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APPLICATION

PROCESS RECOMMENDATIONS FOR BEZAKTIV DYES

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OPTIMISED DYEING SYSTEM

The CHT Group will be happy to support you with a wide range of individual solutions.

Innovative reactive dyes and auxiliary agents from CHT help to optimise processes and results.

This application brochure contains everything you need to know for successful application of BEZAKTIV reactive dyes and auxiliary agents. Dye selection, dyeing methods, colour fastnesses, selection of auxiliary agents and other application-related topics are presented clearly and explained concisely here.

The CHT Group combines the best of two worlds. We offer both comprehensive competence in textile finishing and an extensive background in speciality chemicals. As a result, we are able to deliver perfectly coordinated solutions that are both highly efficient and genuinely user-oriented.

- So you would like to optimise your formulations or processes?
- Or you need a product that is developed perfectly in line with your specific requirements?
- Or perhaps you have questions about BEZAKTIV dyes and their application?

We will be glad to help!
Please get in touch with our experts via
dyestuffs@cht.com

1. Introduction

BEZAKTIV dyes are reactive dyes for dyeing cellulose, cellulose regenerated fibres and their blends. The principle of dye bonding to the cellulose is based on a reaction between the OH groups of the cellulose and the reactive groups of the dye. The dye is chemically bound to the fibre by this reaction. Reactive dyes are distinguished in particular by the positive wear fastness properties, the varied application range and the wide variety of shades. These properties make reactive dyes one of the most often used dyes for cellulosic fibres.
In addition to the right choice of dye, the customer's equipment also affects the technical options for optimum production of an article. Based on these facts CHT Group supplies reactive dyes which are excellently coordinated with the individual requirements of a system. For this reason it is necessary to be able to use the same dye in an exhaust, semi-continuous and continuous process.
The following table shows a general overview of the characteristics of the different dye groups.

		Dyeing temperature	CPB suitability	Discharge-ability	Perspiration light fast
BASIC	BEZAKTIV V	60 °C	+	+	–
	BEZAKTIV S	60 °C	+	–	–
	BEZAKTIV HE	80 °C	–	–	–
ADVANCED	BEZAKTIV S-MATRIX 150 01	60 °C	+	–	–
	BEZAKTIV HE-MATRIX	80 °C	–	–	–
	BEZAKTIV COSMOS S-C	60 °C	+	+	–
	BEZAKTIV S-W	60 °C	+	+	–
HIGH PERFOR-MANCE	BEZAKTIV HP	60 °C	+	–	+
	BEZAKTIV GO	40 – 60 °C	+	+	–

This table can be used to narrow down the dye selection taking into account the requirement profile or the dyeing process. A more specific selection of individual dyes or dye combinations is possible in the dye profiles. These dye profiles make it possible to select dyes according to specific criteria such as washing fastness, light fastness or other fastness properties. A selection aid is also provided in section 5 (dye selection).
When a recipe has been compiled, the corresponding tables can be used to calculate the necessary quantities of salt and fixing alkalis, taking the substrate and liquor ratio into account.

2. General information

2.1 Commercial form
BEZAKTIV dyes are powder dyes that are finished in a manner that ensures dust-free handling and positive solubility properties. Some BEZAKTIV dyes are also available in liquid form.

2.2 Dissolving the dyes
BEZAKTIV dyes are dissolved by sprinkling in pH-neutral, soft or softened water at 60 °C while stirring. The warm, concentrated dye solution should not be left to stand. Urea improves the solubility of the BEZAKTIV dyes. Addition is not permitted at dye liquor temperatures above 50 °C. The solubility specifications of the BEZAKTIV dyes can be found in the dyestuff profiles. To prevent insufficiently dissolved dye becoming deposited on the dyed fabric during the dyeing process, we recommend pouring the concentrated dye solution through a fine-mesh sieve into prepared cold water.

2.3 Safety instructions
If the safety instructions are observed and complied with, use of BEZAKTIV does not constitute a health risk. In general, however, inhaling or swallowing the dye and contact with the eyes and skin should be prevented. Detailed information on the ecological and toxicological properties of the BEZAKTIV dyes are contained in the safety data sheets.

3. Important dyeing information

To ensure perfect and reproducible dyeing results, correct pretreatment is necessary in addition to a correctly performed dyeing process. Pretreatment can have a considerable influence on the dyeing results. The key factors are described below.

Residual alkali on the fabric
Residual alkali can also be contained on the fabric or in the core of the fibre after alkaline scouring or pre-bleaching. The resulting high pH value can cause unlevelness or premature dye hydrolysis. To prevent this happening, adequate rinsing and neutralisation after the pre-treatment is necessary to eliminate the core alkali in the fibres.
If acetic acid is used for neutralisation, the following stoichiometric fact must be taken into account: 1 g of a 100 % caustic soda solution requires 1.5 g of a 100 % acetic acid for full neutralisation.

