PGL.

Rigid substrates

UV-RG and UV-RM are suitable for roller-coating onto the below mentioned rigid substrates:

- Rigid PVC (including foamed PVC)
- Polystyrene (PS, ABS)
- Polycarbonate (PC)
- Polyester (PET-G)
- Various wood / plywood materials
- Aluminium composite panels (Dibond®)
- Cardboard, corrugated board

The UV-curable Liquid Coating Marashield UV-AG is suitable for roller-coating onto the below mentioned rigid substrates:

- Rigid PVC
- ABS
- Polycarbonate (PC)
- Polyester (PET-G)
- Aluminium composite panels (Dibond®)

This Liquid Coating is basically a protective barrier against soiling, scribbles, or graffiti, which can be removed easily e.g. in public areas or transportation.

Tested markers / sprays:

- Marabu Do-It colour spray
- Edding 3000 – Permanent marker
- Edding 400 – Permanent marker
- Soennecken -Permanent marker
- Schneider 230 Permanent marker
- Staedler – Lumicolor permanent

Tested Cleaners /Removers:

- Isopropyl alcohol (IPA)
- 3M Graffiti Remover System®

Flexible substrates

UV-FXG and UV-FXM are suitable for roller-coating onto the following flexible substrates:

- Self adhesive PVC foils
- Tarpaulin materials (plasticised PVC)

UV-RG/-RM and UV-FXG/-FXM were designed as a protective overcoat for digital prints.

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Cardboard Materials

UV-CBG is available for roller-coating onto these substrates:

- Cardboard, corrugated board
- Reboard[®] material

UV-CBG is suitable for roller-coating onto digital or screen prints on cardboard materials. These applications include e.g. displays, a variety of interior design objects made of Reboard[®] materials, and printed packaging. Owing to its slight flexibility, UV-CBG is also suitable for post processing steps such as folding or cutting.

As the mentioned print substrates may differ in their printability even within an individual type, preliminary trials are essential to determine the suitability for the intended use.

Characteristics

Processing

UV-RG/-RM, UV-FXG/-FXM, UV-CBG and UV-AG are press-ready but should be stirred homogeneously before use.

UV-PGL must be mixed homogeneously with Adhesion Modifier UV-HV8 prior to processing.

Addition: 2% parts of weight

The pot life of UV-PGL + UV-HV 8 is approx. 8h, based on 18-25°C room temperature and 30-60% humidity.

For best results if coating/priming onto Float Glass, it is recommended to coat the fire side and not the tin side; easily determinable with tin side detectors.

For a good adhesion, a uniform surface tension of the substrate with > 44 mN/m is generally important. Furthermore, the glass surface must absolutely be free from graphite, silicone, dust or residues like grease or similar (e.g. fingerprints). Pre-cleaning with an appropriate glass

cleaner and post-cleaning with demineralised water is recommended.

A pre-treatment of the glass by flaming immediately before printing will generally enhance the adhesion of the Primer to the substrate.

The glass pane is ready to be digitally printed onto directly after priming and UV-curing.

The UV-Primer UV-PGL is silicone-free and must therefore not come into contact with products which contain silicone. Prior to changing from a product containing silicone to a silicone-free product, the machine must be cleaned completely with utmost care.

Roller Coater Settings

Variable parameters like the speed of the applying, transport, and doctor roller, as well as the regulation of the dosing unit must be adjusted individually dependant upon the application and the speed of production.

A speed ratio of 4:1 between applying roller and doctor roller is recommendable. Please refer to the machine manual for further details. The viscosity of the Marashield Liquid Coatings is attuned to common roller coater machines.

Marashield Liquid Coatings achieve their desired viscosity in the roller-coater after a lead time of 5 minutes prior to the start of production.

Layer thickness

The thickness of the layer can be influenced by various machine parameters such as the choice of applying roller (smooth or grooved), the regulation of the dosing unit, the roller pressure and the belt speed.

In general, the chemical and mechanical resistance is dependant upon the layer thickness.

Using UV-PGL as a primer, a layer thickness from 3 to max. 10µm, applied with either a smooth or a finely grooved roller has proved to be suitable.

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UV-RG/UV-RM, UV-FXG/-FXM, UV-CBG and UV-AG deliver best results using a grooved applying roller and a layer thickness of 15 to 25µm.

If UV-PGL is used for finishing/protection, a layer thickness of 15-25µm is recommendable.

Resistance

All Marashield Liquid Coatings are resistant against water and also very resistant against alcohol-based customary cleaners. The chemical and mechanical resistance increases with the thickness of the layer.

UV-AG is also very resistant against paint and graffiti.

Fade resistance

UV-PGL is suited for a limited outdoor use of up to 3 months.

