

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

Vers. 1
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Field of Application

Substrates

Tampapur TPU is excellently suited to print onto pre-treated polyethylene (PE) and polypropylene (PP), but also onto polyurethane (PU), polyamide (PA), melamine resins, phenolic resins, metal, anodised aluminium, varnished surfaces, powder-coated surfaces, wood, and glass (please note, that the printing onto glass should only be carried out for decorative purposes since the ink is not resistant to water and dishwasher-cleaning).

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

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

Tampapur TPU is used when extremely high mechanical and chemical resistance on thermosetting plastics, polyethylene, polypropylene, and metals are required. 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 Tampapur TPU with a surface tension of at least 42-48 mN/m. On polypropylene, you can also apply a thin film of our colourless Special Primer P 2 for surface pre-treatment (see technical data sheet "Special Primer P 2").

For multiple colour printing, please consider, that you should not flame the substrate between print sequences, as this may reduce intercoat adhesion.

Characteristics

Mixing ratio

Before the ink is printed, it is a must to add Hardener TPH 1, resp. H 1, or TPH 2, resp. H 2 in the correct quantity. The ratio is as follows:

4 parts by weight of ink:

1 part by weight of hardener

3 parts by weight of varnish:

1 part by weight of hardener

Pot life

The pot life (processing period) at room temperature (approx. 20 °C) will be about 7-8 hours with TPH 1, resp. H 1 and about 3-4 hours with TPH 2, resp. H 2. Higher temperatures reduce pot life.

If the mentioned times are exceeded, the ink's adhesion and resistance may be reduced, even if the ink characteristics show no noticeable change.

Drying

Parallel to physical drying (i. e. the evaporation of the solvents used), the actual hardening of the ink film is caused by the chemical crosslinking reaction between ink and hardener.

The following standard values concerning progressive crosslinking (hardening) of the ink film are indicated as follows:

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Extent of drying	temp.	time	time
		TPH 1 (H 1)	TPH 2 (H 2)
ready for overprinting	20°C	3 min	2 min
stackable	60°C	60 min	30 min
final hardness	20°C	7-10 days	4-6 days
pot life	20°C	7-8 hours	3-4 hours

Chemical crosslinking 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 TPH 1, resp. H 1, is used and 8 hours after the previous print when Hardener TPH 2, resp. H 2, is used.

The processing and curing temperature should not be lower than 15 °C as irreversible damage can occur. Also avoid high humidity for several hours after printing as the hardener is sensitive to humidity.

Fade resistance

Only pigments of high fade resistance are used in the Tampapur 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 case the prints are intended for outdoor applications, hardener TPH 1, resp. 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.

However, on glass no resistance to dishwashers can be achieved. In this case we recommend our Glass Ink GL.

Range

Refer to the shade card "System Tampacolor".

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

*semi-transparent/transparent

All shades are intermixable. To maintain the special characteristics of this outstanding ink range, the TPU should not be mixed with other ink types.

Tampapur TPU is included in our computerised colour matching system Marabu-mix.

By using these basic shades in accordance with the mixing ratios provided by the Marabu-Color-Manager software, it is possible to produce shades of the popular colour reference systems PANTONE®, HKS®, RAL®, and Marabu System 21.

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Shades for 4-colour process prints

TPU 429	Process Yellow (Yellow)
TPU 439	Process Red (Magenta)
TPU 459	Process Blue (Cyan)
TPU 489	Process Black (Black)

Press-ready gold and silver shades

TPU 191	Silver
TPU 192	Rich Pale Gold
TPU 193	Rich Gold

Clears

TPU 409	Transparent Base
TPU 910	Overprint Varnish, can also be used as bronze binder

Bronzes

(to be mixed with Overprint Varnish TPU 910)

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

Due to their chemical structure, Pale Gold and Copper have a reduced processing time. Please prepare mixtures freshly, as they cannot be stored and must be processed within 4 h.

For the processing of metallics, we refer you to our separate data sheet "Bronze Inks".

The pigments used in the above mentioned standard shades, based on their chemical structure, correspond to the EEC regulations EN 71/part 3, safety of toys - migration of specific elements -. All colours are suited for printing onto toys.

Auxiliaries

Hardener:	TPH 1, resp. H 1 TPH 2, resp. H 2, fast hardener HT 1, heat-reactive
Mixing ratio:	4 p. ink : 1 p. hardener 3 p. varnish : 1 p. hardener

Thinner:	TPV TPV 2, fast thinner TPV 3, slow thinner
Retarder:	SV 1 VP, Retarder Paste
Matting product:	TPUM, Matting Paste MP, Matting Powder
Antistatic Paste:	AP
Primer:	P 2, for polypropylene
Cleaner:	UR 3
Printing modifier:	ES, addition: 0 - max. 1 %

The hardener should be added to the ink briefly before printing in the correct ratio as mentioned before.

To adjust printing viscosity, it is generally sufficient to add 5-15 % of Thinner TPV to the ink. Thinner TPV 2 can be used for fast printing, TPV 3 for slow printing requirements.

By adding Matting Paste TPUM the glossy effect of the ink is reduced to a silky or semi-matt finish. For a subsequent addition of hardener, you must consider how much TPUM was added, i. e. you should add 1 part of hardener to 4 parts of the mixture TPU with TPUM. The addition of up to 30 % of TPUM will not influence the chemical resistance of the ink.

For the printing of very fine motives, the Retarder SV 1 or Retarder Paste VP may be added to the ink. An excessive addition may result in ink transfer problems.

Attention

For an ink mixture containing retarder, only thinner should be used for additional thinning during the print run.

Printing Modifier ES contains silicone. It can be used to rectify flow problems on critical substrates by adding up to 1 % by weight to the ink. If an excessive amount of printing modifier is added, flow problems are increased, and adhesion may be reduced, especially when overprinting.

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Cleaning

To clean ink containers, clichés, and tools, please use our Cleaner UR 3.

Recommendation

The ink should be stirred well before printing. 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.

Labelling

For our ink type Tampapur TPU and its additives and auxiliaries there are current Material Safety Data Sheets according to EC-regulation 91/155 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.

The ink has a flash point between 21 °C and 100 °C. Since the ink is not considered as a flammable liquid due to its pastous nature, any specific regulations for the handling of flammable liquids do not apply.

Note

Please refer to the information in our technical data sheets of pad printing inks.

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 utilised by you with respect to any and all damages not caused intentionally or by gross negligence.