Alkaline processing water
Soft processing water normally contains sodium bicarbonate which results in an increase in the pH value when the temperature is increased as sodium carbonate is formed. With light colours this can already result in unlevelness, while with dark shades the dye can already hydrolyse at an early stage and is then no longer reactive during the subsequent dyeing process. Reproducibility problems can already occur in the laboratory if solutions with a high pH-value are mixed and left to stand for a prolonged period of time. The dye can partially hydrolyse. During production the same problem can occur when dye formulations are prepared.

Nonionic tensides

Residues of nonionic tensides can cause precipitation and agglomerates, especially with phthalocyanine dyes (turquoise range). As nonionic washing agents are normally used for pre-washing or pre-bleaching due to their efficiency, it is essential to rinse out these products effectively. The use of SARABID LDR or also SARABID MIP in the dye bath has proven effective. When this product is used, nonionic residues are masked and agglomerates therefore prevented.

Residual peroxide

Residual peroxide on the fabric results in a change of colour, depending on the dye combination. The safest method of removing residual peroxide is the use of enzymes such as CHT-CATALASE BF. This enzyme only affects the residual peroxide and ensures the full removal of the peroxide. The efficiency range of CHT-CATALASE BF is optimal at a pH value of 4 - 9 and a temperature range of 20 - 60 °C.

Liquor ratio

Maintaining the liquor ratio is one of the most important parameters for good reproducibility. If its variation is too great, the salt content of the liquor and also the alkalinity is shifted upwards or downwards. Dyes with a lower substantivity react particularly sensitively to fluctuations. The BEZAKTIV dyes with their bifunctional vinyl sulphone-monochlorotriazine anchor system only react slightly to fluctuating dyeing parameters.

Salt content in the dyeing liquor

Salt affects the substantive uptake of the dye by the fibre. If different liquor ratios are used, the balance of the dye-fibre ratio can be regained by adapting the salt and alkali quantities, which prevents a change of colour. The necessary quantity of salt and alkali can be taken from the requirement tables. The correct salt content in the liquor can be easily determined by means of its density with a suitable hydrometer or refractometer. Conversely the liquor ratio can also be checked if the salt quantity is known. If turquoise or green dyes are used, the use of Glauber's salt is recommended. The purity of Glauber's salt is higher than that of common salt. The risk of precipitation during dyeing is therefore lower. When using BEZAKTIV Blue V-RN 150 and Blue V-RN spec., Turquoise V-G conc., Turquoise S-BF 150 and Green V-6B 175, Glauber's salt must be used. It must also be ensured that the quantity of Glauber's salt does not exceed 50 g/l with BEZAKTIV Blue V-RN 150 and Blue V-RN spec.

Dyeing temperature

Observance of the temperature is very important due to the specific dye characteristics. During production, temperature differences of 5 - 8 °C caused by inaccurate or defective sensors can already result in clearly visible variations in the shade. In this respect the BEZAKTIV S dyes are regarded as relatively insensitive due to their characteristic double-anchor system. However, controlled temperature monitoring should be ensured.

Fixing alkalis

The correct application amount and optimum dosing of the fixing alkali are decisive parameters for dyeing. The correct alkali quantities are given in the table. It is extremely important that the application amounts are adapted to the respective liquor ratio. If this is not observed, based on a liquor ratio of 1:10, the amount of alkali in the dye bath is too low with a liquor ratio of 1:5. and too high with a liquor ratio of 1:20. Insufficient alkali results in a lower fixing yield and therefore a lower reproducibility. Too much alkali means a higher hydrolysis or also unlevelness. Dosing should preferably be performed with a dosing device which permits progressive dosing. With BEZAKTIV V and S dyes the alkali is not only responsible for fixation, but also increases the affinity. For this reason the dosing time should not be less than 45 minutes. The bicarbonate content of the processing water should also be taken into account. From a content of 0.3 g/l bicarbonate, the application amount of fixing alkali should be corrected as follows: For 0.1 g/l sodium bicarbonate, 0.1 ml/l caustic soda solution 38 °Bé is necessary in addition to the normal calculation.

4. Dye classification

4.1 BASIC

- BEZAKTIV V

BEZAKTIV V dyes are reactive dyes with one or two vinyl sulphone groups. They have very good dye properties on cellulosic fibres and an impressively wide selection of dischargeable dyes. The BEZAKTIV V dyes include a wide spectrum of navy and black types. The BEZAKTIV V dyes are used in exhaust, CPB and continuous dyeing processes.

- BEZAKTIV S

BEZAKTIV S dyes are bifunctional reactive dyes (vinyl sulphone and monochlorotriazine anchors), the main advantages of which are the very good reproducibility and a high fixing level. With the bireactive anchor system, such dyes are less sensitive towards fluctuations in the production parameters such as liquor ratio, temperature, electrolyte, alkali and time. The BEZAKTIV S dye range features additional sub-groups which have been adapted to certain requirements such as colour intensity or light fastness.

