The ink mixing station in a print shop

This technical information sheet provides information on the mixing of inks in a print shop. In addition to listing the basic inks and basic ink series available, this publication also offers suggestions with regard to the equipping and layout of such an ink mixing station and for working methods and workflow organisation.

CRS basic inks

One of the main criteria when using an ink mixing station in a print shop is the choice of suitable basic inks. The **huber**group can offer you CRS basic inks

(CRS = Computer-Rezept-System or computerised formulation system).

This basic ink system consists of highly concentrated basic inks - including transparent white, black and brightened black - with different fastness properties to cover the various requirements. This means that the basic inks are chosen individually depending on the requirements.

Special properties

- The basic inks can be chosen individually in line with the requirement profiles of our users.
- Ensured selection of basic inks to match the fastness requirements
  - label printing (lye-resistant)
  - package printing with dispersion varnish
  - subsequent finishing with UV varnish or cellophane
- High colour intensity and consequently greatest possible coverage of the colour spectrum
- Monopigmented and consequently optimum purity
- An optimum number of special tones with high colour intensity can be produced
- Very good ink/water characteristics
- The inks are formulated ready to use. In the case of QX and NX versions, the siccative must be added and mixed in thoroughly.

Advantages of the CRS ink mixing systems

- Quick and reliable mixing of PANTONE®, HKS® and special colours, and consequently optimum and quick handling of orders (variants 1, 2, 3 and 4)
- Simple way to reduce the amount of ink left over, because there is no longer any need to allow for extra amounts of ink to be on the safe side or take minimum delivery quantities into account
- Possibility of utilising excess quantities of special colours (left-over inks) that have been mixed using CRS basic inks (variant 4)
- Simple administration of formulae by means of the files for PANTONE® inks and special in-house colours.

CRS basic inks

				Fastness properties[1]			Labels	Finishing		
		Light WS	Transparency	Alcohol	Solvent mixture	Alkali	lye-resistant	UV varnish[2]	Dispersion varnish[6]	Cellophane
CRS Yellow	41.. 6601	7	ld	+	bd	+	+	-	+	-
CRS Yellow	41.. 6602	5	l	+	+	+	+	+	+	+
CRS Yellow[3]	41.. 6603	5	l	+	+	+	+	+	+	+
CRS Orange	41.. 6604	5	l	+	+	+	+	+	+	+
CRS Red	42.. 6606	6	l	+	bd	+	+	-	+	-
CRS Magenta	42.. 6608	5	l	+	+	-	-	+	+	+
CRS Red	42.. 6609	5-6	l	+	bd	+	+	-	+	-
CRS Red	42.. 6629	6	l	+	+	+	+	+	+	+
CRS Rhodamine Red	42.. 6611	4	l	-	-	-	-	-	bd[5]	-
CRS Red	42.. 6612	7-8	l	+	+	+	+	+	+	+
CRS Red	42.. 6613	7-8	l	+	+	+	+	+	+	+
CRS Bordeaux	42.. 6614	5-6	l	bd	-	+	+	-	+	-
CRS Purple	43.. 6615	4	l	-	-	-	-	-	-	-
CRS Violet	43.. 6626	7-8	l	+	+	+	+	+	+	+
CRS Violet	43.. 6617	4	l	-	-	-	+[4]	-	bd[5]	-
CRS Reflex Blue	43.. 6618	4	l	-	-	+	+[4]	-	bd[5]	-
CRS Blue	43.. 6619	4	l	-	-	-	+[4]	-	bd[5]	-
CRS Blue	43.. 6620	8	l	+	+	+	+	+	+	+
CRS Blue	43.. 6621	8	l	+	+	+	+	+	+	+
CRS Green	44.. 6622	8	l	+	+	+	+	+	+	+
Transparent White	40.. 0550			+	+	+	+	+	+	+
CRS Black	49.. 4100	8		+	+	+	+	+	+	+
CRS Black brightened	49.. 4111	8		+	+	+	+	+	+	+
CRS Yellow	41.. 6627	7	l	+	+	+	+	+	+	+
CRS Orange	41.. 6628	7	l	+	+	+	+	+	+	+
CRS Red	42.. 8013	5	l	+	-	+	+	-	+	-
CRS Warm Red	42.. 0030	4	l	+	bd	-	-	-	-	-

[1] Fastness properties per DIN 16524 and 16525

[2] The pigments are resistant. Read TI 5.10.02 E with regard to reticulation problems.

[3] Same nuance/colour intensity as **41 Q 6602**, but even higher transparency.

