

# Ultraform UVFM



**UV curable screen printing ink for PVC self-adhesive foils, rigid PVC, acrylic glass, polystyrene, polycarbonate, PETG, pre-treated PP, paper and cardboard**

**Glossy, elastic and flexible, deep-drawing suitability, high pigment quality, press-ready, excellent detail printing**

Vers. 05  
2009  
12 Mar.

## Field of application

UVFM is a universal and very flexible UV curable screen printing ink covering a wide range of tasks and substrates in graphical screen printing.

### Substrates

UVFM is suited for the following substrates:

- self-adhesive PVC foil
- rigid PVC
- acrylic glass (PMMA)
- polystyrene (PS), ABS
- polycarbonate (PC)
- PETG
- pre-treated polypropylene (PP), as well as hollow parts
- paper and cardboard

Since all the print substrates mentioned may be different in printability even within an individual type due to low surface tension, preliminary trials are essential to determine the suitability for the intended use.

### Field of use

UVFM is best suited for high-quality printing tasks such as displays (tests for long-term outdoor luminous box signs are not yet concluded and can thus not be recommended by now), promotional boards, formed articles, etc.

## Characteristics

### Ink characteristics

All UVFM basic shades (Opaque White 170 included) 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 the following processing steps such as stamping, cutting, embossing, and grooving.

The capability of UVFM will be restricted if double or single-faced printed sheets having a high ink deposit are directly running into the stack. A blocking of the ink is possible to happen and preliminary tests for suitability are necessary.

When printing behind acrylics followed by a thermoforming process, the item must not be completely over-varnished because the transparent 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 Libraspeed LIS 910. Preliminary tests for suitability are necessary.

### Colour adjustment

Ultraform UVFM is press-ready but must be stirred homogeneously before printing.

### Curing

UVFM is a fast curing UV ink. A UV curing unit with 2 medium-pressure mercury lamps (80 to 120 W/cm) is curing UVFM at a belt speed of 20-30 m/min. The curing speed of the ink is generally depending on the kind of UV-curing unit (reflectors), number, age, and power of the UV-lamps, the printed ink layer thickness, colour shade, substrate in use, as well as belt speed of the UV curing unit.

UVFM is a post-curing ink. The ink film has to withstand a cross-cut tape test after having cooled down to room temperature and will achieve its best resistances after 24 hours.

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## Fade resistance

Only pigments of high fade resistance are used for the UVFM range. Owing to this, all UVFM shades are generally suited to a medium term outdoor use of up to 3 years related to the moderate Central European climate, provided that the prints have been placed vertically.

## 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 but it can significantly be increased by a full area overvarnish with Printing Varnish Ultragraph UVGR 910 (Attention! This varnish is not suited for PMMA and PP substrates). This kind of ink structure is chemically seen more stable but it cannot be formed any longer.

## Fabrics, mileage

Selection of the fabric depends on the printing conditions, the required curing speed and yield as well as opacity. Generally, fabrics from 120-34 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.

Mileage is about 60-80 m<sup>2</sup> per kg ink depending on the mesh and substrate selected.

## Stencils

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

## Range

### Basic shades

(see colour chart System Ultracolor)

|         |              |         |                  |
|---------|--------------|---------|------------------|
| UVFM922 | Light Yellow | UVFM952 | Ultramarine Blue |
| UVFM924 | Medium Yell. |         |                  |
| UVFM926 | Orange       | UVFM956 | Brilliant Blue   |
| UVFM932 | Scarlet Red  | UVFM960 | Blue Green       |
| UVFM934 | Carmine Red  | UVFM962 | Grass Green      |
| UVFM936 | Magenta      | UVFM970 | White            |
| UVFM950 | Violet       | UVFM980 | Black            |

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

These 13 basic shades are stored in our Marabu ColorFormulator (MCF). They build the basis for the calculation of individual formulas, as well as colour matches according to the common reference systems Pantone®, HKS®, and RAL®.

All formulas are stored in the Marabu-Color-Manager 2 (MCM 2) software.

### Further shades available

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

### Shades for 4-colour process printing

Satin-gloss 4-clr. process set acc. to Euro scale, suited for white substrates

|          |                       |                 |
|----------|-----------------------|-----------------|
| UVFM 425 | Process Yellow        | density 1.4-1.5 |
| UVFM 435 | Process Red (Magenta) | density 1.4-1.5 |
| UVFM 455 | Process Blue (Cyan)   | density 1.4-1.5 |
| UVFM 485 | Process Black         | density 1.8-1.9 |

### 4-colour process shades with a higher density

Satin-gloss 4-clr. process set with an increased density for e. g. back-lit transparent substrates.

|          |                       |                 |
|----------|-----------------------|-----------------|
| UVFM 428 | Process Yellow        | density 1.7-1.8 |
| UVFM 438 | Process Red (Magenta) | density 2.1-2.2 |
| UVFM 458 | Process Blue (Cyan)   | density 2.4-2.5 |
| UVFM 488 | Process Black         | density 2.3-2.4 |

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Basis for the density values is a 150-31 mesh whereas many further printing parameters may also influence this value.