- BEZAKTIV HE

BEZAKTIV HE dyes are reactive dyes from the monochlorotriazine dye group. Due to their chemical constitution and the resulting properties, the BEZAKTIV HE dyes are used for exhaust dyeing. This dye class belongs to the classic hot dyeing dyes. The HE dyes are mainly used for dye penetration of dense fabrics or linen yarn. Due to the high stability towards alkali, hot dyes are often used if dyeing is followed by alkaline treatment such as after-bleaching or mercerisation.

4.2 ADVANCED

▶ BEZAKTIV S-MATRIX 150 01

BEZAKTIV S-MATRIX 150 01 is an optimally coordinated reactive ternary for medium and dark shades. These dyes are primarily recommended for dyeing critical shades. Due to the special characteristic, the dyes are less sensitive to fluctuations in the production parameters such as liquor ratio, temperature, electrolyte, alkali and time. The highest fixing levels and reproducibility rates are achieved in exhaust, CPB and continuous processes due to the bi-functional anchor system.

▶ BEZAKTIV HE-MATRIX

BEZAKTIV HE-MATRIX is the optimised ternary in the HE dye range with very good combinability. They are used above all for reproducibly dyeing critical shades on mercerised articles or viscose. Due to the high stability towards alkali, the HE-MATRIX dyes can be used if dyeing is followed by alkaline treatment such as after-bleaching or mercerisation.

▶ BEZAKTIV COSMOS S-C

BEZAKTIV COSMOS S-C are high-concentration reactive dyes for economical dyeing of the deepest shades with minimum quantities.

▶ BEZAKTIV S-W

BEZAKTIV S-W are reactive dyes with a multifunctional anchor system, high light fastness and good multiple washing fastness. Thanks to their good colour-build up, they are also recommended for darker shades. BEZAKTIV S-W dyes are used in exhaust dyeing, CPB dyeing and continuous dyeing processes.

4.3 HIGH PERFORMANCE

▶ BEZAKTIV HP

BEZAKTIV HP are dyes with the highest perspiration light fastness and light fastness with excellent reproducibility. The multifunctional anchor system with selected chromophores also offers optimally coordinated dyeing behaviour.

▶ BEZAKTIV GO

BEZAKTIV GO dyes are environmentally-friendly reactive dyes for water and energy-saving dyeing processes. It offers maximum fixing properties at low dyeing and rinsing temperatures and short process times.

▶ BEZAKTIV ZERO GO

Not only are BEZAKTIV ZERO GO dyes free of p-chloroaniline, but they also offer high fixing speeds and excellent wash-out properties. Universally suitable for all methods. Particularly suitable for the commercially and ecologically advanced GO process.

5. Dye selections

5.1 Selection for light shades without photochromism and dischargeable to white

BEZAKTIV Yellow V-GL 150
BEZAKTIV Red V-3B
BEZAKTIV Red V-BB 150
BEZAKTIV Blue V-2B 133

5.2 Selection for dark shades for discharge grounds

BEZAKTIV Yellow V-GR 133
BEZAKTIV Red V-BB 150
BEZAKTIV Black V-B 150

5.3 Standard ternaries

▶ BEZAKTIV V

BEZAKTIV Yellow V-GR 133
BEZAKTIV Red V-RB 133
BEZAKTIV Blue V-2B 133
BEZAKTIV Black V-B 150

▶ BEZAKTIV S

BEZAKTIV Yellow S-3R 150
BEZAKTIV Red S-3B 150
BEZAKTIV Blue S-GLD 150
BEZAKTIV Navy S-3G 150

Optimised BEZAKTIV S:
BEZAKTIV Yellow S-MATRIX 150 01
BEZAKTIV Red S-MATRIX 150 01
BEZAKTIV Blue S-MATRIX 150 01

▶ BEZAKTIV HE

BEZAKTIV Yellow HE-4R
BEZAKTIV Red HE-3B
BEZAKTIV Blue HE-RM 133
BEZAKTIV Navy HE-R 120

Optimised BEZAKTIV HE:
BEZAKTIV Yellow HE-MATRIX
BEZAKTIV Red HE-MATRIX
BEZAKTIV Navy HE-MATRIX

