

Pad printing ink specifically formulated for ABS, rigid PVC, some PC, PS and PMMA, pretreated PE and PP as well as some metals and varnish

UV- Curable, High Gloss, good opacity one or two component ink, resistant to chemicals

## **Application**

### **Substrates:**

Sigma UV-curable inks are suitable to print and adhere to substrates like

- Polycarbonate
- ABS
- Polystyrene
- Rigid PVC
- Acrylic

By adding hardener, UV adheres excellently to many other substrates such as

- Pre-treated polyethylene
- Varnished Surfaces
- Pre treated polypropylene
- Various metal surfaces
- Polyamide

Metal substrates may require adhesion promoter to improve adhesion of the ink. Pre-treating polypropylene and polyethylene by means of corona discharge or flaming are required as usual.

Because substrates may be different in printability, preliminary trials are important to decide the suitability for intended use.

### **Use:**

Sigma UV-curable inks are particularly suited when printed parts are immediately to be processed further, resp. when excellent mechanical and chemical resistances are required.

With multi color printing, it is important to note that Sigma UV can be printed wet on-wet, without an intermediate UV-curing. When printing overlapping motives with opaque color shades, however, the individual ink films must be cured one by one.

If the different ink layers do not overlap, it is possible to cure all printed layers with one single pass through the curing unit. Due to their transparency, 4-colour process

shades can also be cured with one pass through the curing unit. Nevertheless, preliminary tests are essential.

### **UV-Curing**

According to the required curing speed, a UV curing unit (medium-pressure mercury lamps) of 80-120 W/cm is necessary.

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

The adhesion of the ink is usually tested by a tape test after the ink has been cooled down to room temperature (approx. 20°C/68° F).

## **Ink Characteristics**

### **Drying:**

Sigma UV ink contains solvents. Parallel to physical drying and the evaporation of the solvents used, the actual hardening of the ink film is caused by a chemical cross-linking reaction started by the UV-light.

Sigma UV is a somewhat post-curing UV ink which will achieve its best resistances after 24 hours. If hardener has been added, the curing speed will be reduced. Due to this, adhesion and scratch resistance should be tested only after 24 hours. A final curing of the ink film will be reached after 48 hours.

### **Pot Life:**

The pot life at room temperature (approx. 21°C/70°F) with hardener will be about 12-16 hours. Higher temperatures reduce pot life. If 16 hours is exceeded, the ink's adhesion and resistance may be reduced even if the ink characteristics show no noticeable change. When using hardener, the processing and curing temperature must not be lower than 14°C/58°F as irreversible damage can occur. Please also avoid high humidity for several hours after printing as the hardener is sensitive to humidity.

**Fade Resistance:**

Sigma uses medium to high fade resistance pigments within our Sigma UV shades, and are generally suited to a short-term outdoor use of up to one year related to a moderate outdoor climate.

**Wear Resistance:**

After proper and thorough drying, the ink film exhibits outstanding rub and scratch resistance and is resistant to a large number of chemicals, oils, greases, and solvents, as well as perspiration. These resistances can further be improved by adding 10% hardener.

**Using Sigma UV as a 2 Component ink**

According to the substrate and the required ink characteristics, it is possible to add hardener to the UV inks before printing by adding 10% hardener by weight.

Color System

**Opaque Colors**

- UV-310 Black EO
- UV-311 Light Gray EO
- UV -320 White EO
- UV -330 Primrose Yellow EO
- UV -331 Rich Yellow EO
- UV -340 Orange EO
- UV -350 Fire Red EO
- UV -351 Red EO
- UV -380 Reflex Blue EO
- UV -381 Blue EO
- UV -390 Green EO

**Mixing Colors**

- UV-M-10 Mixing Black
- UV-M-20 Mixing White
- UV-M-30 Mixing Warm Yellow
- UV-M-31 Mixing Yellow
- UV-M-40 Mixing Orange
- UV-M-50 Mixing Pink
- UV-M-51 Mixing Red
- UV-M-52 Mixing Scarlet Red
- UV-M-70 Mixing Violet
- UV-M-80 Mixing Blue
- UV-M-90 Mixing Green
- UV CLEAR Clear/Varnish

**Metallic Colors**

- UV-300 Metallic Silver
- UV-305 Rich Metallic Gold
- UV-306 Bright Metallic Gold
- UV-307 Pale Metallic Gold

**CMYK**

- UV-P CYAN Process Cyan
- UV-P MAGENTA Process Magenta
- UV-P YELLOW Process Yellow
- UV-P BLACK Process Black

**Custom Color Matching**

As a service, Sigma will custom match to Pantone, RAL, Federal Standard, or sample color chips.

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

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 colors are suited for printing onto toys. Due to a possible direct contact with the mouth, however, **we do not recommend** using this ink neither for baby bottles, baby toys, nor for food packaging in direct contact with food since the possible presence of residual monomers and degradation products of the photo-initiators cannot be completely.

**Thinners**

- MP/UV-101 Retarder 3-10%
- MP/UV-102 Thinner 20-40%
- MP/UV-103 Fast Thinner 20-40%

Thinner should be added to the ink concentrate as a percentage of the weight of ink measured out. Thinning requirements may require adjustment for particular process, speed or environmental conditions.

### **Shelf Life**

Shelf life depends very much on the formula/ reactivity of the ink system as well as the storage temperature. It is 2 years for an unopened ink container if stored in a dark room at a temperature of 15-24°C/60-75°F.

Under different conditions, particularly higher storage temperatures, the shelf life is reduced. In such cases, the warranty given by Sigma expires.

### **Printing Plates**

All commercially available plate materials including: photopolymer, both thick- and thin-steel as well as ceramic coated metal are compatible with Sigma UV Series ink. Recommended artwork etch depth is 26 to 36 microns (0.001”-0.0015”).

### **Printing Methods**

Sigma UV Series ink is specifically formulated for the demands of the pad printing process; with transferability, opacity, adhesion, flexibility, and high wear resistance being its core attributes.

Sigma UV Series has been extensively tested with closed-cup pad printing machines and has been used in screen printing and open ink well printing systems. Thinning requirements must be tailored to the specific printing process and environmental conditions.

### **Note**

Any technical recommendations relayed through this TDS are based through our knowledge from our preliminary testing and qualifications of our inks. This information is merely to inform about our products and their uses. This is not meant as an assurance for certain properties of the products nor their suitability for each application. You are, for that reason, obliged to carry out your own tests with our products to prove they are suitable for the desired process. The selection and testing of the ink for specific application is exclusively your responsibility. Should 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.

### **Labeling**

Original ink and additive containers are labeled with appropriate health and safety information as well as downloadable MSDS available via QR Code and/or web address. Sigma or its distributors can be contacted for any additional questions or concerns regarding labeling.

### **Recommendations**

Mix contents of the ink can thoroughly before each use. Ink is supplied in concentrated form (Thinner must be added for production use). MP/UV-101 Retarder may be added to control ink tacking performance. All containers should be tightly sealed when not in use. Do not pour mixed or used ink back into the original container.

### **Certifications**

- Phthalate Free: Annex XVII Items 51 & 52 of the REACH Regulation (EC) NO. 1907/2006 (formerly known as Directive 2005/84/EC)
- RoHS Compliant: Free of Lead, Cadmium, Mercury, Hex-Cr, PBB, PBDE-fire retardant
- REACH Compliant: Free of SVHC, as listed by ECHA
- EN-71-3: International Toy Safety standard regarding the use of toxic chemicals.