

# Hot Stamping on Glass

## Application of UVGL and LEDGL Primers

Screen  
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Precious metals are often used for the decoration of high-end products. Despite continuous improvement, organic gold and silver inks have never been able to reach the look of the expensive precious metal preparations which must be baked at high temperatures. The Ultra Glass UVGL and LEDGL Primers, in combination with hot stamping foils, are now the perfect solution: Equal brilliance at much lower costs!

The Primers were developed in collaboration with the hot stamping foil manufacturer "Peyer Graphic" and the machine manufacturer "Madag Printing Systems".

This TechINFO provides some information on the hot stamping technique itself, as well as on the use of the Marabu Primers.

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### 1. General Information

Any favoured design can simply be printed with the primers on the glass surface. The printed motif then acts as a cliché for the hot stamping foil which is applied by roll-on or stroke-stamping, and only adheres to the areas where primer was applied before.



The result is a high-gloss, metallic effect: Since glass bottles are often pre-decorated with different colours and effects, UV screen printing is usually the most practical solution.

### 2. Advantages

Compared to precious metal preparations, Marabu primers not only **save** you the cost of baking at high temperatures, but also up to **90% of the material costs!**

### 3. Materials and sources of supply

#### 3.1. Primers and auxiliaries by Marabu

Two primers are available in each of the ink types Ultra Glass UVGL and LEDGL. Their inherent colour is either beige (for gold applications) or grey (for silver applications).

Product	Name	Application
Hot Stamping Primer Gold	UVGL-PG LEDGL-PG	Prior to printing, it is essential to mix the primer homogeneously with 4 % UV-HV 8.
Hot Stamping Primer Silver	UVGL-PS LEDGL-PS	
Adhesion Modifier	UV-HV 8	
Hot Stamping Additive	UV-HS 1	UV-HS 1 allows hot stamping at lower temperatures and is only added to the primer if applied onto painted glass or in combination with multi-coloured UV screen prints. Recommended addition: 10 % (min. - max. 8 - 20 %)
Transparent Base (optional)	UVGL 409	The addition of 10 - 50% UVGL 409 can increase the reactivity, depending on the type and power of the UV-curing unit. The addition of Transparent Base is only recommended for UVGL.
Thinner (optional)	UVV 6 UVV 1 (LEDGL)	Can be used to adapt the viscosity to the motif, printing speed, or mesh (addition 1 - 10%)

For further information on Ultra Glass UVGL / LEDGL please refer to [www.marabu-inks.com](http://www.marabu-inks.com).

#### 3.2. Hot stamping foils by Peyer Graphic

Type of foil	Suited for
GXI gold and silver	UVGL-PG/-PS, LEDGL-PG/-PS
GXO coloured metallics	

For further information please refer to [peyer@peyergraphic.ch](mailto:peyer@peyergraphic.ch) or [www.peyergraphic.ch](http://www.peyergraphic.ch)

### 4. Technical process details

4.1. Pre-treatment	
Glass	Glass bottles should be pre-treated with silane for best adhesion of the Primers (e. g. PYROSIL®).
Painted glass	On painted glass, flame pre-treatment is mandatory (distance flame ↔ bottle approx. 25 mm).

<b>4.2. Settings for screen printing</b>	
Auxiliaries	Preparation of the primer with auxiliaries, see chapter 3.1.
Mesh	Polyester mesh 120-31, for thinner ink layers 140-31 For highest quality prints we recommend steel mesh 325-31
Emulsion coating	1 : 3 (squeegee side : substrate side)
Distance screen ↔ bottle	Screen off-contact approx. 1 - 4 mm. The bigger the distance, the higher the warpage and the risk of smearing.
UV curing	Medium pressure mercury vapour lamps are recommended. The tests were carried out with 100 % lamp power. Depending on the kind of UV-curing unit (reflector), number, age and power of the UV-lamps, the printed ink film thickness, the inherent colour of the glass, as well as the number of passes of the UV-curing unit, the power may be reduced down to 50 %. We generally recommend exposing preprints at 100% power and several times if necessary.
LED curing	LEDGL requires a wavelength range of 385 - 395 nm for LED curing. We generally recommend exposing preprints at 100% power and several times if necessary.
Bottle fixtures	Rigid fixtures must be used for the screen printing unit.
Squeegee	65 Shore for area printing, 75 Shore letters + area printing
Squeegee type	Duplex squeegee 95/65 resp. 95/75, sharp edge, flood blade is highly recommended, for best results make sure squeegee speed is appropriate.
Squeegee angle	75 - 80°
Squeegee pressure	1,5 - 2,5 bar
Mesh tension	6 - 10 N

