

Control device

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Instructions for use

Ugra/FOGRA Digital Plate Wedge

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Mitglied der



Otto von Guericke

Software Licence Agreement

The following is hereby agreed between
FOGRA Forschungsgesellschaft für Druck
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(Graphic Technology Research Association, a
registered non-profit association),
Streitfeldstraße 19,
D-81673 Munich, Germany

- referred to hereinafter as the licensor
- on the one hand –
- and
- the purchaser of the software
- referred to hereinafter as the licensee
- on the other hand:

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Subject of the contract

The subject of the present software licence agreement is the computer program (the software) recorded on the data carrier (the diskette). This also includes all updates of this software which the licensor subsequently makes available to the licensee. The licensor is entitled, but not obliged, to produce updates of the software at his own discretion.

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Licence

The licensor grants to the licensee, for the duration of the present contract, a simple licence to use the software on a single computer system at a location of his choice. If this single computer system is a multi-user system, this right of use applies to all the users of this one system. The licensee is permitted to transfer the software in physical form (i. e. stored on a data carrier) from one computer system to another, provided that the software is always used only on a single computer system.

On the other hand, the licensee is not permitted to transfer the software from one computer system to another via a network or a data channel. The licensee is not permitted to alter, translate, or – by reverse engineering – develop the software, or to produce packages derived from the software. In addition, the licensee is prohibited from copying, or from otherwise reproducing, the software either wholly or partially, whether in its original or in an altered form, or in a form which is mixed together with, or included in, other software. The licensee is permitted to create a single backup copy.

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The licensee is not authorised to transfer the licence to third parties, to issue sub-licences, or in any other way to render the software to be used by third parties, unless the licensor gives his express permission for the software to be transferred to the third party.

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The licensor makes available to the licensee a set of accompanying documentation in the form of a user's guide to the software which forms the subject of the contract. The licensee is not authorised to reproduce – in any way – either the entire accompanying documentation or any extract from it.

Article 6

Right of inspection

The licensee grants to the licensor the right either himself to carry out an inspection, or to cause third parties to carry out an inspection, of whether the licensee's contractual obligations are being observed at the licensee's premises.

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Should the data carrier which carries the licensed software be faulty, the licensee may, during a guarantee period of 6 months from the time of delivery, demand that a replacement delivery be made. For this purpose he must return to the licensor, or to the dealer from whom the software was obtained, the diskette, as well as any backup copy that may have been made, the accompanying documentation which was supplied to him, and a copy of the invoice or of the receipt. If a fault is not eliminated within an appropriate period by means of a replacement, the purchaser may, in accordance with his own choice, demand either that pecuniary remuneration be made or that the contract be cancelled.

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Limitations of liability

1. The licensed software is a standard package. Consequently, the licensor cannot guarantee that the licensed software meets the licensee's requirements. Moreover, he cannot in the nature of the matter be liable for ensuring that the licensed software is free of faults or that any faults that may exist can be corrected. As a result, the licensor is not liable for indirect damage or consequential damage arising from faults in the licensed software. The licensor's liability is limited to liability for fraudulently withholding information concerning deficiencies.
2. The licensor does not know of any third parties' rights which would impair the licensee from using the software. However, the licensor is not liable for the question of whether the licensed software is free of third parties' rights. If – with the licensed software being used in accordance with the agreement – any third parties assert rights against the licensee, the licensor will grant to the licensee, at the licensee's request and the licensee's expense, every possible assistance in defence against the claims being made against the licensee.

Article 9

Period of duration of the agreement

The agreement is concluded for an indefinite period. The licensee may at any

time give notice to terminate the contractual relationship, there being a six months' period of notice ending at the end of a calendar year.

Article 10

Contractual conditions

Both contractual partners may terminate the contract for specific reasons, particularly

1. if the licensee is using the licensed software on more than one computer system,
2. if the licensee inadmissibly copies the licensed software in any other way or
3. if a contracting party commits other breaches of an essential contractual obligation and a period of 10 days has elapsed after the issuing of a notice by the other party without effect.

