



## Who defines the standard?

Felix Brunner

### The Development of Standardization in Printing and Prepress

***Various interest groups attempt to define standards: market leaders, technical colleges and research institutes, industry associations, suppliers, large customers. But since 1970 the real history of standardization has been written almost solely by System Brunner. And the reason is that System Brunner concentrates more resolutely than anyone else on researching the processes of print technology.***

Standardization was originally restricted to solid ink densities and dot gain. However, in the course of the last 30 years, quality expectations in the printing industry have risen across the board and as a result standardization has gradually been expanded to include other influencing variables.



The 2<sup>nd</sup> (1973) Print Control Strip System Brunner for checking dot gain, color balance, solid ink density, trapping, highlight dots.

### The sequence of standardization

Before an influencing variable can be standardized, it must first be **identified** as such. This may sound banal but it is not. On the contrary, events of the past have shown that identification is a long process which is not yet concluded.

After an influencing variable has been identified, its importance for the overall result must be properly **assessed**. The different influencing variables in printing are by no means equally important. Dot gain for example is more important than solid ink density.

One of the next steps is to **differentiate** certain influencing variables from others e.g. make a distinction between mechanical dot gain and optical dot gain.

An important step is to make the influencing variable **measurable**. A prerequisite for this is the availability of suitable **measuring methods**, mostly combined with appropriate *measuring instruments*; if not then these must first be developed or existing instruments improved.

The development of suitable **measuring elements** has proven to be very effective and System Brunner has been and still is very active in this area.



After actual measuring follows **processing of the measured values** e.g. calculation of the halftone area coverage based on solid ink density and halftone density. The processed measured values should be clearly presented to make it easier to compare and interpret them.

When discussing results, sooner or later the question crops up: good or bad?, correct or false? Who has the competence to answer this question – the printer, the plant manager, the customer? To get away from subjective opinions, this can only be done by a widely-recognized industry standard.

And **Eurostandard System Brunner\*** meets this criterion.



*Already in the seventies, the Eurostandard reference values for dot gain (coarse screen / fine screen method) were regarded as the benchmark, simplifying the color matching between proofs and printing results.*

## Chronology of Standardization

1968 Led by the EMPA, the European printing ink manufacturers redefine the color locus of the process colors cyan, magenta and yellow with the aid of colorimetric values. Prior to that the process colors were defined by pigments. The new scale was called **Euroscale** and replaced the then customary DIN and KODAK scales. It was presumed that with defined color loci, solid ink densities, and paper white, color reproduction in halftone printing would be sufficiently under control (Prof. Fink, EMPA). The new scale relieved the manufacturers of having to work with prescribed pigments which could have very different prices and properties.



In the same year Felix Brunner develops his first print control strip at the Fontana & Bonomi photolithographic studio in Milan and has the first prints to use it produced at the printing plant Druckerei Winterthur AG.

Felix Brunner recognizes that controlling color loci and solid ink densities is by no means enough to bring the printing process under control. He identifies the primary cause of variations in printing to be **dot gain fluctuations in on-press proofs and the production run.**

- 1969 Felix Brunner develops the **coarse/fine screen** method to quickly and easily determine dot gain from the density difference without needing logarithmic formulas.
- 1970 STANDARD OFFSET System Brunner based on measurement of the density differences between coarse and fine screen patches.  
**First standard** for prints and proofs; 1/10-rule for coated papers, 1/7-rule for uncoated papers.
- 1972 Printing of finely graduated color charts for visual presentation of color tolerance ranges in printing. It is observed that the number of color fields that can still be described as "gray" is very limited. It is realized that the technical variations in the printing process are firstly, and particularly, discernible in chromatically constructed gray tones. This leads to **gray balance** priority.
- 1973 Development of micro measuring elements; patent. This was followed by the first proposal for **standardization of platemaking** incorporating microlines.
- 1975 **Eurostandard Offset test form** with the "gray display screen" over the entire image area to encourage the printer to aim at having the same color balance and thus the same printing conditions within the printing form.
- 1976 **Isocontours\* diagram** for analyzing the characteristic curves in prints, proofs, and platemaking. The special feature of this patented diagram is the exaggerated presentation of the changes to the screen dot in printing and platemaking.

The advantage of this presentation is that the printing and platemaking characteristic curves are depicted symmetrically to the zero axis. This enables the sum of two important worksteps to be shown and analyzed.

With the aid of the characteristic curves in the Isocontours\*-Diagram, the definition of **Eurostandard Offset System Brunner\*** has been expanded to include all halftone steps and thus improved.

Data was first acquired with hand-held densitometers measuring from the compact System Brunner wedge, and later the measuring process became much faster through the use of scanning densitometers and the ZebraStrip\* developed by System Brunner.



