NewV set® – PANTONE® formula guide

The PANTONE® colour matching system is marketed world-wide by its developer and is used as the basis for a great many special colours. The basis of this system are the 13 basic PANTONE® colours, plus a black and a transparent white. Thanks to the 1,114 different mixed colours on coated and uncoated paper, the system has now become more and more important with regard to proprietary articles, CI etc.

The PANTONE® formula guide is structured in accordance with the following system:

On the basis of the 13 basic colours, approximately 160 mixing formulae (mid-tone in the PANTONE® colour gamut) are generated and produced as solids. Each of these formulae was on the one hand brightened using three different quantities of transparent white (moving up the gamut) and on the other hand greyed with black (moving down the gamut).

These mixed colours are proofed on a special letterpress press and printed on two different materials.

C = coated material

U = uncoated material

Each year, PANTONE® publishes 2 editions of its formula guide.

The original basic colours have the following fastness properties:

Basic PANTONE® colours

Basic PANTONE® colours		Fastness properties per DIN 16 524/25				
		Light WS	Alcohol	Solvent mixture	Alkali	UV varnish
Yellow	41 UE 0010	5	+	+	+	+
Yellow 012	41 UE 0012	5	+	+	+	+
Orange 021	41 UE 0021	5	+	-	+	-
Warm Red	42 UE 0030	4	+	+	-	-
Red 032	42 UE 0032	5	+	-	+	-
Rubine Red	42 UE 0040	5	+	+	-	+
Rhodamine	42 UE 0050	4	-	-	-	-
Purple	43 UE 0060	4	-	-	-	-
Violet	43 UE 0070	4	-	-	-	-
Blue 072	43 UE 0072	4	-	-	+	-
Reflex Blue	43 UE 0080	4	-	-	+	-
Process Blue	43 UE 0090	8	+	+	+	+
Green	44 UE 0095	8	+	+	+	+
Black	49 UE 0100	8	+	+	+	+
Transparent White	40 UE 0550					

Lightfast basic PANTONE® colours

Basic PANTONE® colours		Fastness properties per DIN 16 524/25				
lightfast*		Light WS	Alcohol	Solvent mixture	Alkali	UV varnish
Yellow C fast	41 UE 1010	7	+	+	+	+
Yellow 012 fast	41 UE 1012	7	+	+	+	+
Orange 021 fast	41 UE 1021	7	+	+	+	+
Warm Red fast	42 UE 1030	7	+	+	+	+
Red 032 fast	42 UE 1032	7	+	+	+	+
Rubine Red fast	42 UE 1040	6	+	+	+	+
Rhodamine fast	42 UE 1050	7	+	+	+	+
Purple fast	43 UE 1060	7	+	+	+	+
Violet fast	43 UE 1070	7	+	+	+	+
Blue 072 fast	43 UE 1072	7	+	+	+	+
Reflex Blue fast	43 UE 1080	7	+	+	+	+

* Auxiliary colour with higher fastness value – not a genuine PANTONE® colour

In the hubergroup, standard PANTONE® mixed colours are colour-matched with the latest colour guide during the delivery inspection with the aid of a weighed proof.

Up until Edition 2/2003 of the colour guide, the type of stock used was BVS gloss. Since Edition 1/2004, Consort Royal 170 g/m² has been in use. (The change of paper became necessary because PANTONE® began using a whiter paper as of Edition 1/2004).

U colour shades (i.e. shades printed on uncoated paper) are matched on typing paper (Offset Primat, 80 g, wood-free, white).