▶ Metal-free ternary

BEZAKTIV Yellow S-MATRIX 150 01
BEZAKTIV Red S-MATRIX 150 01
BEZAKTIV Blue S-GN 150

5.4 Selection with good polyamide reserve
BEZAKTIV Red V-3B
BEZAKTIV Violet V-5R
BEZAKTIV Black V-RL 150
BEZAKTIV Yellow S-W
BEZAKTIV Red S-W
BEZAKTIV Blue S-W
BEZAKTIV Dark Blue S-W
BEZAKTIV Black S-W
BEZAKTIV Yellow S-3R 150
BEZAKTIV Red S-3B 150
BEZAKTIV Brilliant Red S-3G
BEZAKTIV Blue S-2G
BEZAKTIV Blue S-FR 150
BEZAKTIV Blue S-GLD 150
BEZAKTIV Navy S-3G 150
BEZAKTIV Green S-4B 150
BEZAKTIV Brown S-5BR
BEZAKTIV Black S-GR
BEZAKTIV Cosmos S-MAX
BEZAKTIV Yellow HP-F
BEZAKTIV Brilliant Yellow HP-M
BEZAKTIV Red HP-BL
BEZAKTIV Red HP-3B
BEZAKTIV Brilliant Red HP-G
BEZAKTIV Blue HP-R
BEZAKTIV Brown HP-5R
BEZAKTIV Brilliant Yellow GO
BEZAKTIV Scarlet GO
BEZAKTIV ZERO Orange GO
BEZAKTIV ZERO Scarlet GO
BEZAKTIV ZERO Navy GO
BEZAKTIV ZERO Black GO

5.5 Light fast dyes
BEZAKTIV Yellow V-GL 150
BEZAKTIV Yellow V-GR 133
BEZAKTIV Red V-3B
BEZAKTIV Bordeaux V-B
BEZAKTIV Violet V-5R
BEZAKTIV Blue V-RN spec.
BEZAKTIV Blue V-RN 150
BEZAKTIV Blue V-2B 133
BEZAKTIV Green V-6B 175
BEZAKTIV Black V-RL 150
BEZAKTIV Yellow S-W
BEZAKTIV Red S-W
BEZAKTIV Blue S-W
BEZAKTIV Dark Blue S-W
BEZAKTIV Black S-W
BEZAKTIV Navy S-LF
BEZAKTIV Yellow HP-F
BEZAKTIV Yellow HP-NP
BEZAKTIV Brilliant Red HP-G
BEZAKTIV Red HP-BL
BEZAKTIV Red HP-3B
BEZAKTIV Blue HP-R
BEZAKTIV Dark Blue HP-W
BEZAKTIV Olive HP-B
BEZAKTIV Brown HP-5R
BEZAKTIV Grey HP-N
BEZAKTIV Scarlet GO
BEZAKTIV Blue GO

5.6 Perspiration-light fast dyes
BEZAKTIV Brilliant Yellow HP-M
BEZAKTIV Yellow HP-F
BEZAKTIV Yellow HP-NP
BEZAKTIV Brilliant Red HP-G
BEZAKTIV Red HP-BL
BEZAKTIV Red HP-3B
BEZAKTIV Blue HP-R
BEZAKTIV Dark Blue HP-W
BEZAKTIV Olive HP-B
BEZAKTIV Brown HP-5R
BEZAKTIV Grey HP-N

5.7 Colour-intense dyes
BEZAKTIV Brilliant Red S-3G
BEZAKTIV COSMOS Yellow S-C
BEZAKTIV COSMOS Gold S-C
BEZAKTIV COSMOS Orange S-C
BEZAKTIV COSMOS Carmine S-C
BEZAKTIV COSMOS Red S-C [2]
BEZAKTIV COSMOS Blue S-C
BEZAKTIV COSMOS Dark Blue S-C
BEZAKTIV COSMOS Navy S-C
BEZAKTIV COSMOS Deep Navy S-C
BEZAKTIV COSMOS Black S-C
BEZAKTIV Yellow S-MATRIX 150 01
BEZAKTIV Red S-MATRIX 150 01
BEZAKTIV Blue S-MATRIX 150 01
BEZAKTIV Cosmos S-MAX

5.8 Selection for dyeing at 80 °C with BEZAKTIV HP/S and V
BEZAKTIV Yellow V-5GL
BEZAKTIV Turquoise V-G conc.
BEZAKTIV Green V-6B 175
BEZAKTIV Yellow S-8GN
BEZAKTIV Yellow S-3R 150
BEZAKTIV Red S-2B
BEZAKTIV Red S-3B 150
BEZAKTIV Red S-MATRIX 150 01
BEZAKTIV Blue S-2G
BEZAKTIV Blue S-FR 150
BEZAKTIV Turquoise S-BF 150
BEZAKTIV Navy S-3G 150
BEZAKTIV Green S-4B 150
BEZAKTIV Brown S-5BR
BEZAKTIV Brilliant Yellow S-W
BEZAKTIV Yellow HP-NP
BEZAKTIV Red HP-BL
BEZAKTIV Brown HP-5R

5.9 Selection for ecological and economical dyeing
BEZAKTIV Brilliant Yellow GO
BEZAKTIV Golden Yellow GO [1]
BEZAKTIV Orange GO
BEZAKTIV Scarlet GO
BEZAKTIV Red GO
BEZAKTIV Blue GO
BEZAKTIV Dark Blue GO

[1] This offer ist not valid in Mexico. [2] This offer ist not valid in Japan.

