Ink mixing Instructions:

Pad printing Inks are mixed by weight not volume. *(A digital scale measuring in grams is recommended.)*

- Open the Ink Container and mix thoroughly.
- Place an appropriate container on the scale & zero out the TARE on the scale.
- Add 100% of ink *(or 100 grams)* into the container.
- Zero out the TARE on the scale
- Selected Hardener (Normal/Fast) should be added at this time. Ratios are listed on the package. *(example 10% or 10 grams of MP200 hardener is added)*
- **MIX THOUROUGHLY FOR 2-3 MINUTES**
- Zero out the scale, add minimum 25% *(25 grams)* up to 35% *(35 grams)* of thinner.
- **MIX THOUROUGHLY AGAIN FOR 2-3 MINUTES**
  Let Stand for 3 minutes before use.

Ink has a pot-life of 8-10 hours when hardeners have been added.
Ink has to be periodically re-thinned in the ink cup to replace evaporated solvents.
Typically a 2-3 hour maintenance program can be implemented on longer runs.
Never return ink back into the original container after dispensing.
All mix ratios are based off of the original 100% ink weight, do not accumulate.

If you require assistance please contact technical support 1 800 982 1928

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

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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.

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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 1.2 thousandths of an inch (0.0012 inch).

Printing Methods

Sigma UV Series ink is specifically formulated for the demands of the pad printing process; with transfer-ability, 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.

Shelf Life

Shelf life depends upon the formula/ reactivity of the ink system as well as the storage temperature. The shelf life for an unopened ink container if stored in a dark room at a temperature of 60-78°F is:

UV Ink – Metallic Colors	2.5 years
UV Ink – All Other Colors	3.5 years
UV Ink Additives	2 years
UV Ink Thinners	5 years

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

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.