Also in 1976 the 2<sup>nd</sup> generation of the **System Brunner Color Charts** was introduced. What makes these color charts so special is their high degree of accuracy and gradation fineness which encompasses 27 lightness gradations per process color. With the aid of 27 triplet numbers and the primary values of 50% area coverage for cyan and 41% for magenta and yellow, these color charts were used to define the **gray balance in Eurostandard**

**By the end of the seventies the Eurostandard Offset System Brunner\* already included the following influencing variables:**

- Dot gain in the individual colors (tonal value increase) with tolerances
- Solid ink densities with tolerances, different measuring devices/types of filters
- Print characteristic curves with tolerances
- Platemaking with micro-measurement technology, highlights, closure dots
- Trapping (two-color overprint) with Brunner formulas
- Gray balance definition for reproduction in 27 lightness gradations
- Gray stabilization (GCR) as a guideline for reproduction

- 1980 **Eurostandard Cromalin\***. System Brunner develops measuring elements with microlines for the DUPONT CROMALIN\* analog proofing process. Printers at that time were very skeptical about accepting proofs not produced with printing ink on paper. But despite that CROMALIN\* quickly became recognized as an industry standard all over Europe.
- 1982 System Brunner defines the first reference values for **newspaper printing** under the name **Eurostandard Press**. It was only at the beginning of the nineties that multicolor newspaper printing started to be widely used. This was accompanied by the changeover from relief printing (letterpress) to planographic printing (offset).
- 1985 Standardization and gray balance become the basis of patents for printing press **inking unit control**.
- 1990 Standardization of offset printing now comprises more than 30 parameters (influencing variables). The **Instrument Flight\*** technology enables them to be quickly recorded and analyzed.
- 1992 Standardization is supplemented by **quality categories** which are rated by stars (BBBBB).
- 1993 Commencement of the research for standardization of the **gravure printing process** which gained acceptance in gravure printing plants under the name **Eurostandard Helio**.
- 1998 Commencement of the research for standardization of the **flexo printing process** which leads to the definition of **Eurostandard Flexo** which gained acceptance under this name in packaging printing plants.



## Different standards but the same gray balance

System Brunner has defined different standards for the different classic printing processes:

- Eurostandard Offset with several variants for papers and other materials,
- Eurostandard Helio for gravure printing, and
- Eurostandard News for newspaper printing.

To ensure that the color of illustrations match as far as possible even when they are printed by different processes, System Brunner has paid special attention when defining the standard values that the **gray balance** remains the same. The gamuts of contrasts in gravure, offset, and newspaper printing vary in size but, so long as the balance is the same, the color sensation of the picture also remains the same.

The technical development of print media is by no means ended. Particularly in the segments of short and very short runs, it is continuing at a rapid pace. Examples here are digital printing, laser printing, the Inkjet process, and others as well.

It is interesting to note that new color printing techniques initially attempt to use their own primary colors and color gamuts but sooner or later always switch to the CMYK color gamuts of the classic printing processes.

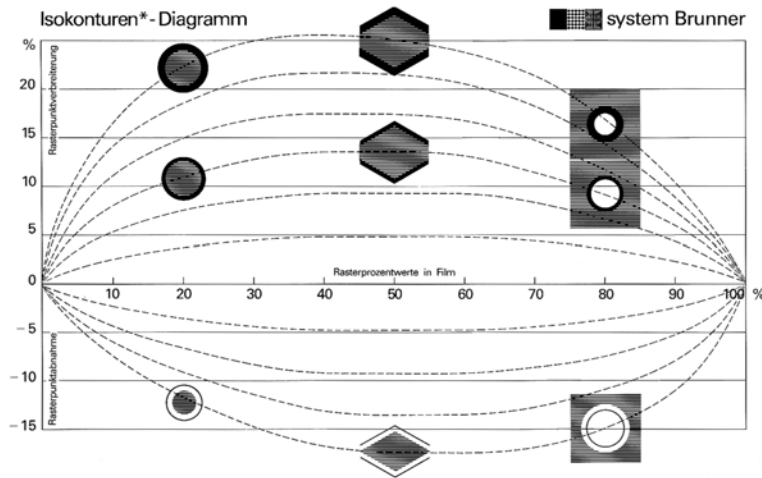
Standardization remains an ongoing task. The technical development in print media demands that every standard be checked periodically to ensure that it is still relevant. However, not every new development needs to be immediately considered. Many developments hailed as revolutionary eventually prove to be nothing of the sort.

The most important developments in offset printing over the past 30 years have been a permanent average reduction in dot gain and an increase in the overall contrast gamut.

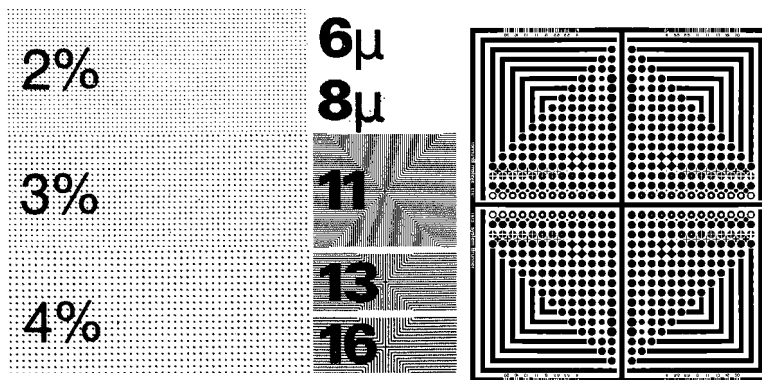
The standardization started by System Brunner at the end of the sixties has proven to be successful and enduring because the concept was right, and because this will be resolutely continued now and in the future.

***The next article will introduce Eurostandard System Brunner\* with the current definitions.***

(Locarno, September 19<sup>th</sup>, 2003; FB/DW)



The copyrighted ISOCONTOURS\* diagram is used for portraying and analyzing transfer characteristic curves. The border zone theory explains why halftone dot changes are most noticeable in the mid-tones.



The microline technology for visual monitoring and standardization of platemaking is used successfully all over the world.

The super-micro measuring element is the basis for analyzing platemaking, films and prints.



One of the first System Brunner test forms (1976). The "gray balance screen" forces the printer to consistently match according to the gray balance.