Tampa® *Glass* TPGL

Marabu

Pad printing ink for glass, ceramics, metal, aluminium, chrome-plated parts, varnished surfaces, and thermosetting plastics

Glossy, high opacity, fast curing 2-component ink system, dishwasher resistant

Vers. 11
2022
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Field of Application

Substrates

Tampa® *Glass* TPGL is excellently suited to print onto

- Glass
- Ceramics
- Metals (incl. thinly anodised aluminium)
- Chrome-plated parts
- Varnished surfaces
- Thermosetting plastics

For a good adhesion, a uniform surface tension of at least 38 mN/m is generally important. The substrate surface must be completely free of contaminating residues such as grease, oil, and finger marks. Flame pre-treatment immediately before printing will generally enhance the adhesion of the ink to the substrate.

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.

Field of use

Tampa® *Glass* TPGL is mainly used for printing onto glass and ceramics, especially to decorate e. g. perfume bottles or promotional goods. TPGL offers high water and fill good resistance. TPGL can also be processed with a spray gun, but preliminary trials are necessary for this process. In order to avoid surface irregularities, we recommend to filter the thinned ink (25 µm screen) before processing.

Tampa® *Glass* TPGL was developed for pad printing applications. In combination with the appropriate auxiliaries it is also suited for screen printing.

Characteristics

Ink Adjustment

The ink should be stirred homogeneously before printing and if necessary during production.
TPGL is a 2-component ink system. Prior to printing, it is essential to add hardener in the correct quantity and to stir homogeneously. 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.

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

Pot life
The ink/hardener mixture is chemically reactive and must be processed within 6-7 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, the actual hardening of the ink film is caused by the chemical cross-linking reaction between ink and hardener.
The following values can be assumed **(ink film 4-12 µm)**:

Pad Printing:

Extent of drying:	Temperature	Time
touch-dry	20 °C	30 sec.
overprintable	20 °C	1-2 sec.
final hardness	20 °C	ca. 4-6 days
	140 °C	ca. 30 min.

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Screen Printing:

Extent of drying:	Temperature	Time
touch-dry	20 °C	ca. 30 min.
overprintable	20 °C	ca. 50 min.
final hardness	20 °C	ca. 4-6 days
	140 °C	ca. 30 min.

Chemical cross-linking will be accelerated and improved by higher temperatures. For high resistances (dishwasher-safe), Tampa® *Glass* TPGL must be baked at 140 °C for 30 min. Without baking the dishwasher resistance of TPGL is very limited.

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 times mentioned vary according to substrate, depth of cliché, drying conditions, and the auxiliaries used. For quick printing sequences, we recommend forced air drying (about 200 °C for 2-3 sec) of the surface after each colour.

Fade resistance

Only pigments of high fade resistance are used in the Tampa® *Glass* TPGL range. Please note, however, that Tampa® *Glass* TPGL 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. The printed ink film must be tempered for 30 min at 140 °C.
The following resistances have been achieved:

Dish washer resistance:
• Domestic dish washer: at least 500 cycles acc. to DIN 12875
• Glass washer (Winterhalter UC-L): at least 700 cycles acc. to DIN 10511

Metallic shades generally have a reduced dishwasher resistance.

Chemical Resistance:
• Perfume: 24 h test, G1-test
• Ethanol and glass cleansing agent: 500 DRS
• Aceton / MEK: 50 DRS

Test device: Taber® Abraser 5700,
DRS: Double rub strokes (350 g)

Humidity resistance:
• Condensation water test 70 °C / 100 % RH / 30 min
• Cold water immersion test / 24 h

In order to increase the mechanical resistance we recommend an overprint with TPGL 910.

Range

Basic Shades

920	Lemon
922	Light Yellow
924	Medium Yellow
926	Orange
930	Vermilion
932	Scarlet Red
934	Carmine Red
936	Magenta
940	Brown
950	Violet
952	Ultramarine Blue
954	Medium Blue
956	Brilliant Blue
960	Blue Green
962	Grass Green
970	White
980	Black

4-Colour Process Shades Standard

429	Process Yellow
439	Process Magenta
459	Process Cyan
489	Process Black

High Opaque Shades

122	High Opaque Light Yellow
130	High Opaque Vermilion
152	High Opaque Ultramarine Blue
162	High Opaque Grass Green
170	Opaque White
180	Opaque Black

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Press-Ready Metallics

191	Silver
192	Rich Pale Gold
193	Rich Gold

Etch Imitation Effects

913	Milky Matt Varnish
914	Satin Transparent Varnish
915	Semi Structured Varnish

Further Products

910	Overprint Varnish

In the event of processing problems with TPGL 489 due to magnetic holders, the use of TPGL 980 or TPGL 180 should be considered.

