

**UV-LED-curable Screen Printing Ink for pretreated polyethylene and polypropylene, polyester PET and PETG, rigid PVC, polycarbonate PC, and polystyrene PS**

**Very fast curing, high gloss, very good water resistance, good structural viscosity, versatile**

## Field of Application

### Substrates

Ultra Pack LEDC is a UV-LED-curable screen printing ink suitable for printing onto

- Pretreated Polyethylene HDPE/LDPE
- Prereated Polypropylene PP
- Pretreated or non- pretreated PET/PETG
- Rigid PVC
- Polycarbonate (PC)
- Polystyrene (PS)

Before printing onto PE and PP, please keep in mind that the substrate surface must be pretreated by flaming. With this process, surface tension will rise and a very good adhesion from > 44 mN/m is possible. The surface treatment can be tested by appropriate test inks.

The substrate surface must be absolutely free of contaminating residues such as grease, oil, and finger sweat.

Due to the processing parameters, PET and PETG substrates can have great differences in surface tension which can be rectified by a pretreatment with a 'soft' gas flame. The adhesion of LEDC on PVC is very good.

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 as well as a sufficient adhesion.

### Field of use

Ultra Pack LEDC was especially designed for direct printing onto packaging and containers.

This ink series is not suitable for direct food contact nor for printing on food contact materials as substances contained in the formulation or introduced by contamination may migrate

under certain conditions. Materials that constitute a natural migration barrier are excluded.

If this ink series is nevertheless used for printing on permeable food contact materials, the manufacturer of the printed product is responsible for ensuring that its products comply with legal or industry-specific requirements.

For printing on permeable food contact materials (= without appropriate migration barrier), we recommend our specially designed Ultra Pack UVFP / Tampa® RotaSpeed TPHF.

## Characteristics

All Ultra Pack LEDC shades are brilliant and high-gloss at the best possible opacity. Further characteristics:

- fast curing
- very good 1-c water and steam resistance
- high filling resistance
- flexible ink film
- thixotropic structure, and no dripping through during machine stops
- can be over-embossed with hot stamping foil

### Ink Adjustment

The ink should be stirred homogeneously before printing and if necessary during production.

### Use as 2-component ink

Depending upon the substrate and the requirements, hardener can be added to the ink before printing. 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.

# Ultra Pack LEDC



Vers. 10  
2021  
06. May

Owing to the high reactivity of the ink, exposure to direct daylight should be reduced as much as possible.

## 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 6-8 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

Ultra Pack LEDC is a very fast curing UV-LED-ink.

## LED Curing:

LEDC requires a wavelength range of 385 - 395 nm for LED curing.

## UV curing:

A UV-curing unit with one medium pressure Mercury Vapour Lamp (120- 180 W/cm) will cure the LEDC standard shades at a belt speed of 4800 passes/h resp. 20 m/min. High-opaque shades take longer to cure (3600 passes/h, resp. 12 m/ min ca.).

The curing speed of the ink is generally dependant upon the kind of UV-LED-curing unit (reflectors), number, age, and power of the UV-lamps or LEDs, the distance between UV/LED lamps and substrate (distance from the substrate to the actual LED array, not including the housing!), the printed ink film thickness, colour shade, substrate in use, as well as the exposure time to the curing unit.

Ultra Pack LEDC is a post-curing ink which will achieve its final adhesion and resistances after 24 hours. The ink film should pass a cross-cut tape test right after being cured, or after having cooled down to room temperature.

As with all radical curable printing inks, the presence of residual monomers and photoinitiators' decomposition products cannot be com-

pletely ruled out even after sufficient curing. If these traces are relevant for the application, this must be taken into account in individual cases, as this depends on the actual printing and curing conditions.

Please make sure that waste prints are also completely cured, otherwise they are subject to the same disposal rules as liquid ink residues (hazardous waste).

## 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 solvents (see DIN 16 524), alcohol (96% ethanol), finger sweat, and further common alkaline and acid fillers. Especially the chemical resistance, and water resistance can be increased by adding Hardener H 3 as adhesion modifier.

