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 DFTA RWBK 1.0

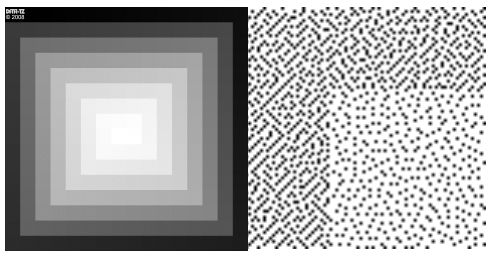
The document at hand describes the DFTA flexographic Anilox impression engagement signal element DFTA RWBK, Version 1.0, its goal, its application and its interpretation, as well as the benefits to be gained from it for the user.

Basics

In flexographic printing the press operator, amongst other things, has to set the impression engagement between printing plate and substrate, as well as the impression engagement between Anilox roller and printing plate. The latter may be handled substantially more precise and reproducible when using the DFTA RWBK 1.0. Moreover, through the utilisation of the DFTA RWBK 1.0 the running smoothness of the involved cylinders may be optimised through the specific setting of the Anilox roller particularly for the printing design at hand. Banding may be avoided much more safely and the print job at hand may typically be run at higher press speeds.

Description

The DFTA RWBK 1.0 has a quadratic shape with seemingly vignetting grey level patches from the outside to the inside in the shape of „staircase" from black to white. It will be delivered as a high-resolution file in bitmap format (1 bit file depth). Therefore it is a black and white image file that may be utilised by the platesetters in use throughout Flexography. In reality the pretended grey levels are formed by various densities of populations of single black pixels in the image file. There are 256 of these individual pixel patterns in total which have been arranged in the shape of the aforementioned „staircase".



Picture 1: the DFTA RWBK 1.0 (left), original size (at 2540 dpi imaging resolution), and an enlarged section of it (right) that shows the micro structures

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The original size of the DFTA RWBK 1.0 signal element is 32 x 32 mm at the standard resolution of 2540 dpi. This size may change in case the element is being output at different resolutions. It must, however, be indicated clearly that this large size of the full signal element will only be utilised in a single preliminary experiment. Thereafter all running jobs may be produced with a section of only 1 x 1 mm in size.

Potential Applications

The DFTA RWBK 1.0 may currently be used for the so-called digital photopolymer flexographic printing plates that work with Round-Top technology. It may be inserted into all digital workflows that allow for the utilisation of such bitmaps. If it is to be postioned inside the original file of the printing plate design it must be ensured that no alterations of the resolution may be carried out, neither deliberately nor involuntarily, throughout the import process or the further processing of the file.

Function

The DFTA RWBK 1.0 causes the deliberate perforation of the digital mask of the photopolymer printing plate that has been imaged with it to get the aforementioned pretended grey levels in spite of the fact that the utilised platesetters are not capable of producing true grey levels when outputting digital files. Through the simulated grey levels in the digital mask the DFTA RWBK 1.0 causes a more or less intense filtering of the UV light impact during main exposure. This respective reduction of the radiation that causes photopolymerisation in turn causes the respective grey level to gain a more or less reduced height level on the final printing plate. After full processing of the respective printing plate the DFTA RWBK 1.0 produces successively reducting surface heights towards its center.

This height reduction may be used in Flexo printing to visually indicate the actual setting of the Anilox roller impression engagement relative to the printing plate. This factor of the printing press setup is otherwise left to the talent and feeling of the press operator, because the print result is being predominantly governed by the other impression setting, namely the one between the printing plate and the substrate. If one manages to control the impression engagement between the Anilox roller and the printing plate, however, this yields the following benefits:

1. Visual control over the absolute amount of applied impression engagement between Anilox roller and printing plate (any surplus or deficit will be visible and may therefore be corrected immediately)
2. When placing a DFTA RWBK 1.0 element on either side of the web the parallelism between Anilox roller and printing plate may be checked visually very effectively and quick
3. A section of the DFTA RWBK 1.0 may be repeated along the web direction on the printing plate, thus indicating press vibrations through its reduced height very intensively. This may be used to set the impression engagement even more precisely so that the respective print job may be run at top quality and top speed at the same time.
4. The DFTA RWBK 1.0 may also be used as a very sensitive control element for the precision and repeatability of plate making over various printing plates and, most of all, over longer periods of time.

