DFTA TECHNOLOGIEZENTRUM
Die FlexoKompetenz.

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Handling and Processing Description

Important Notice!
Due to changes in available technologies for Flexographic platemaking we need to emphasize that the signal element at hand will only deliver its full benefits if it is being used in a so called **Round-Top** platemaking workflow! In a Flat-Top process it will only show part of its strengths and functions. We do recommend its use under Flat-Top conditions only after in-depth evaluation of suitability.

DFTA Flexographic Signal Element „Combi" KE V2.0

The document at hand describes the DFTA Flexographic Combination Signal Element KE, Version 2.0, its goals, it application and its evaluation, as well as the benefits to be derived from it by the user.

Basics

In Flexography it is the press operator who has to establish the correct impression engagement settings between printing plate and substrate, as well as between Anilox roller and printing plate. This job may be made more precise and reproducible using the DFTA KE 2.0. Moreover, the application of the DFTA KE 2.0 may yield a greater quietness and harmony of the rotation of the cylinders through optimization of the respective impression engagement settings. Generating vibration lines that disturb the printed design may be avoided more safely than otherwise. Generally the respective print job may typically be run at a higher press speed.

Description

The DFTA KE 2.0 has the adjacent shape with 10 "micro dots". It will be delivered as a high resolution file in a bitmap format of one bit data depth. Hence, it is a black and white bitmap file that can be processed by the respective platesetters. The apparent grey levels are realized by different populations of black pixels. There are 10 of those pixel patterns that have been composed to the adjacent "micro dot" shape.

Pic. 1: the DFTA KE 2.0 magnified (original size approx. 2 x 22 mm at 2540 dpi imaging resolution, single circles 1,5 mm in diameter)

The original size of the delivered DFTA KE 1.0 element is approximately 2 x 22 mm [including the DFTA logo] at the standard resolution of 2540 dpi. When outputting the element at the different resolution its size will change accordingly. However, the original element of the aforementioned size will only be required for a preceding experiment. After its evaluation ONE of the "micro dots" will be chosen and will be utilized solely.

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Possibilities of application

The DFTA KE 2.0 is suitable for so called digital (LAMS) photopolymer Flexographic printing plates that work with Round-Top technology. It may be introduced into all such workflows that enable outputting bitmap files of this kind. In case it will be introduced to the original file it must be obeyed to not introduce any changes in resolution, neither deliberately nor through any automatisms of data processing.

Function

The DFTA KE 2.0 causes the digital LAMS mask that has been imaged with it to develop what appear to be grey levels although the involved platesetters are not capable of producing true grey levels. Through the „grey levels" in the digital mask the DFTA KE 2.0 initiates a filtering effect for the actinic UV radiation during main exposure of the photopolymer plate. This reduction of the radiation energy is it that causes photopolymerisation (i.e. cross-linking of the molecules) to get recessed against normal printing height. After full processing of the respective printing plate a progressive height differentiation will be established over the 10 original "micro dots" included in the DFTA KE 2.0.

The height differentiation may be utilized during printing for indicating the currently applied impression engagement between Anilox roller and printing plate, as well as between printing plate and substrate. Otherwise, these important factors of press setup will be attributed solely to the talent and "feel" of the operator. As one now has the aforementioned press settings under good control the following advantages may be derived thereof:

1. Visual control over the absolute amount of printing impression engagement between Anilox roller and printing plate on one hand and between printing plate and substrate on the other hand. Deficits and excesses are being indicated very apparent and may therefore be corrected right away.
2. When placing the DFTA KE 2.0 on either side of the printing plate (operator and drive side of the press) the parallelism of the involved cylinders may be checked very quickly and easily.
3. The DFTA KE 2.0 may be utilized as a very sensitive signal element for reproducibility and consistency of photopolymer plate making over longer time frames.

Processing the DFTA KE 2.0 in Repro and Plate Making

1. *Check for the required resolution of the DFTA KE 2.0*

   The DFTA KE 1.0 will usually be distributed at a resolution of 2540 dpi. In case you require a different resolution version, please contact one of the DFTA TZ team. Individual resolutions are available at a moderate handling fee.