The output of inks that are filled by weight may vary considerably owing to the specific gravity of the respective colour shade. This must be considered especially for white and mixtures with white.

All shades are intermixable. Mixing with other ink types or auxiliaries must be avoided in order to maintain the special characteristics of this ink system.
All basic shades are included in our Marabu-ColorFormulator (MCF). They build the basis for the calculation of individual colour matching formulas, as well as for shades of the common colour reference systems HKS®, PANTONE®, and RAL®. All formulas are stored in the Marabu-Color Manager software.

Additionally there are high-opaque formulas available marked with + + behind the reference name. These formulas have been developed by using the System Tampacolor formulas for basic and high-opaque shades excluding the semi-transparent, resp. transparent basic shades 922/930/936/950/952/956/962.

Metallics

Metallic Pastes

S 291	High Gloss Silver	10-20%
S 292	High Gloss Rich Pale Gold	10-20%
S 293	High Gloss Rich Gold	10-20%

Metallic Powders

S 181	Aluminium	17%
S 182	Rich Pale Gold	25%
S 183	Rich Gold	25%
S 184	Pale Gold	25%
S 186	Copper	33%
S 190	Aluminium, rub-resistant	12.5%

These metallics are added to TPGL 910 in the recommended amount, whereas the addition may be individually adjusted to the respective application. We recommend preparing a mixture which can be processed within a maximum of 8 h since metallic mixtures usually cannot be stored. Due to their chemical structure, the processing time of mixtures with Pale Gold S 184 and Copper S 186 is even reduced to 4 h.
Owing to the bigger pigment size of Metallic Powders we recommend the use of a coarser fabric like 100-40, or a halftone cliché with a minimum depth of 25-30 µm. Shades made of Metallic Powders are always subject to an increased dry abrasion which can only be reduced by overvarnishing.

All metallic shades are displayed in the Marabu "Screen Printing Metallics" colour chart.

Auxiliaries

TPV	Thinner	15-25%
PPTPV	Thinner	15-25%
TPV 3	Thinner, slow	15-25%
TPV 6	Thinner	15-25%
TPGLV	Thinner	15-25%
SV 3	Retarder, for screen printing	10-15%
SV 9	Retarder, for screen printing	10-15%
GLV	Thinner, for screen printing	5%
UKV 1	Thinner	5%
MGLH	Hardener	5%
SA 1	Surface Additive	3-5%
MP	Matting Powder	1-3%
ES	Printing Modifier	0-1%
UR 5	Cleaner (flp. 72°C)	

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

After hardener has been added to the ink, thinner is added to adjust the printing viscosity.

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Pad Printing: TPGLV, TPV, PPTPV, TPV 3, TPV 6, or UKV 1.

In case of static charge, thinner PPTPV can be added to the ink.

Screen Printing: UKV 1 or GLV.
For slow printing sequences and fine motifs (Screen Printing), 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.
The choice of thinner and the amount added are highly depending upon the local climate and the printing speed.

A separate TechINFO provides more details on the adjustment of TPGL for screen printing applications.

By adding Matting Powder MP the ink film can be matted individually (preliminary trials in terms of adhesion and resistance are essential, white shades addition max. 2 %).

Printing Modifier ES contains silicone and can be used to rectify flow problems on critical substrates. If an excessive amount is added, flow problems are increased and adhesion may be reduced, especially when overprinting. The use of ES may reduce the degree of gloss.

UKV 1 is recommended for manual pre-cleaning of clichés, ink wells, and ink cups. Cleaner UR 5 is recommended for manual or automatic cleaning of the working equipment.

Printing Parameters

Pad Printing:
All commercially available clichés made of ceramic, photopolymer, thin steel, and chemically hardened steel (10 mm) can be used. The recommended cliché depth is 18-21 µm for non-halftone clichés and approx. 35-40 µm for halftone clichés.
As per our experience, all common printing pads consisting of materials cross-linked by condensation or addition can be used.

Tampa® *Glass* TPGL is suitable for closed ink cup systems as well as for open ink wells. Depending on type and usage of the machine, it is to accordingly adjust type and amount of the thinner used.

Screen Printing:
All types of commercially available polyester and nylon fabrics and solvent-resistant stencils can be used. For a good opacity on dyed substrates, we recommend a fabric thickness between 68-64 and 90-48, for printing finest details 100-40 to 120-34.

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:

- 1,5 years for TPGL 192 and 193
- 2 years for TPGL 170
- 3 years for all other shades

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. All characteristics described in this Technical Data Sheet refer exclusively to the standard products listed under "Range", provided that they are processed in accordance with their intended use and only when used

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with the recommended auxiliaries. 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 Tampa® *Glass* TPGL 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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