



HANDLING INSTRUCTIONS

GRAUEL – THERMOSETTING INK OF SERIES “ER”

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 Thermosetting inks.

Consistence, viscosity and covering capacity correspond with common printing inks.

For good printing results, the parts to be printed on must be free of grease and dust.

After printing, Thermosetting inks must be exposed to short but intensive heat treatment.

We offer a large range of inks and also printing auxiliaries. Please ask for our catalogue.

***Please note, that during the warm season it is not possible to post gelatine pads (applicable for “B” series only) as the pads would deform. Therefore, we recommend to use our special rubber press rollers during summertime.

ER-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. 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?

2. Additives/Printing Auxiliaries

Retarder ER 9000 (bottled)

- Reduces tack and viscosity of printing inks. Auxiliary for feeding-down, replacement for solvent lost through volatilisation due to permanently low ink consumption.
Amount: 3-4%

Retarder V 964

- Reduces tack and viscosity of printing inks and makes them “softer”. Auxiliary for feeding-down, replacement for solvent lost through volatilisation due to permanently low ink consumption.
Amount: 1-4%

Retarding Gel ER 462

- Improves flexibility of printing inks without affecting their viscosity. Reduces tack, suitable for tack graduation, especially in wet-in-wet printing or in case of occasional separation problems with press blankets and cover (→ planographic printing)
Amount: max. 3-10%

Transparent White ER 784

- For reducing shade of ink, e.g. within the scope of a basic ink mixing system. The ink’s printing behaviour is not affected.
Amount: unrestricted.



By varying the amount of added Transparent White, the ink can be adapted to the respective requirements very well, especially for the purpose of mixing light shades. It is recommendable to reduce the amount for wet-in-wet printing in order to achieve a sharp-edged printing result by means of reduced inking. This way, negative fonts stay clearer as well.

On the other hand, one must keep in mind that if the ink thickness is too low ($< 0.6 \text{ g/m}^2$), the mechanical lasting properties may be insufficient.

Printing Varnish ER 902

- Increases tack and viscosity of printing inks. Improves ink motivity inside the ink duct. Stabilises ink transfer, especially under unfavourable conditions (e.g. high inking unit temperature)
Amount: unrestricted

ER – Additive (Slip Additive)

- ERF 0020: 1 - 2 %, must be mixed in very well

All raw materials are based on silicon. Tack and viscosity are reduced. Ink surface tension is also reduced (the higher the surface slip, the better scratch- and sticky-tape-resistance). Considerable reduction of unwanted abrasion, e.g. during stapling of buckets with unfavourable shape, if other methods do not work out.

Despite the parameters being changes all the time, ER-inks work very reliable without using any additives. However, no printing ink was developed yet which prints and sticks equally well under all possible conditions.

All parameters relevant for the process must be rather adjusted to each other in order to achieve a printing result of high quality. ER-inks contribute to this, and additives can certainly make the result even better in the individual situation.

3. Pre-Treatment / 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.

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 a 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 the ink transfer and hence the printing result. It also plays an important role in mosaic respectively wet-in-wet printing. The marginal sharpness of the 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 retarder. Allow the retarder 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.

GRAUEL- Machine type “B”

- Distribute a little amount (not bigger than a pin head) of ink on the ink plate, repeat two or three times, then print.
- In case the ink starts to dry, spray retarder onto ink plate and rollers now and then from 40 to 50 cm distance for approx. ¼ sec., distribute immediately.
- If you use too much retarder you will obtain a smudged printing result (see 3.).

GRAUEL – Machine type “R” / Manual operation

- Start job (see GRAUEL – machine type “B”).
- Remove misprints from image roller using TR 87, let the detergent evaporate, only then go on printing.
- Change inks and clichés after each job (see 3.).



GRAUEL – Machine type “R” / Motor driven

- Put roller carriage in rearmost position.
- Open protection facility, switch on the motor and spray retarder on the inking rollers from 40 to 50 cm distance for approx. ¼ sec.
- Allow the retarder to react for a short while, repeat if necessary until the rollers are saturated, remove residue.
- Fill in the ink (see operators instruction) and print.
- Keep room temperature as low as possible, in order to prevent premature drying.
- Remove misprints from image roller using TR 87, let the detergent evaporate, only then go on printing.
- Change inks and clichés after each job (see 3.).

GRAUEL – Machines of semiautomatic / fully automatic type

- Open protection facility.
- Treat rollers with retarder as described for “R” type machines above.
- Fill in the ink (See operators instruction).
- Close protection facility.
- Let the machine run idly for approx. 1 min., then print.
- Remove misprints from image roller using TR 87, let the detergent evaporate, only then go on printing.
- Change inks and clichés after each job (see 3.).

6. Interruption and breaks

- Spray retarder onto the ink transfer, the tipping and the inking rollers, let the machine run idly for approx. 1 min., then switch-off the machine.
- If the ink has started to dry after a long break, spray retarder for approx. ¼ sec.
- Switch on the machine, let it run idly for approx. 1 min., print.

7. Cleaning

All rollers and clichés must be cleaned daily, after each job and within the scope of every cliché changing. Complete cleaning is necessary within the scope of ink exchange.

If no ink exchange is necessary, it is sufficient to daily clean the ink duct of machines with automatic ink feeding.



8. After-treatment by heat impact (necessary by all means)

Any source of heat (infrared radiator or lamp, hot-air blower etc.) can be used for hardening the printing results. GRAUEL is able to supply the according devices. The duration and intensity of the drying process depends on the material to be printed on. The maximum temperature is approx. 100°C to 200°C. For synthetic materials, the temperature should be at least 10°C below the respective deformation temperature.

With regard to ink choice, the drying process of ER-inks can be influenced very little only. As long as the properties of the printing medium allow it, the infrared radiators' intensity or number may be enlarged. It is also possible to provide more air circulation with warm or cool air in order to speed up the drying process.

Within the scope of this general instruction it is not possible to give any more detailed information as the variety of the printing media and their range of application is too wide. Therefore, it is very useful to carry out tests first. The printing medium should be measured or examined before and after the test.

CONCLUSION

1. Spray all rubber rollers with retarder before printing, allow to react, remove residue.
2. Gelatine pads do not require this pre-treatment. Printing pads made from synthetic material are not suitable for processing Thermosetting inks.
3. Thermosetting inks dry quickly. Please keep this in mind and use retarder accordingly.
4. After cleaning with printing ink detergent TR 87, **do not** immediately continue with printing. If necessary, spray retarder a second time (1/4 sec.).
5. Please observe the security instruction during the use of TR 87.
6. Clean rollers and clichés with TR 87 after each job. As far as the ink was exchanged, the ink duct as well requires cleaning. Apart from this, the ink duct must be cleaned thoroughly every day after the last job.
7. In difficult cases, retarder can be used as detergent, which is very expensive though.
8. Please keep in mind that Thermosetting inks react on warmth and dry quickly. If the ambient temperature is quite high, retarder must be used more often. The instructions above refer to normal room temperatures of 20°C.

B. GRAUEL GMBH