2. *Importing the DFTA KE 2.0 into the original Repro file*

   The DFTA KE 2.0 will usually be imported as a bitmap in TIFF file format into the Repro file, then being placed and processed along with it. Masking off the DFTA logo and the copyright is allowed. The commercial RIP engines will normally not introduce an unwelcome change to the element if the output resolutions match.

   The DFTA KE 2.0 may and should be inserted into each colour separation printer at least one time. This requires the monochrome file to be "coloured" accordingly. It must be recommended

one more time to place the DFTA KE 2.0 on either side of the press as this enables verification of the important parallelisms of the involved cylinders.

3. *RIPping of the Design File or Utilization of the DFTA KE 2.0 as an Output File for the Platesetter*

   You may as well use the DFTA KE 2.0 file directly as an output file for the platesetter. However, it will then not have an integral relationship with the design file and may therefore not be placed inside it. This case will therefore be an exception.

   Usually, the design file including the placed DFTA KE 2.0 will be sent through the RIP to the Platesetter. In that the DFTA KE 2.0 is nothing else than a high resolution line work file the RIP will typically not apply any screening or other manipulation to it. Thereafter, the integrated high resolution bitmap file may be used as regular for the imaging of digital photopolymer Flexo printing plates.

   According to our current understanding a distortion of the design file that is meant to counter the printing plate elongation and therefore is no greater than 5% should be OK to perform with the DFTA KE 2.0 included.

4. *Plate Making*

   Imaging of digital photopolymer Flexo printing plates should always be performed under the high technical standards determined by the ***DFTA Digital Flexo Plate Making Guide***. If so, except for the respective optimisation of the Laser-Power-Balance there are no specific measures needed to apply in the vicinity of the Platesetter in order to image the DFTA KE 2.0 correctly. We do, however, warn against operating the platesetter in under power mode. This would damage the DFTA KE 2.0 due to its delicate structures more than would be the case with a regular design file. Achieving the optimal Laser-Power-Balance may be verified by utilization of the ***DFTA CtP Strip 2.0*** in a very simple and user friendly way.

   Regarding the main exposure of the imaged printing plates a warning must be expressed here in correspondence with the aforementioned Guide. Digital photopolymer Flexo printing plate raw materials react to various intensities of the UV radiation applied through main exposure with different levels of Dot Sharpening. Compensation with prolonged exposure time, as has been performed with analogue photopolymer plates in the past, does NOT work here! The DFTA KE 2.0 utilizes this generally advantageous Dot Sharpening effect, but will show the inevitable differences between various exposure frames much more drastically than would be the case with usual imaging bitmap files. It must therefore be paid much attention to which kind of instrument is being used (devices do differ in their principal output intensity potentials) and which ageing status they currently have. The DFTA KE 2.0 will exhibit pronounced output differences of the devices very drastically.
   The final printing plate will show the DFTA KE 2.0 as a "staircase" of "micro dots" with different amounts of recession against normal printing height.

Application in Printing: Step 1 – Preceding Experiment

When setting up the printing press with printing plates that have been equipped with copies of the DFTA KE 2.0 the operator must initially NOT pay attention to the signal element and establish the impression engagement settings as usual. At this point in time we do assume that we are dealing with fingerprinting test formes as it is predominantly such printing plates that the application of the original, full sized DFTA

KE 2.0 (with 10 "micro dots") does make most sense. (It should be emphasized at this point already that the DFTA KE 2.0 may be stripped down to only ONE "dominant micro dot" after this Step 1, thus covering much less space.)

As a next step the copies of the DFTA KE 2.0 of a printing deck should be compared with one another for similarity, particularly if they have been placed on either side of the web. A simple visual comparison will enable to establish parallelism between the cylinders very easily. When knowing about the height differentiations between the "micro dots" of the DFTA KE 2.0 the interpretations and the conclusions about corrective action are self explanatory. This may be carried out separately or in parallel over multiple print decks.