Article 11

Rights after the termination of the agreement

1. All the licensee's rights to use the software which has been made available to him end when the contractual relationship ends.
2. The licensee undertakes - within one week of the contractual relationship coming to an end - to destroy the software which has been made available to him, to destroy any backup copy which may have been created, and also to destroy all the documents concerning the software, especially the documentation included in the delivery.

Article 12

Saving clause

Should a provision of the present contract be or become invalid, or should the contract contain a hiatus, the legal validity of the remaining provisions remains unaffected by this. Instead of the invalid or missing provision, a valid provision which, in terms of economics, comes the closest to the provision desired by the parties is deemed to have been agreed upon.

Article 13

Amendment of the Agreement

Any amendment to the present agreement must take written form in order to be valid. No oral agreements have been reached or will be regarding the present agreement.

Article 14

Place of jurisdiction, and applicable law

For purchasers residing outside Switzerland, it is agreed that the Patent Litigation Chamber of the „Munich I Landgericht I“ (Regional Court) is competent for all disputes arising from the present agreement. For this purpose the law of the Federal Republic of Germany is applied.

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Keywords:

Offset printing
Standardisation
Computer-to-Plate
Digital Plate Wedge

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How and when to contact FOGRA

Users of the Ugra/FOGRA Digital Print Control Strip (PCS) may require FOGRA's assistance if unexpected results or appearances of the the Ugra/FOGRA Digital Print Control Strip (PCS) occur. In these instances FOGRA will support the user as much as possible. However this support can only be granted to registered users of the current version of the control wedge. FOGRA can give only limited assistance to those using older or outdated versions.

FOGRA can be reached via

phone + 49 89 43182-0
fax + 49 89 43182-100 or
e-mail info@fogra.org

You can facilitate a quicker response by providing the licence number and user name (stated on the original diskette), along with your company name and contact person, on your initial request. In any case, please state the problem in detail. If it is related to unexpected output results do not hesitate to send in output samples for our evaluation.

Information about current versions of control means are published in FOGRA publications and can be found on the FOGRA homepage (www.fogra.org).

Acknowledgement

FOGRA and Ugra as the copyright holders of the Ugra/FOGRA PostScript Control Strip, and the Howson Group, U.K., expended significant effort to change the design to benefit the needs of computer-to-plate users. Mr. Dave Elvin of Howson contributed the design and did the test runs on plates to verify the desired impact of changes and modifications which were programmed by the author.

1 Introduction

Plate setters are complex processing units which need control methods to ensure that printing and print production are executed according to the accepted standards of the graphic arts industry. One of the most successful and well-regarded tools for insuring quality of output systems is the Ugra/FOGRA PostScript Control Strip. For many users it has become an indispensable tool for monitoring prepress system functions. Since its appearance in 1990, many changes in the prepress area have taken place and the control strip has undergone modifications to suit new needs.

The rapid introduction of computer-to-plate systems showed that further modifications were required in order to secure optimal plate exposure. It soon became apparent that a new control device was required, the Ugra/FOGRA Digital Plate Wedge. The data for the control device consists of four different files which produce output results for the process colours C, M, Y, K. The Ugra/FOGRA Digital Plate Wedge – to be addressed in the following text as DPW – is available in the RPS as well as the PDF file format. Fig. 1 shows the DPW for a single colour, which is represented here in black.

2 Contents of data carrier and legal conditions

2.1 What can be found on the data carriers?

The data carrier supplied (CD-ROM) four files which produce one representation each of the DPW on the pertinent printing



Fig. 1:
Ugra/FOGRA Digital Plate Wedge.

forms for the process colours C, M, Y, K. When the data carrier is received, please make sure that both files are present and that the user name is correct. If there are any errors or omissions, please contact your supplier or FOGRA immediately.

The DPW will be supplied either formatted for Macintosh or Windows operating systems. The Macintosh file system splits files into data and resource forks. Since DOS or Windows Systems do not support the resource fork of Mac file systems, these two versions are needed for the EPS version of the digital plate wedge. This does not have any significance for DOS or Windows users as this folder contains information for the Mac operating system only. This folder secures a file exchange with Mac systems and contains the required data for the resource fork.