Marashield UV-RG /-RM, UV-FXG/-FXM and UV-AG are suitable for outdoor exposure of up to 3 years, referred to the middle European climate. The fade resistance of the finished product, however, also depends on the digital printing ink and the substrate used.

UV-CBG is intended for indoor use only.

Digital Prints

If digital prints are involved, you are obliged to conduct your own preliminary trials to confirm the compatibility for the intended use.

We recommend regular maintenance of the UV lamps of the Digital Printer and Roller Coater. Digital prints must be fully cured before coating in order to avoid staining the applying roller.

UV-PGL is fully compatible with Marabu's Digital Printing Inks DUV-R and DUV-H.

The Liquid Coatings UV-RG/-RM, UV-FXG/-FXM, and UV-CBG are, however, fully compatible with Marabu's solvent based and UV-curable Digital Printing Inks. It is fundamental to ensure good adhesion of the Digital Printing Inks to the substrate.

If you want to coat digital prints please make sure that inks for rigid substrates have been used, since they are chemically resistant to the Anti-Graffiti formulation. So-called "Hybrid-inks" are not compatible with Marashield UV-AG.

According to our test results, the following time-frame must be kept for post-curing at room temperature (22°C and 55% rF):

| | |
|-------------------------|--------------|
| Rigid UV-ink: | at least 24h |
| Hybrid/flexible UV-ink: | 3-4 days |

Coating the Digital prints immediately is only possible if the curing process was fully completed by an additional UV curing process.

In general, please allow solvent-based prints to dry for 24h before coating.

Curing

A UV-curing unit with one or two medium-pressure mercury lamps (80-120 W/cm) cures Marashield Liquid Coatings at a belt speed of 5 to 20 m/min. Coating dark surfaces generally requires more UV power (coverage 250-400%) than light coloured substrates.

Marashield Liquid Coatings are slightly post-curing coatings. The ink film (Primer or Varnish + Digital print) has to withstand a cross-cut tape test after the UV-curing process and having cooled down to room temperature.

Marashield Liquid Coatings achieve their final chemical resistance after 24 hours.

If UV-PGL is applied onto glass, this time-frame may be reduced as follows:

- Oven (140°C/ 30 min.):
after having cooled down
- IR Flow Dryer (e.g.140°C/ 30 sec.):
8 h

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The curing speed is generally dependant upon the kind of UV-curing unit (reflectors), number, age, and power of the UV-lamps, the layer thickness, substrate in use, as well as belt speed of the UV-curing unit.

Range

| Product | Description | GU | Angle |
|---------|---------------------------------------|----|-------|
| UV-PGL | Gloss Varnish / Primer for Glass | 80 | 60° |
| UV-RG | Gloss Varnish for rigid substrates | 80 | 60° |
| UV-RM | Matt Varnish for rigid substrates | 10 | 85° |
| UV-FXG | Gloss Varnish for flexible substrates | 85 | 60° |
| UV-FXM | Matt Varnish for flexible substrates | 10 | 60° |
| UV-CBG | Gloss Varnish for cardboard materials | 75 | 60° |
| UV-AG | Anti Graffiti Varnish | 85 | 60° |

GU= Gloss Units

Auxiliaries

Thinner UVV 1

Addition: 1 - 5 % parts by weight

If required, the standard viscosity may be decreased by adding Thinner UVV1. The addition of thinner, however, particularly influences the matt degree of UV-RM and UV-FXM, and decreases the flexibility of UV-CBG (cutting, folding). An excessive addition of thinner (> 5%) will cause a reduction of the surface hardness. UVV 1 is chemically bound in the ink film when UV-cured.

Adhesion Modifier UV-HV 8

Marashield UV-PGL must be mixed homogenously with Adhesion Modifier UV-HV8 prior to processing (pot life approx. 8 h, see chapter "processing").

Cleaning

For manual cleaning of the rolls our cleaner UR 3 (flash point 42° C) or UR 4 (flash point 52° C) can be used.

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 UV-PGL/-RM/-FXM
- 2 years for UV-RG/-FXG/-CBG/-AG

Under different conditions, particularly higher storage temperatures, the shelf life is reduced. In such cases, the warranty given by Marabu expires.

Labelling

For Marashield Liquid Coatings and the 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 the present EEC regulations as to health and safety labelling requirements. Such health and safety data may also be derived from the respective label.

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Safety rules

UV-curable products contain some substances which may irritate the skin. Therefore, we recommend to take utmost care when working with UV-curable products. Parts of the skin dirtied with ink are to be cleaned immediately with water and soap. Please pay also attention to the notes on labels and safety data sheets.

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, they shall be limited to the value of the goods delivered by us and utilized by you with respect to any and all damages not caused intentionally or by gross negligence.