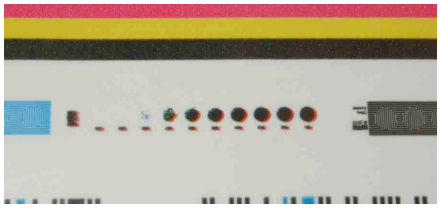
Finally, it is only the total amount of impression engagement between the various print decks that needs to be supervised. In case they do have about equal total area coverage they will need about the same amount of impression engagement. This is typically the case with fingerprinting test formes. Larger differences in the appearances of the printed shapes of the DFTA KE 2.0 copies, which would indicate bigger variations of impression engagement settings between the involved print decks, should be equalized in the final step of setup.

In general it should be verified that the impression engagement between the substrate and the printing plate is slightly higher than the engagement between the Anilox roller and the printing plate. This ensures that the total amount of ink supplied to the printing plate (particularly the ink that goes in between the relief elements along their side walls) will be transferred to the substrate instead of agglomerating on the printing plate, thus cause press stops for cleaning.

Caution! *As has been demonstrated in the print trials of the DFTA Technology Centre, the quality of the prints of the DFTA KE 2.0 strongly depends on the quality of evenness of the substructure of the printing plate. For instance the thickness tolerances of the usual foam adhesive tapes may cause such differences in the appearance of the various copies of the DFTA KE 2.0 and may consequently trigger false corrective actions by the operator. It is therefore very advisable to place the DFTA KE 2.0 as many times as possible on every single colour separation. A good compromise turned out to be the placement of four copies, one each in either corner, as the thickness tolerances typically express with only one of the copies and may hence be identified as such very easily.*

The above pictures show an exemplary appearance of the DFTA KE 1.0. In being a highly sensitive signal element the DFTA KE 1.0 may as well be rendered significantly different in plate making and consequently produce a substantially different printed appearance at normal and high impression engagement settings. Hence, the above pictures do NOT show an absolute reference but are meant to give a good example only. When using the DFTA KE 1.0 highest emphasis should be placed on the evenness of its rendering over multiple copies on a single colour printer as well as their stability and reproducibility over time.

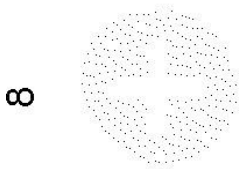
After having carried out the described proof printing process using printing plates including the DFTA KE 2.0 in several copies there are prints available of the look shown in picture 2. The various steps of the staircase will usually print different in intensity. The "micro dots" with the higher numbers may not print at all. The goal of further utilization of the DFTA KE 2.0 must now be to identify one of the steps that do not print any more when going down the "stairs" from #1 to #10. One may select either the first, second or even third step that fulfils this criterion, depending on the particular Flexo application. Irrespective of which one is being chosen they all



Pic. 2: DFTA KE 2.0 (here still without cross marks inside the micro dots) in the preceding experiment, overprinted in several colours. From step #8 up there is no correct print any more.

are recessed against printing height so much that they will not get in contact with the Anilox roller and will therefore not be inked up, whilst still being high enough to touch the substrate.

As soon as you have chosen the respective step (here #8) it will only be **this very single „dominant micro dot" that must be used further on** for regular manufacturing and optimizing the production process. A particular advantage of the DFTA KE 2.0 "micro dots" is that they may be used instead of regular micro dots that are otherwise meant for plate mounting. For doing so the chosen DFTA KE 2.0 "micro dot" must be isolated in the original bitmap file and must be placed in all colour separations at the same positions, as is usual with mounting micro dots. When used and processed correctly, it is of no disadvantageous consequences that the "micro dots" do overlap in this case.