BEZAKTIV Navy GO
BEZAKTIV Black GO
BEZAKTIV Velvet Black GO
BEZAKTIV ZERO Orange GO
BEZAKTIV ZERO Scarlet GO
BEZAKTIV ZERO Navy GO
BEZAKTIV ZERO Black GO

5.10 Selection for turquoise and green shades

Turquoise and green dyes are large-molecular phthalocyanine dyes with a copper or nickel central ion. Due to their properties they are particularly important for reactive dyeing. To ensure defect-free dyeing, attention must be paid to important parameters that must be maintained during dyeing with turquoise and green dyes.

Influence of electrolyte

Phthalocyanine dyes are very sensitive to electrolyte. The quality of the salt has a decisive effect on the dyeing results. Low salt qualities can result in the formation of agglomerates and therefore precipitation and spots. To minimise this risk the usage of Glauber's salt instead of common salt is recommended. The dye solubility is reduced under the influence of electrolyte. The loss of solubility is significantly greater under the influence of common salt than with Glauber's salt. The information on dye solubility under dyeing conditions can be found in the dye profiles.

Influence of nonionic tensides

Nonionic tensides or detergents that have not been thoroughly washed out after preliminary pre-treatment can cause precipitation that then settles on the fabric. For this reason it is necessary to rinse them out thoroughly with cold water prior to dyeing. As an aid to prevent precipitation due to nonionic tensides, the usage of SARABID LDR or SARABID MIP has proven effective.

Dyeing temperature

Phthalocyanine dyes are large-molecular dyes. Due to this size, the diffusion speed is relatively low. Dyeing should therefore be undertaken at a temperature of 80 °C. On dyeing critical articles, a migration stage at 100 °C can also be integrated into the dyeing process. However, this migration stage should be undertaken in the neutral pH range with the addition of reduction protection (MEROPAN XRN PEARLS). Prior to the alkali addition, the dye bath must be cooled to 80 °C again.

Dye selection

Turquoise and green dyes can only be combined with other reactive dyes to a limited extent. This is because combinations of different elements tend to dichroism. Dyes that can be used for brilliant turquoise and green shades are given in the following. All dyes listed can be dyed at 80 °C.

Standard selection

BEZAKTIV Brilliant Yellow S-W
BEZAKTIV Yellow V-5GL
BEZAKTIV Yellow S-8GN
BEZAKTIV Yellow HE-6G
BEZAKTIV Blue S-FR 150
BEZAKTIV Blue HE-RM 133
BEZAKTIV Blue HE-GX 145
BEZAKTIV Green V-6B 175
BEZAKTIV Green S-4B 150
BEZAKTIV Turquoise V-G conc.
BEZAKTIV Turquoise S-BF 150
BEZAKTIV Turquoise HE-A

Selection without catalytic fading

BEZAKTIV Brilliant Yellow S-W
BEZAKTIV Yellow V-5GL
BEZAKTIV Yellow S-8GN
BEZAKTIV Yellow HE-6G
BEZAKTIV Blue S-FR 150
BEZAKTIV Blue HE-RM 133
BEZAKTIV Blue HE-GX 145
BEZAKTIV Green V-6B 175
BEZAKTIV Green S-4B 150
BEZAKTIV Turquoise V-G conc.
BEZAKTIV Turquoise S-BF 150
BEZAKTIV Turquoise HE-A

6. Dyeing methods – overview

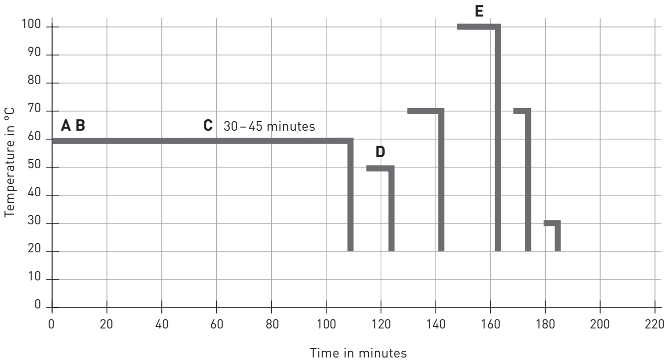
BEZAKTIV dyes are universal-application reactive dyes. The BEZAKTIV HP/S and V dyes in particular can be used in exhaust, semi-continuous and continuous dye processes. Due to the reactive anchor system, BEZAKTIV S dyes can be combined with BEZAKTIV V dyes in some cases.

6.1 Exhaust process for BEZAKTIV HP/S and V

In the exhaust process the recommended dyeing temperature of the BEZAKTIV HP/S and V dyes is 60 °C. The best dyeing results are obtained at this temperature. BEZAKTIV dyes can be used both on exhaust machines (jet, overflow) and also on exhaust devices (cross-package or warp beam dyeing equipment, beam dyeing apparatuses). The recommended auxiliaries and the correct application amounts are listed in the process descriptions. The application amounts of salt and alkali depend on the fabric to be dyed (non-merc. cotton, merc. cotton/viscose), the application amount of BEZAKTIV dyes and the liquor ratio.