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.

Due to a possible direct contact with the mouth, **we do not recommend** to use this ink neither for baby bottles or toys, nor for food packages in direct touch with food since the possible presence of residual monomers and decomposition products of the photoinitiators cannot be excluded even when sufficiently cured.

When printing onto exterior packagings for food or similar goods, we recommend a migration test at the final product.

## Additives

### UVFM 904 Special Binder

- as a binder
- to accelerate curing
- to extend the ink

An addition of UVFM 904 (1-25% parts by weight) accelerates the curing speed and reduces opacity, as well as outdoor resistance at the same time.

### UVFM 910 Printing Varnish

Glossy printing varnish suited for a complete or only partial overvarnishing of sheets printed with UVFM. This can be applied either for protecting the surface or to increase the degree of gloss at 4-colour process printing.

Mesh recommendation is 140-31 or 150-31 in polyester quality.

### Transparent Base UVFM 409

Thixotropic auxiliary for 4-clr. process printing, fine details, and reverse printing. By adding transparent base to the 4-clr. process shades, the ink's density will be reduced and can be adjusted according to the printing copy.

### Bronzes

The following bronze powders and pastes can be used with UVFM and are also suited for a subsequent vacuum-forming if the mixing ratios as indicated below have been followed. For a higher gloss, it is possible to completely overvarnish with UVFM 910.

(To be mixed with Bronze Binder UVFM 904)

|       |                                |
|-------|--------------------------------|
| S 181 | Aluminium (8:1)                |
| S 182 | Rich Pale Gold (5:1)           |
| S 183 | Rich Gold (5:1)                |
| S 184 | Pale Gold (5:1)                |
| S 186 | Copper (4:1)                   |
| S 190 | Aluminium, rub-resistant (6:1) |

Due to the larger pigment size of bronze pigments, we recommend a coarser fabric, e.g. 120-31. Bronze mixtures cannot be put into storage for later use, therefore please prepare fresh mixes daily (to be processed within 8 h).

### High-gloss Bronzes, Pastes

Two high-gloss bronze pastes are available to be mixed with UVFM 904 Special Binder and can also be used for vacuum-forming provided that preliminary tests have been carried out.

|          |                      |              |
|----------|----------------------|--------------|
| S-UV 291 | High-gloss Silver    | (4:1 – 10:1) |
| S-UV 293 | High-gloss Rich Gold | (4:1 – 10:1) |

Both bronzes have a high gloss and a good opacity, they are very brilliant at pot life of 24 h. Due to the small pigment size in contrast to the formerly mentioned bronze powders, it is here possible to use a finer fabric such as 140-31 to 150-31.

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All figures in brackets are guidelines which can be changed according to opacity and curing speed. The ratios in brackets refer to the mixture Special Binder UVFM 904 to bronze whereas the first figure is standing for parts by weight of Special Binder. For more details, please see our technical data sheet "High-gloss Bronze Pastes".

## Auxiliaries

### Thinner UVV 6

Thinner for reducing the viscosity of the ink if used on fast running printing machines.

Addition: **1 - 5 %** parts of weight

An excessive addition of thinner will cause a reduction of the curing speed, as well as of the printed ink film's surface hardness. UVV6 is chemically bound in the ink film when UV-cured.

### Levelling Agent UV-VM

Helps to eliminate flow problems (e. g. bubbles, etc.) which may arise due to residuals on the substrate's surface, insufficient screen tension or incorrect adjustment of the machines.

Addition: **max. 0.5 %** parts by weight

A higher proportioning reduces the ink's adhesion when overprinting. UV-VM is to be stirred well und homogeneously before printing.

## Cleaners and Screen Cleaning

Cleaners UR 3 (flame point 42°C) or UR 4 (flame point 52°C) can be used.

In the case of longer machine stops (> 30 min), it is important that the ink remaining in the screen open area is removed with UR 3/ UR 4 as otherwise it may dry in and clog the meshes.

## Shelf life

Shelf life depends very much on the formula/ reactivity of the ink system as well as the storage temperature. It is one year maximum for an originally closed ink can if stored in a dark room at a temperature of 15 to 25 C. Under different conditions (particularly higher storage temperatures), shelf life will be reduced. In such cases, Marabu's warranty expires.

## Labelling

For our ink type Ultraform UVFM and its additives and auxiliaries there are current Material Safety Data Sheets according to EC-regulation 1907/2006 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.

## Safety rules for UV screen printing inks

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

## Note

Our technical advice whether spoken, written, or through test trials corresponds to our current know-ledge to inform about our products and their use. This is not meant as an

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