2.2 Terms of legal use for the Digital Plate Wedge

In conjunction with this documentation, the contract terms (licence agreement) and conditions for the legal use of the DPW are presented.

Please note the following:

The supplied version of the DPW is solely a single user version. Therefore, its use is not permitted simultaneously in a computer network, or on more than one computer system. In large corporations where several persons need to use the DPW at the same time, a licence must be obtained for each user. For corporations where service personal, sales people and technicians require this wedge for demonstration purposes or for field services, each user must also be supplied with a personalized, individual

licence for the DPW. It must be made clear to all users that the passing on of the DPW as a source code, as individual files, or as retractable components of a document is not permitted.

Occasionally, FOGRA receives requests for technical support relating to problems involving use of older versions of the DPW. Due to changes in the workflow the source code will be adapted to those changes. Users will be notified of these changes in press releases, on the FOGRA internet home pages and by FOGRA publications. Please note that FOGRA will not give support to users of older versions of the DPW.

Any re-engineering, modification or extraction from the source code of the DPW is not permitted. Any such action is a violation of copyright laws and may result in legal action. Sales, passing-on, or copying for any other purpose than making a back-up copy are violations of the contract terms and are an offence under the copyright act.

3 Description of the Ugra/FOGRA Digital Plate Wedge

The DPW consists in the EPS as well as the PDF version of four files, one each for the cyan, magenta, yellow and black printing formes. The following description will always refer to the output for the black printing forme which, of course, should be identical to those on the other three formes. The DPW EPS Version can be sent directly to plate setter but most commonly the EPS file is used as a mark in page impositioning programs.

The method of application for the PDF version is in conjunction with the Acrobat Reader. The

Acrobat Reader treats the PDF file as a PDF document and the DPW is then sent directly to any PostScript or PDF plate setter.

Please note: All files of the DPW (EPS and PDF) show identical output results when sent to the same output device with identical output parameter settings.

The DPW contains six groups of control patches and targets that help to establish and maintain a desired plate setter exposure. If the plate setter is set correctly the control images will be evenly rendered. A good example for this can be seen in Fig. 2, which shows an exposed thermal plate. Note that the resolution targets, the geometrical diagnosis and chequerboard patches and the visual reference steps (VRS) are all rendered in a balanced way. Details will be given in Section 4.3.

3.1 Information section (Fig. 3)

The top line contains from left to right: the user name, the licence number, the name "Ugra/FOGRA Digital Plate Wedge", its version number (e. g. 2.4), the colour, and the copyright statement. This information is part of the source code and hence is permanent. The user name should show the name of the licensee of the software (See Fig. 1). Immediately after the DPW has been delivered, please ensure that the user name has been entered correctly. If there are any errors or omissions, please contact your supplier or FOGRA immediately.

Please note that by use of a PostScript interpreter or by Postscript conversion into other file formats **the information**



Fig. 2:
Plate image with
well-balanced re-
sults.

patch is pre-determined. This means that **the actual information available at the time of output generation will not be used**). Consequently, it shows only the information selected by that **interpreter**. In general, the information statements of this patch work properly with all output devices and are one of the main features for documentation of workflow and output.

The remainder of the information section contains three columns which are all interactively queried by the DPW. They reflect the current parameter settings at the point of processing by a RIP and the name of the output device.

In the left-hand column the current screen frequency (in cm^{-1}), the maximum memory space of the RAM and the disk of the output device (where applicable) are shown.

The middle column may show the overflow of the user name. It further lists the screen angle, the free memory space of the RAM and the disk of the output device (where applicable).

The right-hand column-first gives the name of the output device (e. g. "LaserWriter Plus") to which the DPW was sent. The name appears in different forms depending on whether a hardware or software RIP was used. The PostScript level is displayed on the second line. The next line shows the version of the installed PostScript RIP (e.g. "PostScript V.2014.108"). The last line shows the nominal recording resolution of the output device in dpi (dots per inch) and, after the slash,

the corresponding nominal recording line width in μm ($1 \mu\text{m} = 0.001 \text{ mm}$). For conversion into the metric system, divide by 2.54. Thus, 1270 dpi means 500/cm. The actual recording line width is the reciprocal, i. e. $0.002 \text{ cm} = 20 \mu\text{m}$.