The aforementioned shape of the „staircase" will be only used for this preliminary experiment („Step 1"). During regular production a simplified and much smaller section of the signal element will be used.

Processing in digital Repro and Plate Making

1. *Check for the required resolution of the DFTA RWBK 1.0*

   The DFTA RWBK 1.0 will typically be delivered at an imaging resolution of 2540 dpi. If you are to use another resolution please approach one oft he employees of the DFTA Technology Center for help. Special resolutions are available for a moderate handling fee.

2. *Inclusion of the DFTA RWBK 1.0 into the Design File*

   The DFTA RWBK 1.0 will usually be imported as a bitmap in TIFF format into the original design file. It should be position and processed alongside the design file. Common RIP technology will usually not apply any alterations whatsoever if the resolutions of DFTA RWBK 1.0 and platesetter are identical (see before).

   It is important not to introduce any scaling during processing in order not to compromise the function of the DFTA RWBK 1.0 (dispro against elongation of the printing plate is an exception, see next).

   The DFTA RWBK 1.0 should be positioned into all colour separations at least one time for maximum benefit. In order to do so, the black and white bitmap must be coloured, i.e. the respective colour must be attributed to it virtually in software. It is advisable to position the DFTA RWBK 1.0 once on either side of the web per every colour separation in order to be able and check parallelism between Anilox rollers and printing plates effectively.

Picture 2: DFTA-TZ test target file including 4 each of the DFTA RWBK elements per colour printer

3. *RIPping of the Design File or Using the DFTA RWBK 1.0 directly as a Final Imaging File for the Platesetter*

   It is possible to use the DFTA RWBK 1.0 file directly for outputting it on the platesetter, though it will then not have integral relationship with the design file. Positioning the DFTA RWBK 1.0 inside the design file will then not be possible, which is why this case will rather be an exception.

   Usually, the original design file including the positioned DFTA RWBK 1.0 will be sent through the RIP and then onto the platesetter (see above). In that the DFTA RWBK 1.0 behaves to the RIP like a line work file - though coming at a very high resolution – the RIP will not carry out any undesired changes such as halftone screening on it. Next, the high resolution design file may be used for imaging digital photopolymer plates as usual.

A dispro of the design file in the RIPping process, meant to compensate for printing plate elongation, which does not go beyond 5% is currently being considered as non-problematic and may therefore be applied as usual.

4. *Plate Making*

Imaging of the digital flexographic photopolymer plates should be carried out under the usual high standards of consistency and reproducibility (see also the DFTA guide for making high-quality digital photopolymer printing plates for Flexography). Except for the usual optimum setting of the platesetter´s laser power balance there are no special measures required in order to be able to process the DFTA RWBK 1.0 successfully. It must however be warned against operating the platesetter in under power mode! The DFTA RWBK 1.0 will react to this lack of power much more drastically than the otherwise produced regular printing plates. Optimum laser power balance on the platesetter may be established and checked with the DFTA CtP control strip (version 1.3 or later) in a very simple and effective way.

With regard to the main exposure of the imaged printing plates particular care should be applied just as the aforementioned quality guide requests. Digital photopolymer printing plates do react to variations in exposure intensity in that they develop different amounts of dot sharpening, and compensation through longer exposure times is not possible! The DFTA RWBK 1.0 makes deliberate use of this particular effect, however, it therefore does react very sensitive to differences between various exposure devices or their status of ageing. Large differences between devices and ageing conditions will be made visible by the DFTA RWBK 1.0 very drastically.

The finished printing plate will show the DFTA RWBK 1.0 as an inside wound „staircase" of different heights of photopolymer. It is normal that the outer „rings", despite of the perforation of the digital mask, develop no height differentiation and that the innermost steps will only show the same height as the surrounding floor developed by back exposure.

Application in Printing: Step 1

When setting up the printing press with printing plates that include the DFTA RWBK 1.0 the press operators should NOT observe the signal element at all initially and just set up the press as usual. We do assume here that these particular printing plates are test target plates meant to generate a profile of the printing press (for use in a regular print job the DFTA RWBK 1.0 will usually consume too much space, see also Step 2).