This results in the following situation:

1. **Strength of colour of the colour guide**
   A number of the colour shades in the PANTONE® colour guide are proofed with a high film thickness that can not be achieved with just a single pass on an offset press, e.g. PANTONE® Green and Blue 072. The shade can only be reproduced by conducting two passes.
2. **Fastness properties**
   Many mixed inks have been formulated using basic colours that have a low light fastness rating and are also neither solvent- nor alkali-resistant.
   Some of these basic colours are also used in very low concentrations. This leads to the colour shade produced having an extremely low light fastness (e.g. 227 C, 406 C, 427 C, 434 C).
   In order to obtain higher light fastness values, these formulae must be mixed using basic colours with higher fastness ratings.
   To enable subsequent finishing with UV varnish or film laminating (celloglazing), the inks must be solvent- and/or alkali-resistant, but this too can only be achieved by using special basic colour inks with better fastness properties.
   Compared with the pigments in use, pigments with higher fastness values differ with respect to their colorimetrics. Consequently, differences in colour shade and/or metamerism are inevitable.
3. **Substrate**
   When formulating and conducting quality inspections, the hubergroup uses a paper whose whiteness is as close as possible to that of the paper used for the colour guide. Prints made on a substrate that differs from the colour guide paper, i.e. print run stock, therefore produce variations in shade.
   The paper used for the PANTONE® formula guide is a high-white art paper. Many, above all very pure, colour shades are therefore impossible to produce on stocks that are not as white (GDZ, GC 1, recycling paper) despite special formulation.

4. Differences between various print runs

Each year, PANTONE® publishes 2 editions of its colour guide. This results in differences of shade between identical mixed colours in the various editions. Edition 1/2004 saw the introduction of a different, whiter coated paper for the C section of the guide, which means that many of the colour shades appear purer than in previous colour guides. In the quality assurance departments of the hubergroup, standard colours are always matched to the latest colour guide. This has the following consequences for the user:

- Differences can arise between different batches of the same mixed colours from different editions of the colour guide. For this reason, we state on each can label which edition of the colour guide has been used for colour matching.
- Special customer-specific colour shades can over the course of time vary in comparison with the colour shade in the PANTONE® formula guide. Customer and brand colours are matched with the master samples finalised at the time of first production and are not compared with the PANTONE® guide.

5. Differences between C and U

In the PANTONE® formula guide system, the same colour with identical formula is printed on coated and uncoated paper. The formula is not adapted in order to match up the coloristics (shade and purity) of the colour on the two stocks. As a result, differences can be detected between some mixed colours when printed on C and U.

Comment

In the HKS® system, the formulae are adapted to the respective substrate and printing process. This means that different ink formulae are used to produce the same shade in the K, N, E and Z colour guides, so that the shades match up as perfectly as possible between the various guides and printing processes. (K = coated paper, N = uncoated paper, E = continuous forms, Z = newsprint)

6. Finishing

The PANTONE® formula guide presents the colours without surface finishing. Postprint finishing (varnishing or lamination) usually leads to a change in the colour shade. This is technically unavoidable and can not be counteracted by modifying the formula either.

7. Mixing inks from the basic PANTONE® colours

As a licensee of PANTONE Inc., the hubergroup is obliged to have the basic colours of the PANTONE® system checked and re-approved at regular intervals. The mixing formulae given in the PANTONE® formula guide are reference formulae. Due to the facts mentioned above (difference between the stocks used for the guides and those for production, ink coverage, tolerances when printing the colour guides), variations from the guides may also arise in individual cases when mixing inks from basic PANTONE® colours.

The CRS system available from the hubergroup is the ideal basic colour system that enables printshops to mix their own inks. In addition to the basic colours of the PANTONE® formula guide, the CRS system also includes basic colour inks with higher fastness values (see TI 10.4.02).

The mixing formulae for all the colours from the PANTONE® formula guide are available on CD. Reference formulae are also available for colours with better fastness properties. In addition to the colour shades listed on page 1 of this Technical Information sheet, the PANTONE® formula guide also incorporates six bronze inks in various nuances and one silver ink. Furthermore, it also includes seven different metallic colours. To enable printers to produce special effects, the colour guide also contains a further seven basic colours and seven mixed colours with fluorescent formulations.

This system, which was created by PANTONE® as a colour communication system for designers and printers, does have its own intrinsic limitations. The application instructions contained in this Technical Information sheet must be observed if this system is to function without problem.