

Ultra Form UVFM



Vers. 9
2017
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UV-curable screen printing ink for PVC self-adhesive films, rigid PVC, acrylic glass, polystyrene, polycarbonate, PETG, pre-treated PP, paper, and cardboard

Glossy, flexible, suited for deep-drawing, high quality pigments, press-ready, excellent detail reproduction

Field of Application

Substrates

UVFM is suited for the following substrates:

- self-adhesive PVC film
- rigid PVC
- acrylic glass (PMMA)
- polystyrene (PS), ABS
- polycarbonate (PC)
- PETG
- pre-treated polypropylene (PP) also corrugated sheets
- paper and cardboard

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

UVFM is best suited for the making of high-quality displays, promotional boards, formed articles, etc.

Characteristics

All Ultra Form UVFM basic shades (including Opaque White 170) are glossy, the 4-colour process shades are transparent with satin gloss. The printed ink film is very elastic, flexible and can be formed very well. UVFM is also best suited for post-processing steps such as stamping, cutting, embossing, and grooving. The performance of UVFM will be limited if double or single-faced printed sheets with a high ink deposit are directly running into the stack. Preliminary tests are necessary in order to avoid blocking of the ink.

When printing behind acrylics followed by a thermoforming process, the item must not be completely over-varnished because the trans-

parent varnish could stick to the mold due to the emerging temperatures (e.g. 170°C). If over-varnishing is necessary we recommend to use the solvent-based varnish *Libra Speed LIS 910*. Preliminary tests are necessary.

Ink Adjustment

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

Drying

A UV curing unit with 2 medium-pressure mercury lamps (80 to 120 W/cm) is curing UVFM at a belt speed of 15-25 m/min.

The curing speed of the ink is generally dependant upon the kind of UV-curing unit (reflectors), number, age, and power of the UV-lamps, the printed ink film thickness, colour shade, substrate in use, as well as the printing speed.

Ultra Form UVFM is a post-curing UV ink which will achieve its final adhesion and resistances after 24 hours. The ink film should pass a cross hatch tape test after having cooled down to room temperature.

Fade resistance

Only pigments of high fade resistance are used for the Ultra Form UVFM range. All basic shades are suitable for an outdoor use of up to 3 years if placed vertically and referred to the middle European climate.

Stress resistance

After proper and thorough drying, the ink film exhibits outstanding adhesion as well as rub, scratch and block resistance. Chemical resistances of UVFM are rather low due to the very flexible adjustment of the ink.

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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 |

4-Colour Process Shades Standard

| | |
|-----|-----------------|
| 425 | Process Yellow |
| 435 | Process Magenta |
| 455 | Process Cyan |
| 485 | Process Black |

High Opaque Shades

| | |
|-----|--------------|
| 170 | Opaque White |
| 180 | Opaque Black |

Further Products

| | |
|-----|-------------------|
| 409 | Transparent Base |
| 904 | Special Binder |
| 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 common colour reference systems HKS®, PANTONE®, and RAL®. All formulas are stored in the Marabu-ColorManager software.

We do not recommend this ink for toys due to the foreseeable contact with the mouth since the possible presence of residual monomers and decomposition products of the photo-initiators cannot be excluded even when sufficiently cured.

Metallics

The following Metallics are compatible with UVFM and suited for deep-drawing if the indicated mixing ratios are not exceeded. Preliminary trials are essential.

Metallic Pastes

| | | |
|-------|----------------|--------|
| S 191 | Silver | 15-25% |
| S 192 | Rich Pale Gold | 15-25% |
| S 193 | Rich Gold | 15-25% |

Metallic Powders

| | | |
|-------|--------------------------|-------|
| S 181 | Aluminium | 12.5% |
| S 182 | Rich Pale Gold | 20% |
| S 183 | Rich Gold | 20% |
| S 184 | Pale Gold | 20% |
| S 186 | Copper | 25% |
| S 190 | Aluminium, rub-resistant | 17% |

These Metallics are added to UVFM 904 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 smaller pigment size of Metallic Pastes it is possible to work with finer fabrics like 140-31 to 150-31. Owing to the larger pigment size of Metallic Powders we recommend the use of a coarser fabric like 100-40. 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

| | | |
|-------|---------------------|--------|
| UVV 6 | Thinner | 1-5% |
| UV-VM | Levelling Agent | 0-0.5% |
| UR 3 | Cleaner (flp. 42°C) | |
| UR 4 | Cleaner (flp. 52°C) | |
| UR 5 | Cleaner (flp. 72°C) | |

The addition of thinner reduces the ink viscosity if necessary. An excessive addition of thinner will cause a reduction of the curing speed, as

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well as of the printed ink film's surface hardness. The thinner becomes part of the cross-linked matrix when UV-cured and may slightly change the inherent odour of the printed and cured ink film.

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.

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 the fabric depends on the printing conditions, the required curing speed and yield as well as opacity. Generally, fabrics from 140-31 to 165-27 can be used. Essential for 4-colour process printing with UV curable inks are the control and reduction of the printed ink. We recommend a mesh count between 150-27 and 165-31 threads (1:1 plain weave). A uniform screen tension (> 16 N) of all fabrics used is further important.

UVFM can be processed with all commercially available stencil techniques such as capillary films (15-20 μ) or solvent-resisting photo emulsions.

Shelf Life

Shelf life depends very much on the formula/reactivity of the ink system as well as the storage temperature. It is 2.5 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.

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 Ultra Form UVFM 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 printing inks

UV-inks contain some substances which may irritate the skin. Therefore, we recommend to take utmost care when working with UV-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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