## Range

### Basic Shades

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

### High Opaque Shades

122	High Opaque Light Yellow
132	High Opaque Scarlet Red
152	High Opaque Ultramarine Blue
162	High Opaque Grass Green
170	Opaque White
180	Opaque Black
188	Deep Black

### Further Products

904	Special Binder
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### Special Products "Inline Foiling Tubes"

171	Opaque White, silicone-free
LEDC-IFT	Varnish "Inline Foiling Tubes"

# Ultra Pack LEDC



Vers. 10  
2021  
06. May

LEDC 171 is more flexible than LEDC 170, and it is silicone-free for utmost flexo overprintability.

Special binder 904 was developed especially for with mixing coloured shades and should not be printed purely.

LEDC-IFT is especially suitable as highly transparent protective varnish and carrier for coloured pigments for cold foil application in the Inline-Foiling process.

LEDC 171 and LEDC-IFT are silicone-free. For silicone-free products it is important to use only thoroughly cleaned stencils, squeegees, ink pumps, tubes (in the case of an automatic ink supply), and injectors for the manual ink filling of the stencil, etc. If cleaning is carried out with automatic screen washing systems, we recommend prior to printing an additional manual cleaning with a fresh cleaner not having had any contact with ink residues containing silicone.

All silicone-containing shades are intermixable. All silicone-free shades are intermixable. Mixing silicone-free shades with silicone-containing shades, with other ink types, or auxiliaries must be avoided in order to maintain the special characteristics of this outstanding ink range.

Silicone-containing shades cannot be overprinted with silicone-free shades.

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-ColorManager software.

## Auxiliaries

H 3	Hardener	2-4%
UVV 1	Thinner	1-10%
UV-B 1	UV Accelerator	1-4%
UV-B 4	UV Accelerator	1-4%

UV-B 5	UV Accelerator	1-4%
STM	Thickening Agent	0.5-2%
UV-VM	Levelling Agent	0.5-1.5%
UV-SA 1	Surface Additive	0.4-0.8%
UV-TA 1	Thickening Agent	0.1-0.5%
UR 3	Cleaner (flp. 42°C)	
UR 4	Cleaner (flp. 52°C)	
UR 5	Cleaner (flp. 72°C)	

Hardener H 3 is sensitive to humidity and is always to be stored in a sealed container. Hardener H 3 can be added for increased resistance and adhesion. The mixture ink/hardener is to be stirred well and homogeneously. The mixture ink/hardener is not storable and must be processed within pot life (White shades max. addition 2%, Black & colour shades 2-4%).

If necessary, the addition of thinner can reduce the ink viscosity and increase the cure speed. An excessive addition of thinner will cause a reduction of the curing speed, as well as of the printed ink film's surface hardness. The thinner becomes part of the cross-linked matrix when cured and may slightly change the inherent odour of the printed and cured ink film.

UV-B 1 accelerates the curing speed if necessary and may increase the adhesion to the substrate owing to a better depth curing. UV-B 4 accelerates the deep curing. UV-B 5 accelerates the surface curing.

The Thickening Agent STM enhances the ink's viscosity without significantly influencing the degree of gloss. Please stir well, the use of an automatic mixing machine is recommended.

The Levelling Agent UV-VM helps to eliminate flow problems which may arise due to residuals on the substrate's surface or incorrect adjustment of the machines. An excessive amount may reduce the ink's adhesion when overprinting. UV-VM must be stirred homogeneously before printing.

UV-VM must **not** be used for silicone-free products like LEDC 171, or LEDC-IFT.

The addition of UV-SA 1 can permanently increase the surface smoothness, gloss, and surface hardness.

The liquid Thickening Agent UV-TA 1 increases the viscosity and improves the dot definition at higher processing temperatures.

# Ultra Pack LEDC



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.

## Printing Parameters

Selection of fabric depends on the printing conditions, the desired curing speed and mileage as well as the required opacity. Generally, fabrics of 140-31 to 180-31 can be used. A uniform screen tension ( $> 16 \text{ N}$ ) of all fabrics used is further important. For UV inks, all commercially available capillary films (15-20  $\mu\text{m}$ ) or solvent resistant photo emulsions and combined stencils can be used.

## Shelf Life

Shelf life depends very much on the formula/reactivity of the ink system as well as the storage temperature. It is 1,5 years for an unopened ink container if stored in a dark room at a temperature of 15-25°C. 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 with the recommended auxiliaries. The selection and testing of the ink for specific applica-

tions 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 Ultra Pack LEDC 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.

### Safety rules for UV-LED printing inks

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

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