[4] The colour on the label changes, but the washup lye does not absorb colour.

[5] With concentrations of less than 15 %, the dispersion varnish may lead to changes in colour. Apart from that, light fastness is reduced considerably.

[6] For some special applications the used dispersion varnishes may content solvent. These varnishes used with CRS - basic colours with a solvent mixture fastness property of (bd) or (-) may lead to changes in colour.
Concerning the necessary fastness properties please contact your varnish supplier.

Range of applications

Different versions of ink can be mixed depending on the application:

41 Q ...	Offset/FB (ready to use)
41 GA...	Offset/low-odour (ready to use)
41 QX...	Offset/FB without siccative
41 N...	Offset/film with siccative
41 NX...	Offset/film without siccative
41 MGA...	Offset/low-odour, low-migration
41 UE...	UV offset paper/board
41 UP...	UV offset foil
41 UH...	Hybrid offset paper/board
41 UG...	UV offset paper/board - ITX-free formulated
41 UL...	UV label printing

Q - Standard series

for all grades of paper and board that allow the inks to be absorbed.

GA - Standard series for organoleptically neutral packaging

GA inks have only average surface stability and rub resistance, which means dispersion varnishing is necessary for packaging. This can be done wet-on-wet or wet-on-dry. Suitable for all highly absorbent stocks (see also TI 10.1.14 E).

QX - Standard formulation (FB) without siccative

This series is suitable for automatic metering apparatus. The siccative must be metered and added as an additional component. We recommend automating this addition by means of the software of the formulation computer or that of the metering apparatus. Suitable for all highly absorbent stocks. Can also be supplied in larger containers (25 kg, 200 kg).

N - Suitable for all substrates that can be printed on in the offset process

With the aid of appropriate transparent white, it is also possible to formulate inks for printing on films or poorly absorbent stocks (aluminium-vaporised papers, PE-coated boards, etc.).

Since the basic inks are free of mineral oil, mineral-oil sensitive substrates (PP, PE etc.) can also be printed on.

NX - Version same as N, but without siccative

Can also be supplied in larger containers (25 kg, 200 kg). The siccative must be added separately.

MGA - Low migration and low-odour special inks

for printing on the outside of foodstuff packages. MGA is an ink series specifically for primary packaging for foodstuff. It stands out thanks to its extremely low migration values.

Due to their slow setting characteristics, these inks are suitable only for absorbent stocks. The prints must be dispersion-varnished wet-on-wet (see also TI 10.1.15 E).

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UE - UV-curing inks for offset printing on paper/board

The inks are formulated ready to use.

UP - UV-curing inks for offset printing on non absorbent materials like foils, aluminium-vaporised or aluminium-coated paper/board. The inks are formulated ready to use.

UH - Hybrid inks for offset printing on paper/board

The inks are formulated ready to use.

UG - UV-curing printing inks for offset printing, ITX-free formulated.

The inks are formulated ready to use.

UL - UV-curing printing inks for label printing on UV rotary presses (not suitable for web-offset).

The inks are formulated ready to use.

Appropriate auxiliaries are available for every type of application.

Working methods

Possible applications

The highly concentrated CRS basic inks open up a number of possibilities for using this system in the print shop.

1. If you send us the colour originals and specify the desired fastness properties and the substrate to be used, we can very quickly draw up a guideline formula for a special ink. We will charge you for this service at cost price only.
2. The print shop uses a spectrophotometer (e.g. the SpectroEye from GretagMacbeth) to take reflectance readings. After e-mailing the data to a **huber**group company, this company will compile the formula(e) and mail it back to you (what we call „e-mail formulation“). Mixing, checking and, if necessary, fine tuning are conducted at the print shop.
3. For a nominal charge, we can provide you with the necessary calibration data for all CRS basic inks. This data is available in a form based on the X-Rite software. This will enable you to put together practically all formulae for special inks in very quick time.

Working methods for ink mixing and quality control

The software of an ink formulation computer puts together various formulation proposals with differing requirements with respect to metamerism, price and the amount of ink left over. The most suitable proposal is mixed in a small quantity and proofed on the proofpress. The result obtained can be corrected by the ink formulation computer.

Quantities of colours that exceed a batch size of approx. 30 kg should be made up by the ink supplier who has mixing units of sufficient size.

Work procedure

Submitting the job

As the job documents are prepared, a job order is sent to the mixing shop: this is an appropriate form containing details of the quantity, press, stock, fastness requirements and any ink numbers known.

