

Pad printing ink for pre-treated polyethylene and polypropylene, metal and varnished surfaces

High gloss, good opacity, fast curing 2-component ink system, resistant to chemicals

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Field of Application

Substrates

Tampa® Pur TPU is particularly suited to print onto

- Pre-treated polyethylene (PE)
- Pre-treated polypropylene (PP)
- Polyurethane (PU)
- Polyamide (PA)
- Melamine resins
- Phenolic resins
- Metal (incl. thinly anodised aluminium)
- Varnished surfaces
- Powder-coated surfaces
- Knitted fabrics made of cotton or cotton/elastane
- Wood
- Glass (for decorative purposes only)

On polyacetal (POM), e. g. Hostaform C or Delrin, a satisfying adhesion can be achieved by forced air drying (300 - 400°C, 3-4 sec).

When printing onto polyethylene and polypropylene, please make sure to pre-treat the surface of your substrate by flaming or Corona discharge as usual. As per our experience, you can achieve a very good adhesion with the Tampa Pur TPU with a surface tension of at least 42-48 mN/m.

On polypropylene, you can also apply a thin film of our colourless Primer P 2 for surface pre-treatment. For multiple colour printing, please consider, that you should not flame the substrate between print sequences as this may reduce intercoat adhesion.

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® Pur TPU is used when extremely high mechanical and chemical resistance on thermo-setting plastics, polyethylene, polypropylene, and metals are required.

Characteristics

Ink Adjustment

The ink should be stirred homogeneously before printing and if necessary during production. To protect the ink in opened containers against excessive drying, it can be carefully covered with a layer of thinner which can then be later stirred into the ink prior to printing.

Prior to printing, it is a must to add Hardener in the correct quantity. The ratio is as follows:

4 parts of ink : 1 part of hardener
3 parts of varnish : 1 part of hardener

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.

Pot life

The ink/hardener mixture is chemically reactive and must be processed within 7-8 h (H 1) or 3-4 h (H 2), 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. With the use of HT 1, there is no pot life to consider since this hardener is only activated by a baking process (30 min/150° C).

Drying

Parallel to physical drying (i. e. the evaporation of the solvents used), the actual hardening of

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the ink film is caused by the chemical cross-linking reaction between ink and hardener. The following values concerning progressive cross-linking (hardening) of the ink film can be assumed:

	H 1	H 2	HT 1
touch-dry 20°C	2 min	1 min	2 min
stackable 60°C	60 min	30 min	--
final hardness 20°C	7-10 days	4-6 days	--
final hardness 150°C	30 min	30 min	30 min

Chemical cross-linking can be accelerated by higher temperatures. 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.

For multiple colour printing we point out that the previous printed ink film should not be entirely cured before the consecutive ink film is printed on top of it. By drying at room temperature, the consecutive print should be carried out within 48 h after the previous print when Hardener H 1 is used and 8 h after the previous print when Hardener H 2 is used.

Fade resistance

Only pigments of high fade resistance are used in the Tampa® Pur TPU range.

Shades mixed by adding overprint varnish or other colour shades, and especially white, have a reduced fade and weather resistance depending on their mixing ratio. The fade resistance also decreases if the printed ink film thickness is reduced. In the case the prints are intended for outdoor applications, Hardener H 1 must be used.

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, scratch, and block resistance and is resistant to a large number of chemical products, oils, greases, and solvents. On glass, however, no

dishwasher resistance can be achieved; in this case, we recommend Tampa® Glass TPGL.

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

Press-Ready Metallics

191	Silver
192	Rich Pale Gold
193	Rich Gold

Further Products

409	Transparent Base
910	Overprint Varnish

All shades are intermixable. Mixing with other ink types or auxiliaries must be avoided in order to maintain the special characteristics of this ink.

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 com-

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mon colour reference systems HKS®, PANTONE®, and RAL®. All formulas are stored in the Marabu-ColorManager 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 shades.

Oeko-Tex® Standard 100 Certification

Tampa® Pur TPU 922-980, TPU 122-162, and TPU 191 have been certified according to Oeko-Tex® Standard 100.

Metallics

Metallic Powders

S 181	Aluminium
S 182	Rich Pale Gold
S 183	Rich Gold
S 184	Pale Gold
S 186	Copper
S 190	Aluminium, rub-resistant

These metallics are added to TPU 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 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

H 1	Hardener	25-33%
H 2	Hardener, fast	25-33%
HT 1	Hardener, heat-reactive	25-33%
TPV	Thinner	10-15%

TPV 2	Thinner, fast	10-15%
TPV 3	Thinner, slow	10-15%
TPV 7	Thinner	10-15%
SA 1	Surface Additive	3-5%
OP 170	Opaquing Paste	0-15%
AP	Antistatic Paste	0-10%
VP	Retarder Paste	0-10%
SV 1	Retarder	0-5%
MP	Matting Powder	0-4%
ES	Printing Modifier	0-1%
UR 3	Cleaner (flp. 42°C)	
UR 4	Cleaner (flp. 52°C)	
UR 5	Cleaner (flp. 72°C)	
P 2	Primer	

Hardener H 1 and H 2 are sensitive to humidity and always to be stored in a sealed container. Shortly before use, the hardener must be added to the ink and stirred homogeneously. The mixture ink/hardener is not storable and must be processed within pot life. If using HT 1, there is no pot life to consider since this hardener is only activated by a baking process (30 min/150°C).

Please see chapter ink adjustment for ratio recommendations.

Thinner is added to the ink to adjust the printing viscosity. The choice of thinner and the amount added are highly depending upon the local climate and the printing speed.

The addition of surface additive SA 1 can increase the resistance against abrasion and other mechanical stress. At the same time, it is possible to improve the ink transfer from pad to substrate (max. addition 10%).

By adding Opaquing Paste 170, the opacity of colour shades can significantly be increased without considerably influencing the chemical and dry abrasion resistance. OP 170 is not suitable for white shades, and should not be used for prints that will be exposed to more than 2 years outdoor application.

The addition of Antistatic Paste AP reduces the impact of static charge on the ink. It lowers the viscosity of the ink and non-polar components help to avoid "stringy" behaviour when printing onto non-polar substrates.

For slow printing sequences and fine motifs, it may be necessary to add retarder to the thinner.

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For an additional thinning of the ink containing retarder, only pure thinner should be used.

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.

The cleaners UR 3 and UR 4 are recommended for manual cleaning of the working equipment. Cleaner UR 5 is recommended for manual or automatic cleaning of the working equipment.

Special Primer P 2 is used for manual pre-cleaning and pre-treatment of PP substrates.

Printing Parameters

Clichés

All commercially available clichés made of ceramic, photopolymer, thin steel, and chemically hardened steel (10mm) can be used. The recommended cliché depth is 20-24 µm.

Printing pads

As per our experience, all common printing pads consisting of materials cross-linked by condensation or addition can be used.

Printing machines

Tampa® *Pur* TPU 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.

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:

- 2.5 years for TPU 191, 192, 193
- 3.5 years for all other standard products

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.

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® *Pur* TPU 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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