- Isothermal process

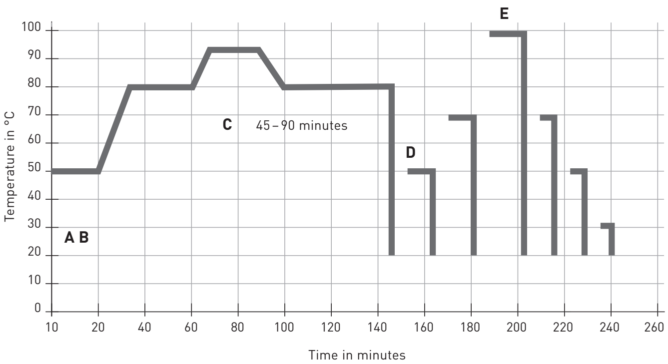
Universal process for excellent reproducibility and levelness. If a dosage control system is used, the sodium carbonate and lye can be added progressively which leads to a steady increasing fixing curve and therefore the best possible levelness is reached. In addition, premature hydrolysis of the dye is prevented. This means the highest possible colour yield.



A	1.0–2.0	g/l	SARABID LDR or SARABID MIP
	1.0–2.0	g/l	BIAVIN BPA
	10.0–90.0	g/l	Glauber's salt or common salt
B	x	%	BEZAKTIV dye
C	5.0–10.0	g/l	Sodium carbonate
	0–4.0	ml/l	Caustic soda solution 38 °Bé (add progressively within 45 min) or 0–7.0 ml/l EGASOL SF
D	0.5	ml/l	Acetic acid 80 %, pH 7–9 during soaping
E	1.0–2.0	g/l	COTOBLANC SEL

Temperature stage process

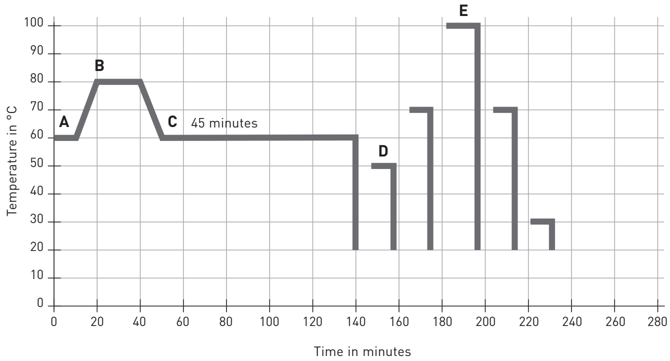
Process which is mainly used for dyeing on machines without a suitable dosing device. To prevent unlevelness the alkali should be added in portions. Furthermore this process can be used to improve the tone-in-tone dyeing of cotton/viscose blends.



A	1.0–2.0	g/l	SARABID LDR or SARABID MIP
	1.0–2.0	g/l	BIAVIN BPA
	10.0–90.0	g/l	Glauber's salt or common salt
	5.0–10.0	g/l	Sodium carbonate
	x	ml/l	Caustic soda solution 38 °Bé (add 20 % of the total quantity) or 0–7.0 ml/l EGASOL SF
B	x	%	BEZAKTIV dye
C	x	ml/l	Caustic soda solution 38 °Bé (add 80 % of the total quantity) or 0–7.0 ml/l EGASOL SF
D	0.5	ml/l	Acetic acid 80 %, pH 7–9 during soaping
E	1.0–2.0	g/l	COTOBLANC SEL

Migration process 80/60 °C

Process for articles with which level dyeing is very difficult and for critical shades such as grey, khaki or beige. Excellent dye penetration and levelness, especially on dense wound packages or cross-wound bobbins. With difficult light or medium colours, salt dosing is also possible after the dye has been added.



A	1.0–2.0	g/l	SARABID LDR or SARABID MIP
	1.0–2.0	g/l	BIAVIN BPA
	10.0–90.0	g/l	Glauber's salt or common salt
B	x	%	BEZAKTIV dye
C	5.0–10.0	g/l	Sodium carbonate
	0–4.0	ml/l	Caustic soda solution 38 °Bé (add progressively within 45 min) or 0–7.0 ml/l EGASOL SF
D	0.5	ml/l	Acetic acid 80 %, pH 7–9 during soaping
E	1.0–2.0	g/l	COTOBLANC SEL

COMBI DOS process

The COMBI DOS process is an optimised dosing process which is coordinated with the characteristics of the BEZAKTIV S dyes. Due to simultaneous dosing of salt and alkali, a considerably higher process reliability is achieved, especially with light and medium colours, with an excellent reproducibility. Articles with a difficult dye penetration, modified cellulose fibres, critical shades and dyeing wound packages can be produced with a much higher process reliability with COMBI DOS.