3.2 Resolution targets (Fig. 4)

The actual resolution may differ from the nominal resolution in almost any electronic exposure unit. The term „resolution“ is not clearly applied in practice. When it refers to individual dot resolution, it is a measure of the size of the smallest depictable dot in a printing system. But the word „resolution“ also refers to the width of an additional exposure line in an electronic output system. This width might better be described as „recording resolution“. It is obvious that the individual dot resolution can be increased by technically feasible means of partial overlapping of single dots. This can be done while the recording resolution remains constant.

For the resolution target it is necessary to distinguish between the resolution of lines and dots. The former is tested with the resolution targets and the geometrical diagnosis section whereas the latter is assessed with the chequerboard patches.

It is obvious that under idealised conditions the line and dot resolutions should be equal and independent of line orientation or whether

the line or dot is "negative" or "positive". The actual line and dot resolutions achieved under practical conditions may be quite different and notably less fine than the nominal recording resolution as stated in the information section. This is quite normal and of no concern as long as the fine lines and half-tone dots of the subject matter are adequately rendered. Note that in conventional plate making the normal exposure is distinctly different from the exposure for optimum resolution.

The resolution targets are programmed so that each ray radiates from the lower left-hand corner for positive lines and the lower right-hand corner for negative lines. The rays begin at the horizontal (0°), and each subsequent ray is advanced by 1° , until the vertical edge is reached at 90° . In each case the width of the rays is equal to twice the nominal line width of the plate setter. The width of the positive rays in the right hand target is twice the nominal recording line width, the same applies to the negative ray in the left hand target. Both targets are labelled with the dpi resolution. For conversion into the metric system, divide by 2.54. Thus, 1270 dpi means 500/cm. The actual recording line width is the reciprocal, i. e. $0.002 \text{ cm} = 20 \mu\text{m}$.

The nominal resolution is stated in the information patch. The purpose of the rays in the resolution patch is to give an indication of the actual resolution achieved by the output unit. It is also intended to provide a reference for the extent to which the reproduction of a thin line changes as a function of the angle. The extent of the step effect can also be assessed

U. Schmitt FOGRA Munich 1998	Winkel: 45.0 Grad	Mac Distiller
Raster: 23.622 L/cm	Frei: 20190 KByte	PostScript Level 2
RAM-Memory: 20480 KByte	Free Disk: 0 MByte	PostScript V. 3010.106
Diskmemory: 0 MByte		Resolution: 600 DPI / 42 mv

Fig. 3:
Information section.

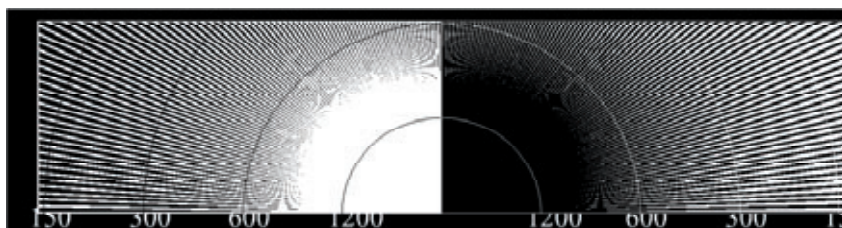


Fig. 4:
Resolution targets, enlarged.

visually as a function of the angle.

In general, the higher the recording resolution of the exposure unit, the smaller the radius of the half circle where the positive and negative lines merge. Accordingly, the radius of the half circle is very small in high resolution units, while in relatively low-resolution units it is comparatively large. Many factors are involved in the image-generating process and various methods of exposure have an effect on how the radius of the half circle is generated. These factors may include: incorrect exposure, a photographic process which has not been suitably adjusted, or excessive toner in the electro-photographic printing systems.