<b>4.3. Settings for hot stamping</b>	
Hot stamping temperature	On glass: 190 - 250°C, on painted glass: 160 - 200°C When using UV-HS 1, the temperature should be as low as necessary: In this case already from 150°C.
Hot stamping speed	200 - 350 mm/sec.
Foil tension	As low as possible, so that the foil does not wrinkle or wrap around the bottle.
Embossing wheel/punch	Roll-on wheel with silicone surface 12 mm and 60 shore
Distance embossing wheel ↔ foil	As far as possible (prevention of heat striation), at least 10 mm
Foil size	The foil must be chosen as wide as possible for an even tension (in order to avoid wrinkling), but the foil must be within the size of the bottle.
Pressure	Pressure must be as high as possible. For the input of the impression roller's diameter, the offset of the bottle in the silicon lamination must be considered. This will avoid friction between the glass bottle and the roll-on wheel (identical speed).
Roll-on wheel	Ideally the roll-on wheel is on both sides 10 mm wider than the image.
Silicone roll-on wheel	Perfectly matched conicity of roll-on wheel and bottle will help to avoid

<b>4.3. Settings for hot stamping</b>	
	wrinkles in the foil due to an uneven tension
Fixtures	The fixtures must be adapted to the conicity of the bottle, e. g. with different-sized support rings.
Position of the application wheel	The axis of the application wheel must be exactly parallel to the axis of the bottle (otherwise wrinkling and cracking problems).

<b>4.4. Post-treatment</b>	
Glass	Additional post-treatment is not necessary
Painted glass	For painted bottles, post-treatment is mandatory: min. 120 °C/ 10 minutes - max. 160 °C/ 10 minutes
In general	Heat-forced drying accelerates the chemical and mechanical resistance, and also improves the level of these resistances. Post-curing at 160 °C for 10 min. is equivalent to post-curing at room temperature and normal relative humidity (40 - 60 %) over a period of 24 hours. It is also possible to improve the mechanical / dishwasher / fill good resistance by over-varnishing or cold-end coating.

## 5. Errors: Cause & Remedy

<b>Error</b>	<b>Cause/Remedy</b>
Bad edge definition, saw tooth	Mesh is not suited for the motif
	Emulsion coating is not optimally adjusted
	Screen off-contact is too high
	Squeegee is too soft
	Ink layer is too thick
Foil is not glossy, no smooth flow	Primer is not completely cured
	Auxiliaries (see chapter 3.1.) can improve the flow of the primers
	Top point of the squeegee is not perfectly adjusted
	Stamping temperature is too high
Insufficient adhesion between foil and primer, pinholes	Stamping temperature is too low
	Stamping pressure is too low
	Stamping speed is too high
	Embossing punch is too soft
	Primer and foil are not compatible
Foil is cracked	Primer is overcured
	Foil tension is too high
Foil is wrinkled	Foil tension is too low If blisters appear after post-treatment, reduce temperature to max. 120°C.

## 6. Remarks

The advice in this TechINFO is based on our current knowledge. Nevertheless, before production start, the individual conditions (machinery, embossing method, type of glass, etc.) must be considered, tested and approved on site. The result will also be influenced by the ambient temperature, the air humidity, and the level of cleanliness in the production area.

### In the event of any queries, please contact:

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