

## Print control strip

### Printing quality – Positioning the print control strip properly for sheetfed

“The print control strip is put where there is room!” This quote is often heard in the industry but is actually contradictory to the quality demands of today. Unfortunately the print control strip is often regarded as a necessary evil which has to be given plenty of space on an expensive print substrate. The following text is not only intended as a plea for the right selection of the print control strip position but is also intended to promote it as a particularly helpful means for high-quality print production.

### Quality requires measurement fields

Quality requires print control strips, since high and reproducible quality can currently only be achieved during the offset process by using a color measurement and control system with continuous print control strip. The results achieved when controlling a printing machine with a CMYK image without a print control strip are unsatisfactory due to the usual process fluctuations. This procedure can be regarded purely as a marketing argument. Unambiguous information on the full-tone coloration and tonal values per zone can be provided by using a print control strip with representative measurement fields. By large measurements in images are only recommended in addition to process monitoring in the print control strip and not as a substitute for it (bvdM publication “Measuring during preliminary stages and printing”, page 73). The full measuring speed, the highest control quality and consequently the highest productivity of the printing system can only be achieved by measuring continuous print control strips.

The reference fields of the print control strips for grapho metronic measurement systems only have a width of 3 mm and height of 4 mm. As a result, there is not only a number of control fields and additional quality diagnostics fields per zone (30 mm) in the strip, the paper requirements are also very low. Measurement fields which are even smaller are not recommended, since the representative area for measuring values would be too small.

Analyses of reference fields of larger dimensions (e.g. 4 mm wide x 7 mm high) show fluctuations in density within these measurement fields, depending on the measuring patch size in relation to the height of the field. The measured inhomogeneity within a measurement field is the reason for fluctuations in density during reproducibility measurements. This spread is reduced by averaging the measured density values in a measurement field. The quality of a measurement system can be determined by the number of measured values per measurement field. With its measurement systems, grapho Metronic measures up to 24 density values in every 3 mm wide measurement field in order to determine the average.

### Affect of printing malfunctions on color control

With offset printing, continuous print control strips are usually positioned at the centre of the sheet or at the edge of the printing plate. The advantages and disadvantages of different machines of different manufacturers make it impossible to make a clear decision for or against the front or rear edge, however a research report by FOGRA has provided concrete information on the correct strip position (FOGRA research report no. 3.280, page 14): “With large-sized machines, thin paper is often offset irregularly and this effect is, of course, increased in the direction of the printing end. The best position is at the print start if you wish to control the machine regardless of these sporadic malfunctions, which are barely able to be influenced by the printer.” Not only in large formats, but also in medium-sized and small formats and even with stable types of paper, the sheet end can unevenly peel off the printing

blanket, resulting in sporadic doubling, in particular with smooth types of paper and a high absorption of ink. "This effect can be reduced considerably if the strip is mounted at a distance of about 1 cm to the sheet end." A strong argument against positioning the print control strip at the rear edge is if screen information has to be queried. Pressure malfunctions and therefore unrealistic results are caused by pushing and doubling in particular with raster fields and also with grey balance.

Furthermore the paper format tolerances have an affect on the rear edge of the sheet. An important feature of the grapho metronic measurement systems is the automatic track search mechanism which can be used by the color density measurement system to automatically find the print control strip and follow its course along the sheet width. Large cut tolerances at the rear edge of the sheet however, can result in the measurement strip being positioned at a considerable slant and the measurements being terminated.

It is therefore clear that the print control strip must be positioned at the front edge. Unfortunately there are also some constraints here however. Problems can occur at the front edge of the sheet due to dirt caused by the line structure, powder or ink, in particular if the rubber blankets are of poor quality. The issue of dirt is of particular significance for cardboard printing (at the rear edge too of course). The measured values should also be treated with caution if the ink transfer is faulty at the start of printing.

## The position of the print control strip depends on the postpress

The question of where to position the print control strip depends primarily on the postpress. Print control strips are often not used for package printing, based on the argument that the increased material consumption would result in unacceptable costs. If one assumes that, depending on the model, punching machines can only be applied 12 to 15 mm away from the front edge of the sheet, but printing begins at 10 mm, an additional space of only 1 to 4 mm has to be taken into account for the print control strip at the front edge of the sheet, as opposed to the 6 mm generally assumed. This additional material consumption is usually redeemed by saving material and machine time during the set-up procedure. For the construction of punching die moulds, the position of the print control strip can be taken into account step-by-step when replacing punching die moulds from storage.

With job printing, the print control strip is positioned according to the folding pattern used and depending on the sheet format. In the 0B format (printing plate with 4 pages lying down) print control strips can only be positioned at the centre of the sheet if the (A4) printed product is bound with glue. In 3B or larger formats with printing plates with 8 or more upright (A4) pages, there is usually a folding space of 10 mm or even 12 mm at the centre of the sheet or at the front of the sheet, perpendicular to the printing direction. A 6 mm high print control strip can be positioned in this folding area, although in this case there must always be a seam overfilling of at least 2 mm above and below the print control strip. In such cases print control strips can be used in standard printing patterns without additional material consumption even with standard paper formats such as 63 cm x 88 cm.

## Ergonomics and standardization

Overall it has been established that the print control strip should be positioned as far away as possible from the edge of the paper, which means the centre of the sheet is the best position. At space requirements which are often only 6 mm in printing direction, the intended off-cut is usually sufficient. "Ergonomic measuring" is another argument for using the front edge instead of the rear edge if this position is not possible due to the printing job or the measuring system is only able to measure strips at the front or rear edge. The print control strip must also always be able to be evaluated visually. With large formats this is not exactly made any easier in day-to-day productions if the print control strip is at the rear edge and therefore relatively far away from the observer.

The following must also be taken into account if the aspect of standardization also has to be considered for the correct print control strip position. The strip should always (for all jobs) be at the same position to prevent the influence of any significant dependence on positional fluctuations (within a color zone). The ink decrease in the printing direction, due to the roller set-up, can be influenced by the lateral trituration, but differences in density can still occur between the front and rear edge with the according constellation.

Several factors should therefore be observed for the selection and the positioning of the print control strip. Additional paper costs can be caused by using of a print control strip, but they are surely paid off by higher productivity and fewer customer complaints.