The size of the radius of the half circle can thus serve as a reference value for the actual resolution of the output device. To support fast visual identification of the actual resolution there are help lines included in the new form of the resolution target. These help lines are indicators for the different resolution values at 1200, 600, 300 and 150 dpi. The help lines are not solid but instead have a 50% tone value which makes it possible to identify the lines at low resolution (in the dark half circle) as well at high resolution (in the white areas between the rays)



Fig. 5:
Geometrical diagnosis section.

3.3 Geometrical diagnosis section (Fig. 5)

There are six columns with geometrical diagnosis patches. A variety of faults can be detected from the way the lines are rendered. The sizes of the lines are preset in terms of the nominal recording line width. Accordingly, the appearance of the lines on the plate depends on the setting of the nominal recording resolution of the plate setter or its equivalent at the point where the data was processed by a RIP.

The first two columns of the diagnosis patches contain lines which represent a 50 % tone value (under optimal conditions), the line width corresponds to one (column 1) or two (column 2) nominal recording line widths. The lines are arranged horizontally in the first column and vertically in the second.

In columns 3 to 6, positive and negative lines are displayed, both horizontally and vertically, spaced at an interval of twenty-four times the nominal recording line width. The top row shows lines with the



Fig. 6:
Checkerboard section.

nominal recording line width (for example 10 μm at 2540 dpi), the lines of the bottom row are double that size.

3.4 Checkerboard section (Fig. 6)

The square image elements of these three control patches form checkerboard patterns. As indicated by the numbers above each patch, they consist of black and white squares whose sides are programmed as one, two or four nominal recording line widths. Due to the checkerboard pattern, the screen angle is 45 degrees.

In general, the lightness should be as close as possible to a tone value of 50%, but exposure unit adjustment, type of material used and the development process may cause deviations. The checkerboard patch is intended to give general information about the combined components. If an exposure unit is functioning perfectly, the visual impression of all three patches should be the same.

3.5 Visual Reference Steps (Fig. 7)

The eleven visual reference steps (VRS) consist of rectangles filled with a 4 x 4 checkerboard



Fig. 7:
Visual Reference Steps – VRS.

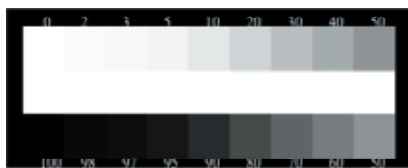


Fig. 8:
Half-tone wedge.

set against a background tint whose tone value increases from the left to the right in 5% steps. The nominal tone values are of 5% tone value step starting at 35% (VRS1). The VRS serve as a quick visual check of the exposure condition, see Section 4.3.

3.6 Half-tone wedge (Fig. 8)

The twenty-step half-tone wedge is used mainly for determining tone value transfer characteristics and their reproducibility from day to day. It consists of two rows with 10 half-tone dot screen patches each. The centre row is a solid. This provides an opportunity to read both the solid and the background next to the half-tone patch in question. The tone values programmed in the half-tone wedge are labelled next to the control patches. No particular screen frequency or screen angle was preset, since these depend on the setting of the PostScript RIP. The latter uses the screening parameters which are set in the device.

4 Application of the Ugra/FOGRA Digital Plate Wedge

4.1 Import of the file

The data carrier contains four PostScript EPS files for the DPW. There is one file each for the process colours C, M, Y, K.

Please note: The files should not be opened directly or altered

in any way. **Do not double click on the icon representing one of the files.** The files should not be altered by any means, this includes changes due to the use of editors or other application programs. Opening the file and/or editing will result in changes to the file structure and source code, which may cause unexpected and undesired output results. The indication and control capabilities of the wedge may be severely affected or even inhibited by such changes. Therefore; the files of the DPW should only be imported and placed in application programs by using the functions of these programs. Rotation by 90° is permitted.

The DPW is not intended to but can to be used for direct output (download) on a plate setter. This might be desirable when a reference output for a specific setting or material/plte setter combination is needed. But one has to bear in mind that with a direct output a whole plate set will be processed and the DPW files will be the only content. The most common use of the DPW is by an output when the files are integrated within a document or placed as sheet marks and then are sent with page or sheet parameters. Loss of output quality due to variation of output parameters and settings can be detected with the DPW.