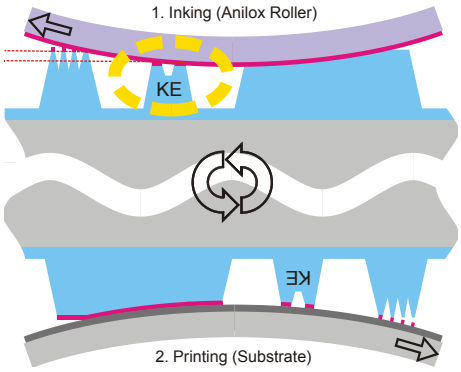


Pic. 3: Example for the chosen section of the full DFTA KE 2.0 which will be used for regular print jobs (figure may be left away)

Application in Printing: Step 2 – The regular Print Job

The function of the DFTA KE 2.0 is based on the observation that print results tend to be most stable in quality if the impression engagement of the Anilox roller to the printing plate is slightly less than the engagement of the printing plate towards the substrate. As soon as one of the "micro dots" of the DFTA KE 2.0 has been identified to not be visible under normal impression engagement settings this determines automatically the height slightly underneath the level of inking by the Anilox roller. This knowledge will then be used for regular print jobs as follows.

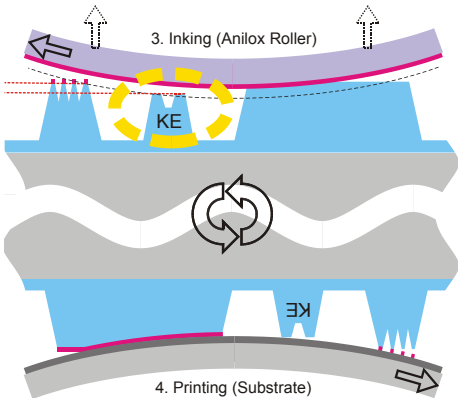
As illustrated by Pic. 4 the press operator will typically establish slight over-impression between Anilox roller and printing plate in **Phase 1** of press setup. He does so because he needs to make sure that every relief element is being inked up in order to become visible during the next phase when he establishes the impression engagement between (the now inked up) printing plate and substrate. This is a standard procedure and will only be eased up by the use of the DFTA KE 2.0.



*Pic. 4: **Phase 1** of establishing impression engagement: the Anilox roller will be engaged against the printing plate so that inking may be guaranteed safely >>> DFTA KE 2.0 will be inked mildly >>> printing plate may be engaged against the substrate so that the DFTA KE 2.0 just prints softly*

When now establishing the impression engagement between printing plate and substrate one may concentrate (solely) on the DFTA KE 2.0 (e.g. by zooming into it with the video web inspection). Impression engagement must be set such that the DFTA KE 2.0 just prints softly. In other words: If one were to release the impression engagement by about 10 µm only the DFTA KE 2.0 element would disappear from the print again. For safety reasons one may add an other 10 to 30 µm or extra engagement between printing plate and substrate.

In **Phase 2** of establishing impression engagement the press operator is being used to release the Anilox-to-printing-plate-



*Pic. 5: **Phase 2** of establishing impression engagement: the Anilox roller will be released until the DFTA KE 2.0 just does not print any more (due to an absence of inking)*

impression to a minimum, so that the printing plate will just be inked safely. This may be eased by using the DFTA KE 2.0 (single "micro dot") in that the Anilox may be released such that the DFTA KE 2.0 just disappears from the print. This is being illustrated in Pic. 5.

After these measures it is guaranteed according to the experiences of the DFTA Technology Centre that

- The impression engagement between Anilox roller and printing plate is slightly less than the engagement between printing plate and substrate, which ensures a permanent „running clean" of the printing plate (as opposed to running dirty by agglomerating ink in the reverses) and that
- Both impression engagement settings are optimized as much as possible (in case the „dominant micro dot" out of the 10 possibilities given by the raw DFTA KE 2.0 has been selected adequately in Step 1).

Disclaimer of Warranty

The DFTA Technology Centre as the initiator of the DFTA KE 1.0 may not be held liable for any usage of the DFTA KE 1.0 or collateral damage thereof. You may use the DFTA KE 1.0 at your own risk. Moreover, no demand for correct functionality of the DFTA KE 1.0 may be derived from its purchase or use, particularly when deviating from the processing conditions explained by this document or from the standard resolution of 2540 dpi.

The DFTA KE 1.0 may particularly not exhibit larger differences of height of the printing plate, the printing press components or the print substrate. For avoiding any print voids it is necessary to check the entire colour separation printer on press after the setup process that uses the DFTA KE 1.0.

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