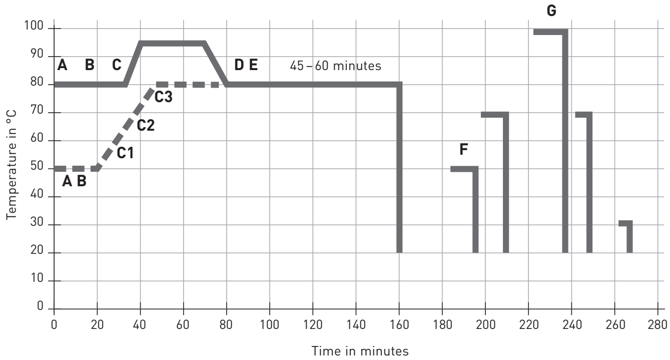
Dye bath exhaustion and dye fixing are almost linear, whereby fixation of the dye on the fibre occurs approximately 20 minutes after uptake. As a result migration is also still possible after substantive uptake onto the fibre.
The use of the COMBI DOS process is generally also possible with dark shades. However, in this case a salt content of 50 % is required due to the high salt quantity.
The dye process itself is performed in accordance with the 60 °C isothermal method. In comparison to the standard process, the dye has even better migration conditions, as there is no electrolyte in the liquor.
Dosing is started after the migration phase at 60 °C. The basic requirement for the use of the COMBI DOS system is a contemporary dosing unit. Calculation of the salt and alkali quantity is possible with the standard tables for BEZAKTIV S dyes.

Dosing depending on the dye concentration

	< 1 % colour depth	< 2 % colour depth	> 2 % colour depth
Salt and alkali	dose together	dose together	Preliminary addition of 50 % of the salt
Dosing progression	70 %	50 %	30 %
Dosing time	60 min	60 min	45 min
Running-on time	30 min	30 min	45 min

Process for turquoise and green shades with BEZAKTIV V and S

Standard process if turquoise or green dyes are used. At 80 °C these dyes have the highest exhaustion. With fabrics which are difficult to dye, a migration phase is also possible. This should then be performed in a neutral pH range. The use of Glauber's salt is recommended as an electrolyte.



A	1.0 – 2.0	g/l	SARABID LDR or SARABID MIP
	1.0 – 2.0	g/l	BIAVIN BPA
	2.0	g/l	MEROPAN XR GRANULAT
B	x	%	BEZAKTIV dye
C1	(10 % of) 10.0 – 90.0	g/l	Glauber's salt (add within 10 min)
C2	(30 % of) 10.0 – 90.0	g/l	Glauber's salt (add within 10 min)
C3	(60 % of) 10.0 – 90.0	g/l	Glauber's salt (add within 10 min)
D	5.0 – 10.0	g/l	Sodium carbonate (add within 20 min)
E	0 – 4.0	ml/l	Caustic soda solution 38 °Bé (add within 20 min) or 1.0 – 7.0 ml/l EGASOL SF
F	0.5	ml/l	Acetic acid, pH 7 – 9 during soaping
G	1.0 – 2.0	g/l	COTOBLANC SEL

To avoid catalytic fading the following combination elements are recommended on dyeing with turquoise dyes:
BEZAKTIV Brilliant Yellow S-W
BEZAKTIV Yellow S-8GN
BEZAKTIV Yellow V-5GL
BEZAKTIV Blue S-FR 150
BEZAKTIV Green V-6B 175

Salt and alkali requirements for BEZAKTIV HP/S and V

For non-mercerised cotton

		Alkali compound		
Dye [%]	Salt [g/l]	Sodium carbonate [g/l]	Caustic soda solution 38 °Bé [ml/l]	Only sodium carbonate [g/l]
< 0.1	10	5	–	5
0.1 – 0.5	20	10	–	10
0.5 – 1.0	30	5	1.0	15
1.0 – 2.0	40	5	1.5	15
2.0 – 3.0	50	5	2.0	20
3.0 – 4.0	60	5	2.5	20
4.0 – 5.0	70	5	3.0	25
5.0 – 6.0	80	5	3.5	25
> 6.0	90	5	3.5	25

For mercerised cotton and viscose

		Alkali compound		
Dye [%]	Salt [g/l]	Sodium carbonate [g/l]	Caustic soda solution 38 °Bé [ml/l]	Only sodium carbonate [g/l]
< 0.1	10	5	–	5
0.1 – 0.5	15	7.5	–	7.5
0.5 – 1.0	20	5	0.8	10
1.0 – 2.0	30	5	1.2	15
2.0 – 3.0	40	5	1.5	15
3.0 – 4.0	50	5	1.7	20
4.0 – 5.0	60	5	2.0	20
5.0 – 6.0	70	5	2.2	25
> 6.0	80	5	2.5	25