If the DPW is integrated in a document page by use of a page layout software an importation of the EPS file can be initiated by commands such as "Position" in the "File" menu or by opening a marked field, plus the command "Picture import" in the "File" menu..

4.2 Restrictions with some application programs

As an EPS file, the DPW can be imported into many application programs. During document preparation it will undergo every modification the document is subjected to during the processing steps. However, this is not the purpose of the DPW: It was developed for setting and monitoring the output of a plate setter; it can only function properly if its size and other parameters remain unaltered. Therefore, any changes other than a rotation by 90° or multiples thereof are strongly deprecated.

We recommend the use of the DPW with page layout, sheet pagination and signature programs, and only for the output on high quality, high resolution plate setters.

The DPW may be used with all non-periodic screens except the Ugra/FOGRA Velvet Screen. Importation of the DPW into the Ugra/FOGRA Velvet Screen program and transformation into a Velvet Screen file are not possible. Velvet Screen can only process pixel-oriented pictures as generated by scanners. Since the DPW is mainly based on vector oriented data and procedures, and cannot be imported.

4.3 How to optimise the resolution of lines and dots

The general aim is to achieve a balanced rendering of the positive and negative lines and line patches and not more than modest differences in the chequerboard patches. This will ensure that fine details of the subject are well rendered and that vignettes show no breaks.

The geometrical diagnosis

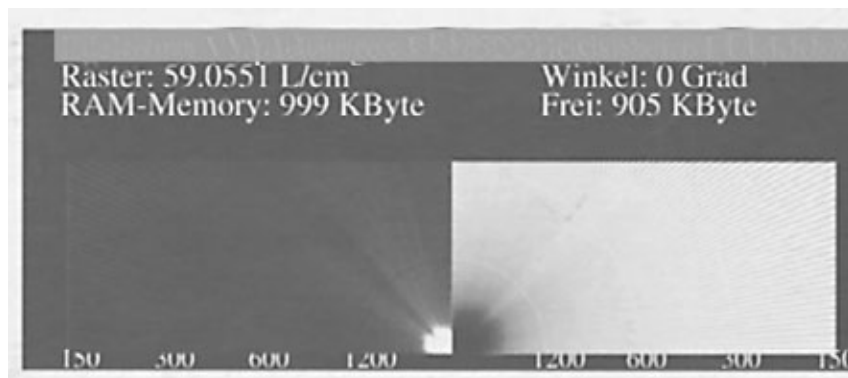


Fig. 9:
Plate image with unbalanced resolution targets.

and the chequerboard patches are particularly sensitive to variations in laser intensity and spot size. Therefore, these patches can be expected to show a tone value that noticeably differs from that of the other patches.

At the optimum setting, the patterns in the resolution targets should represent quarter circles of the same size, see Fig. 4. If this is not the case this might be due to different reason. For example the laser spot may be elliptical, there might be a contamination or dusting of the optical path and/or the intensity may not be properly set. If the pattern is elliptical, this directional imbalance should also produce a marked difference between

the vertical and horizontal line patches of the geometrical diagnosis section. In Fig. 9 an example is shown for an overexposure and a directional dependence. The positive line pattern extends much further than its negative counterpart. From the scale given below the targets, an approximate figure for the actual line resolution, may be read in dpi. For conversion into the metric system, divide by 2.54. Thus, 1270 dpi means 500/cm. The actual recording line width is the reciprocal, i. e. 0.002 cm = 20 µm.

4.4 How to assure correct tone value transfer

Process control demands that the tone values of the subject data file be transported onto the printing forme, and subsequently onto the print, in a predictable way. Furthermore, a printer who is using direct exposure on a plate setter is usually expected to produce results which match those of the conventional production chain. Therefore, the so-called linearisation procedure of the plate setter has to be arranged in such a way, that the tone value increase from the data file to the print is equal in both cases. The tone value of a data file is understood to be the tone value that would have been produced by the usual 1:1 transfer on to a positive film, as specified by ISO 12647-1 [1].

