



HANDLING INSTRUCTIONS

GRAUEL – PRINTING INK OF “UV” SERIES

1. General Information

These inks can be used in all GRAUEL-machines as long as the machines are equipped with printing rollers, printing pads*** or blankets made from **special rubber** suitable for the processing of UV-inks. For good printing results, the parts to be printed on must be **free of grease and dust**.

UV-inks were developed for form printing. They are ready for printing, when they get posted, i.e. they generally show very good results in practical operation. UV-inks are a 100%-system and do not contain any volatilising components.

Attention: UV-hardening printing inks require treatment with ultra-violet radiation to harden the ink layer.

The ultra-violet radiation in the spectral range of electromagnetic radiation from 200 to 400nm. The ranges UV-B and UV-C are especially effective for photo-polymerisation during UV-drying.

The drying time for UV-inks is approx. 1-2 sec. If tunnel or mandrel drying method is applied, the drying time is only 0.2 sec. It is more appropriate to call the process UV-ink hardening as it is a (quick) chemical reaction (polymerisation) induced by ultra-violet radiation.

Our experience shows that mercury vapour lamps are especially suitable for being employed as UV-radiators. Medium pressure lamps are the ones commonly used. Their durability is acceptable, and apart from some infra-red radiation they provide also a high proportion of ultra-violet light.

2. Additives/Printing Auxiliaries

Specialists have very contrary opinions regarding the use of additives. Some refuse to employ any additives at all for they consider the overdosing risk to be too high. Others have worked out downright recipes for optimisation purposes.

So, what are the pros and cons of additives? Are they necessary, or is it more recommendable to not use them at all?

UV- Diluent UV 015

- Reduces tack and viscosity, i.e. the ink becomes “short-oiled” and “softer”. Suitable for sluggish ink, low machine temperature. It is recommended to pre-warm the inks by keeping them in the printing hall over night, or by switching off the machine cooling system. Induces increased darkening of shade.

Amount: 2-5%

Attention: DOSE CAREFULLY !



3. Ink Adhesion

In order to make the ink high-adhesive, we principally recommend:

- Pre-treatment of the material by means of corona or flame.
- 44-46 mN/m² surface tension. In most of the cases, this leads to sticky-tape resistance on all common synthetic materials, even if the sticky tape gets ripped off very abruptly.
- regular examination of the surface tension by means of test pens or –inks manufactured by Arcotoec or Softal.

Pre-treatment of the material activates the foil surface in a way which allows to better fix the ink on it. However, good pre-treatment is no guarantee for good ink adhesion. Why not?

Ink layers which are too thick or too thin, insufficient through-hardening and/or foil influences can cause bad adhesion results. For instance, if components of the synthetic material, like slip additive, release agent, waxes or anti-static agent, gather at the top of the foil, in extreme cases the ink layer may be sticky-tape resistant immediately after printing, but not even smudge-proof after 10-20 days time. Ink transfer is improved in any case (well-closed ink layer)

Regarding unfavourable PS- and PVC-materials, our standard ER-inks have certain advantages in comparison to UV-inks as the surface etching results in better anchorage of the ink layer.

4. Viscosity and tack

Viscosity is the physical behaviour of a substance under mechanical strain. Printing ink of low viscosity is also called “soft” or “thin”, printing ink of high viscosity is called “hard” or “compact”.

ER-inks are featured by structural viscosity, i.e. with increasing shearing stress in the inking unit or on the rollers, viscosity declines. Raise of temperature, too, causes decline of viscosity.

Ink of very low viscosity tend to spray, i.e. there is an excessive number of dots and the ink is not resistant to temperature. On the contrary, Ink of very high viscosity due to high pigmentation will show low motivity inside the ink duct (→ inking unit stirrer is recommended) and be hard to distribute on the rollers. Even withdrawal from the tin will be difficult.

Tack can be described as the stickiness the ink shows on the material to be printed on. The stickier and colder the printing ink, the higher the power which pulls on the material surface in the moment of ink separation. Therefore, the tack directly influences ink transfer and hence the printing result. It also plays an important role in mosaic respectively wet-in-wet printing. The marginal sharpness of mosaic dots and the extent of ink re-separation significantly affect the printing quality.

5. Job preparation

1. Fresh rubber rollers must be always saturated with transparent white UV 43784. Allow the White to react or rub it into the roller, and remove the residue.
2. **Do not** treat gelatine pads as described in 1.
3. **Always** clean rollers, pads and clichés using printing ink detergent TR 87 before changing inks or clichés, and after each job.



6. Advantages of UV-inks

Due to their quick chemical drying process, UV-inks have the following advantages in comparison to conventional printing inks:

1. No environmental harm from solvents
2. Quick hardening, high printing speed
3. Direct and easy inline-processing
4. No change in shade caused by ink absorption
5. The inks stay fresh in the inking unit, no membrane evolving in ink tins
6. Non-absorbing media can be printed on without any problem
7. Excellent printing quality, good shining, mechanical and chemical resistance
8. Very space and energy-saving in comparison to common thermal drying facilities
9. Sparing in use (ca. 2g ink/m²)

7. Remarks

1. UV-inks must not be mixed with conventional printing inks and varnishes or their additives.
2. Being an extremely reactive system of printing inks, UV-inks and varnishes are of limited imperishability only. We guarantee that our UV-inks and varnishes keep quality for six months at common storage conditions (ca. 20°C, no light impact). However, this period is generally exceeded by far if the ink is used in appropriate manner.
3. Please take care in controlling the colour shade. It is recommended to avoid any overcolouring, so thorough hardening is possible.
4. High efficiency can be achieved by higher transparency of the ink layer. However, this leads to changes in shade on coloured surfaces or transparent material.

8. Technical Prerequisites

Changing from conventional to UV-hardening printing inks, the rollers must be cleaned **by all means**.

We recommend to use photopolymer-plates (Nyloprint-clichés).

Principally, the UV-radiator's capacity must correspond with the respective job requirements. The distance between UV-radiator and printing medium should be optimally adjusted.

Reflectors and UV-tubes must be clean at all times. Regular maintenance is necessary therefore. Please observe the manufacturer's recommendations.

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