New colour matches for small quantities

- Prepare the new formula in a 10-g trial quantity based on the colour original
- Prepare weighed proofs
- Recalculate the formula to arrive at the constituent amounts for the desired quantity of ink and weigh out the amounts
- Check by proofing or by draw-down comparison with the 10-g trial quantity
- Retain a sample of the master ink
- Prepare the ink

If the formula already exists

- Take the formula from the ink formulation system
- Weigh
- Mix and checking by draw-down comparison with the master ink
- Prepare the ink

Filing the job documents

- File by colour
- File by customer

This procedure is employed with success by a number of print shops.

Ink mixing station

Location

The room or area in which the ink mixing station is located should be very close to the presses, but separate from the print shop itself. If should have windows (north-facing if possible), white walls and neutral lighting.

Technical equipment (fully equipped)

- Shelves for goods in stock
- Shelves for left-over stocks
- Shelves for auxiliaries
- Shelves for master formulations
  (Printing ink manufacturers use the term „master formulation“ to describe the original specimen for each ink formula that has been approved. All subsequent products mixed are compared with this specimen.)
- 1 set of scales for production batches up to approx. 65 kg
- 1 conventional agitator for batches up to approx. 30 kg or
  1 vibration mixer for batches up to max. 5 kg
  (these are toolless mixing units)
- 1 biaxial mixer for batches up to max. 25 kg
  (these are toolless mxing units)
- 1 table with a glass plate as a place for mixing small quantities
- 1 table or shelf for storing cleaning agents and wiping cloths
- 1 set of scales for small quantities of 10 - 300 g (test batches)
  (minimum graduation 0.01 g with weighing table)
- 1 proofpress, e.g. IGT C1, in conjuction with
- 1 set of analysing scales
  (minimum graduation 0.0001 g can be used to make weighed proofs, this method particularly enables you to set the right colour intensity.)

- 1 daylight lamp and/or colour matching booth with alternative light source for assessing metameric mixtures with viewing surfaces
- Formulation system comprising
  - a spectrophotometer
  - a PC with printer
  - the formulation software
- Automatic metering station for quick and reliable weighing of special inks.
  Basic inks can be supplied in 25-kg and 200-kg-drums

Facilities for storing

- Originals, specimen books etc.
- Colour file for documenting all-in-house mixtures, arranged by colour. For each ink: details of the formula, test criteria, quantity and production date of the mixtures, with ink inventory file for goods delivered, arranged according to supplier, and ink numbers for daily inventory tracking; this can, of course, also be conducted by means of PC-based inventory management.
- Ink inventory file for left-over inks for inventory tracking, arranged by colour.
- Printing stocks for proofing.

Personnel

The position of ink mixer should be filled by a qualified member of staff. The ink mixer's responsibilities include reducing ink storage costs by reducing the range of inks and utilising left-over inks by using them, where appropriate, as formula components (reducing the amount of special wastes).

The ink mixer should report to the print shop manager and be kept informed in good times as regards scheduling by the job planning and scheduling department.

Ink costs should be kept low through using the most cost-effective basic inks, that is, only inks with fastness values essential for a particular job should be used.

Where are the financial benefits in investing in an ink formulation system?

It is not possible to economically justify the purchase of an ink formulation system simply on the basis of savings made through mixing in-house. The benefits listed below are of far greater importance than the cost differential between self-mixed inks and special inks bought from your supplier:

- Greater flexibility thanks to the immediate availability of special inks
- Avoidance of production downtimes and consequently associated savings in machinery and make-ready times
- Shortening of delivery times for print runs conducted at short notice
- Less capital tied up due to smaller amount of goods in stock
- Minimisation of the amount of storage space required
- Using-up of left-over inks

The decision as to whether or not an ink formulation system makes economic sense therefore depends on a great many and greatly differing criteria. It is far easier to define the costs associated with the purchase of a formulation system and the installation of an ink mixing station:

Recommended equipment

Spectrophotometer	Euro 5,000
Software for ink formulation	Euro 8,000
PC and printer	

If you do not already have an ink mixining department, you will also require the following:

Mixing units, scales, shelves, miscellaneous items, approx.	Euro 15,000
Proofpress, starting at	Euro 8,000

The equipment recommendations made here may not necessarily cover every item of equipment you will need in practice. The companies that make up the **huber**group will be only too pleased to help you obtain the documentation relating to suitable pieces of equipment. All prices given in this technical information sheet are approximate prices as valid in 2009.

Contact addresses for advice and further information can be found under **www.hubergroup.de**