If the job data file supplied by the reproduction company was intended to be used with positive films and positive plates, the tone value increase pertinent for that process should be used as the reference. The same applies to jobs for the negative process. Internationally recognised tone value increase figures are specified in ISO 12647-2 [2], they are virtually

Tone values of data file	10	20	30	40	50	60	70	80
Control patch of wedge on film	10	20	30	40	50	60	70	80
Print with conventional plate	23	43	58	71	81	88	93	96
Print with laser plate	24	45	61	75	86	92	96	97
Difference	-1	-2	-3	-4	-4	-3	-2	-1

Tab. 1:
Tonwerte im Vergleichsdruck (in Prozent).

Data in	0	10	20	30	40	50	60	70	80	90	100
Data out (to platesetter)	0	9	18	27	36	46	57	68	79	90	100

Tab. 2:
Korrekturtabelle auf Grund des Vergleichsdrucks von Tab. 1 (in Prozent).

identical to those of the standardisation according to BVDM/FOGRA [3].

In the following, a procedure is given for adjusting the tone value increase of the plate setter work flow to that of the conventional process. This procedure has to be applied before the data is sent to the RIP.

A single-colour digital test forme is prepared with an even distribution of subjects across the format. This is complemented by a DPW and a control strip such as the FOGRA Digital Print Control Strip [4]. The data file of the test forme is used for a conventional output on film and a direct output on a laser plate. The tone values of the control strip on the film are carefully measured to ascertain that they agree to those labelled above the control patches. If not, the film has to be corrected. It is then used in a vacuum frame to contact-expose a conventional printing plate under standardised conditions such as given in [5] or ISO 12218 [6].

After processing, both printing formes are printed on the same press unit under exactly the same conditions on the same paper. Either the formes are printed in immediate succession or, even better, they are cut in half and printed side-by-side on the same forme cylinder. The two prints are compared by entering the measured tone values of the DPW in a table, see table 1. On the basis of this table, a correction table (look-up table) is produced, see table 2. It shows how tone values that are inputted into the plate-setter system should be corrected by linearisation in order to yield results that are identical to conventional plate-making.

The success of the operation is

checked in a second print test, where the conventional plate of the first test is compared to a second laser plate that has been produced using the linearisation table generated in the first test. It is important to measure (before printing) the tone value in the mid-tone control patch of the print control strip or the DPW on the new laser plate and save it for further reference. In addition, the VRS number read from the laser printing forme is also recorded.

If the tone values of the prints by the conventional and the laser plates agree within a margin of $\pm 2\%$, this is deemed acceptable. The VRS number and the tone value measured on the laser plate are then used as the aim values for the following plate production. Needless to say the densitometer measurement should be made in exactly the same fashion every time.

If the agreement is not satisfactory, however, a new correction table is required.

As mentioned before, the tone values measured on some laser plates (particularly the silver halide variety) may be appreciably higher (5 % is typical) than those that one would expect from their printing behaviour. No Yule-Nielsen factor can safely remedy this situation. Therefore, the measured tone value is to be regarded as a relative number, used only for checking the reproducibility of the platemaking process. In some cases it is well known (and confirmed by the manufacturer) that the value measured on the forme is indeed the one that prints. Only in this case may the value be regarded as absolute. For the screen frequency of 60/cm and positive plates it should then be around 36 % to

37 % and for negative plates 43 % to 44 %, see [5] or ISO 12218 [6].

Research at FOGRA showed that, under normal printing conditions, the tone value increase from the printing forme to the print is practically independent of the plate type. Thus, identical tone values on the print means identical (printing) tone values on the printing forme.

4.5 Measurement on the printing forme

There are certain difficulties in determining the printing tone value of a print forme by a densitometer or a image analysis instrument. The reading may depend on:

- orientation of the instrument with respect to printing direction;
- method of gum application;
- spot used for zeroing of the instrument;
- pre-exposure of the plate or printing forme (to daylight, etc.);
- type of laser plate;
- size of the measurement aperture.

The measurement is carried out as follows: Adjust the instrument on the reference material according to the instructions. If the instrument provides an option for setting the slope and/or the Yule-Nielsen factors, set both to 1.00. Now select the colour channel that provides the greatest density difference between the non-printing and the printing areas. Set the instrument to zero on the non-printing area next to the half-tone patch to be measured. Read first the value of a nearby solid printing area, then that of the half-tone patch.