Next the press operator should watch the DFTA RWBK 1.0 elements of one colour separation each at a time, in case there are several of them. A simple visual comparison will show the parallelism of the respective Anilox roller and printing plate combination. Corrective measures should be self-explanatory, considering the aforementioned consistency of the signal element with it's various heights. This process will be carried out one after the other in all involved printing decks.

Now it is the general amount of overall impression engagement that should be considered over the colour separations. In case they have approximately the same area coverage and kind of design they should require the same amount

Picture 3: printed results oft he DFTA RWBK signal element prior to harmonisation of Anilox-to-Plate impression engagement settings for Cyan and Magenta

of impression engagement. Test targets typically fulfill this condition. Larger differences between the prints of the various „staircases" in the colour separations which would indicate large differences in overall impression engagement should now be harmonised.

Caution! As has been shown in the press experiments done at the DFTA Technology Center the appearance of the „staircases" in printing depends very much on the quality and thickness caliper of the respective substructure behind the printing plate. Thickness tolerances, for example in the cushion mounting tape, may cause larger differences in the printed look of the DFTA RWBK 1.0, thus triggering the press operator to initiate false corrective action. It is therefore advisable to put 4 copies each per colour separation of the DFTA RWBK 1.0 onto test target printing plates. Potential thickness variations of the substructure will then typically change only one of the four copies and may therefore be recognised as such very easily.

Application in Printing: Step 2

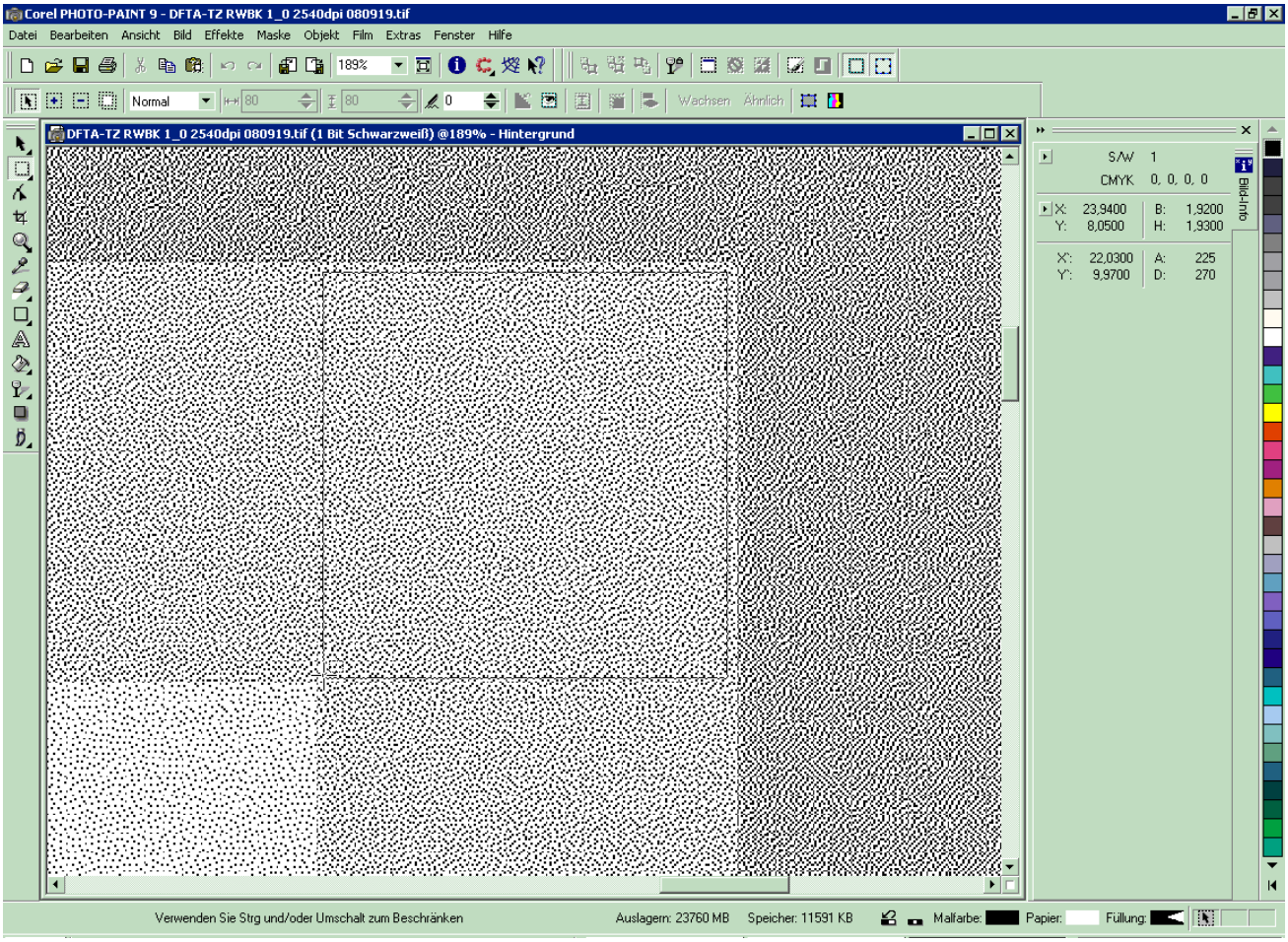
After having carried out the aforementioned press trials with the printing plates including the DFTA RWBK 1.0 there are a number of respective print samples available as shown in Picture 3. The outer rings will print like a usual solid whilst the innermost patches will usually not print at all. The target for further use of the DFTA RWBK 1.0 must be to select one of the intermediate patches in a meaningful way and to prepare it for utilisation in regular jobs.

In the following we suppose that the proof print of the colour Cyan, after having applied the aforementioned optimisation measures (achieving parallelism between the Anilox rollers and the printing plates of the various involved printing decks) has the look of Picture 4. In this case the last just printing edge in the part of the staircase is to be identified. In the case at hand this is the horizontal strip number five when counting from the bottom.

Picture 4: selection of a suitable section for further use in regular print jobs

The single patch that now must be identified should be extracted from the next higher line of grey levels (printing is somehow more dense). It has been circled in picture 4. As has been said initially the DFTA RWBK 1.0 composes of 256 individual patterns of pixels. Consequently, this line of grey levels carries seven different steps. These, however, are differentiated so subtly that their borders may only be visible under massive enlargement of the digital file in software. One of these seven patterns must be selected (their subtle differences justifies to pick ANY one of them).

The following extraction of the respective pattern for the chosen patch must be carried out in pixel based image editing program (such as Adobe Photoshop). Opening a respective mask and then masking off the surrounding areas of the DFTA RWBK 1.0 bitmap file produces the required section to be used in regular jobs. This should be saved under a separate file name and may from then on be introduced as the signal element into all regular jobs to be printed with the combination of printing plate material and processing equipment at hand.



Picture 5: selected patch must be masked off in the DFTA RWBK bitmap file (here Photopaint) and then saved as a separate file

The gained section of the DFTA RWBK 1.0 bears the greatest benefit for the end user if it can be repeated as a strip alongside the web direction of the printing plate, most effectively on either side of the web at the edges of the substrate. Through its reduced height these parts of the printing plate will touch the Anilox roller only very gently and will therefore be inked up just partially. The low-density print this particular patch originally produced when the full DFTA RWBK 1.0 was test printed is indeed desired for this entire strip(s).

In cases of placing these strips on either side of the printing plate along the web direction they will show the absolute amount of Anilox impression engagement as well as parallelism between the Anilox roller and the printing plate. Moreover, as the printed densities will typically vary up and down along the strips they will show the inevitable slight vibrations of the cylinders during printing. With this aid the pressman may visually check and vary impression engagement settings until arriving at an optimum of quality and speed.

On top of that the visualisation of impression engagements will enable the pressman to gain better experience about the variables of flexographic printing, such as the effects of various substructures

behind the printing plates, impression engagement settings etc, thus gaining better quality and productivity over time.

Even if the production job does not seem to leave any room for the positioning of the reduced height strips it is still advisable to use a single copy of the aforementioned section of the DFTA RWBK 1.0 on the outside of the printing plate similar to the micro dots often used for mounting the printing plates. This would at least indicate parallelism between the involved cylinders to the pressman, an information that may avoid many a print problem (such as excessive vibrations and horizontal banding in the print result, premature wear of the printing plate etc).

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