If the proper densitometer mode has been selected, the instrument will now show the tone value. Densitometry on the printing forme yields reliable relative values for process control on a day to day basis, but it may not always provide the correct absolute printing tone values. On some silver halide technology plates, densitometer readings tend to be up to 5 % higher than what will actually print. Therefore, on those plates actual tone values can only be established by a print trial or test print run, see Section 4.4.

5 The PDF and EPS Versions

With the introduction of the PDF file format, there have been significant changes in the PostScript based workflow. This is because new programs, process steps and many new parameters are needed while at the same time many PostScript specific functions are not available with the PDF file format. Due to the changes users are quite often confronted with inappropriately generated or faulty PDF files. In addition, there is a wide spread uncertainty if "good and sufficient" output quality has been achieved in the PDF workflow. Here the EPS file of the DPW is not of significant help anymore as the interactive functions are lost in the course of an EPS to PDF transformation. It is quite reasonable that users have requested a new control device which is adequately adjusted to the PDF workflow. Here the DPW in its PDF version is the first interactive, intelligent control device for the PDF workflow.

In general, when a PostScript file is converted into a PDF

file all interactive functions of PostScript are replaced by values or statements of the PDF file format. This means that information queries to the system or the output device (e.g. actual resolution at time of output) are replaced by settings when the PDF file is generated (e.g. 150 dpi resolution as a parameter which is defined by Acrobat distiller settings). With the EPS file of the Ugra/FOGRA Digital Plate Wedge, these parameters are documented and can be used for quality assurance. In addition, the actual parameters of the output device are needed as well. This is achieved by the DPW PDF file which is added to any PDF document and records the parameters used at time of output.

Modern sheet pagination programs support placement of PDF control strips (via positioning or control mark options). Therefore the PDF file of the DPW can be used in conjunction with the program and for the evaluation of any output device.

6 Use of the PDF version

With the availability of the three files (EPS, PDF) it is possible to evaluate a PostScript and PDF workflows. The PDF version is used whenever a file transfer or data exchange in the PDF file format is performed in a production process and direct output to a plate setter of the PDF document files is intended. The PDF version consists of the actual PDF file (with a file name ending as "PDF"). The PDF version can be used in two different ways which covers two different aspects of quality assurance in the PDF workflow. First, the

actual state of an output device can be documented. Secondly, the output result of the PDF file is used as a reference for comparison with the EPS file or a PS download or a previous PDF file output result. This enables the user to detect loss of quality in any form of PDF workflow or PDF work procedures.

The first aspect of the use of the PDF file is primarily to document the output quality of any output device without interference of additional software parameters defined by regular application programs allowing PDF integration. Direct output (via Acrobat Reader) enables the user to check the state of calibration, adjustment or wear on output device components.

Please note that a direct PDF file output always documents the state of an output device. This means that a direct output is helpful in comparing newly achieved output results with previous output results. In addition achieved direct output results can also be used to evaluate new materials (paper, toner, film, development chemistry ...).

The second aspect of quality assurance is achieved when the PDF file is merged with existing PDF documents and then sent to any output device. This also documents the state of quality of an output device and is the documentation needed for the user that generated the output in cases of complaints about the document output quality. In these instances it can easily be detected if a PDF document was generated inappropriately or if the output device was of inadequate quality. If an EPS file is included in the document and went through the transformation into a PDF

file, the parameters used for the transformation are documented in the EPS file output results.

Comparison of EPS and PDF file output

Under ideal circumstances, a visual comparison of the EPS file output result with the direct output results of the PDF file (via Acrobat Reader) reveals no deviation between both output results. In this case a user has documented proof that from the first import of the EPS file until the output was generated there was no resolution dependent loss of quality. It is the "OK criterion for the workflow. If a variation or deviation between the two output results is detected, it is necessary to evaluate the various patches and targets in detail. Additional EPS file outputs and/or test runs may be necessary to reveal the true causes and source for loss of quality or detected deviations.

7 Literature

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