For green and turquoise dyes

		Alkali compound		
Dye [%]	Salt [g/l]	Sodium carbonate [g/l]	Caustic soda solution 38 °Bé [ml/l]	Only sodium carbonate [g/l]
< 0.1	10	5	–	5
0.1 – 0.5	20	10	–	10
0.5 – 1.0	30	15	–	15
1.0 – 2.0	40	5	0.5	15
2.0 – 3.0	50	5	1.0	20
3.0 – 4.0	60	5	1.25	20
4.0 – 5.0	70	5	1.5	20
5.0 – 6.0	80	5	1.5	25
> 6.0	90	5	1.5	25

Liquor ratio	Factor
1:5	1.30
1:10	1.00
1:15	0.80
1:20	0.65

Convariant factors to determine the lye requirements depending on the liquor ratio

Liquor ratio	Factor
1:5	– 10 g/l salt
1:10	Standard
1:15	+ 10 g/l salt
1:20	+ 20 g/l salt

Convariant factors to determine the salt requirements depending on the liquor ratio

Jigger process COMBI DOS for BEZAKTIV

Start temperature: 60 °C

1. Passage	1.0 – 2.0 g/l SARABID LDR or SARABID MIP
	1/2 quantity of dye on dry fabric
	2/3 quantity of dye on wet fabric
2. Passage	1/2 quantity of dye on dry fabric
	1/3 quantity of dye on wet fabric
3.+ 4. Passage	Migration
5. Passage	15 % amount of salt
	15 % amount of sodium carbonate
	15 % amount of caustic soda solution 38 °Bé
6. Passage	15 % amount of salt
	15 % amount of sodium carbonate
	15 % amount of caustic soda solution 38 °Bé
7. Passage	35 % amount of salt
	35 % amount of sodium carbonate
	35 % amount of caustic soda solution 38 °Bé
8. Passage	35 % amount of salt
	35 % amount of sodium carbonate
	35 % amount of caustic soda solution 38 °Bé
9. – 12. Passage	Fixation

Salt and alkali quantities

Dye [%]	Salt in [g/l]	Sodium carbonate [g/l]		Caustic soda solution 38 °Bé [ml/l]	
		Liquor ratio 1:2.5	Liquor ratio 1:5	Liquor ratio 1:2.5	Liquor ratio 1:5
< 0.2	10	5	5	0	0
0.2 – 0.5	10	5	10	1.0	0
0.5 – 1.0	20	5	5	2.0	1.4
1.0 – 2.0	30	5	5	3.0	2.2
2.0 – 3.0	40	5	5	4.0	3.1
3.0 – 5.0	50	5	5	5.0	4.3
> 5.0	50	5	5	6.0	5.2

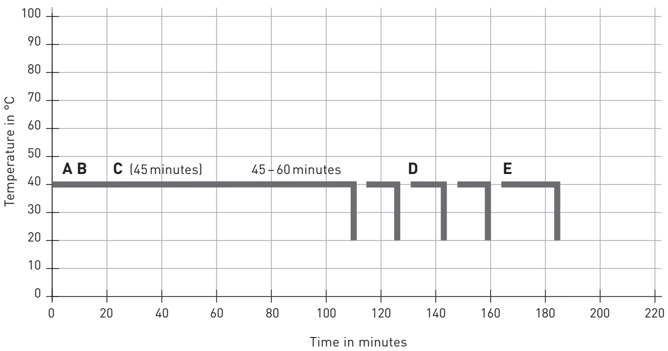
Remark:
Fabric which is difficult to dye through is preferably dyed at 60 °C. Dyeing with turquoise and green dyes is recommended at 80 °C with the use of Glauber's salt and only with sodium carbonate.

Salt and alkali amounts, jigger for green and turquoise dyes

80 °C Dyeing			
		Only sodium carbonate [g/l]	
Dye	Glauber's salt [g/l]	Liquor ratio 1:2.5	Liquor ratio 1:5
< 0,1	10	5	5
0.2 – 0.5	10	10	10
0.5 – 1.0	20	15	10
1.0 – 2.0	30	15	15
2.0 – 3.0	40	20	15
3.0 – 5.0	50	25	20
> 5.0	50	25	25

6.2 Exhaust process for BEZAKTIV GO

The optimal dyeing temperature is 40 – 60 °C. BEZAKTIV GO dyes can be used on exhaust dyeing machines (jet, overflow) as well as on exhaust apparatus (yarn dyeing apparatus, warp beam dyeing apparatus, HT beam). Please note the recommended quantities for salt and alkali.



A	1.0 – 2.0	g/l	SARABID LDR or SARABID MIP
	1.0 – 2.0	g/l	BIAVIN BPA
	10.0 – 90.0	g/l	Glauber's salt or common salt
B	x	%	BEZAKTIV GO dye
C	5.0	g/l	Sodium carbonate
	1.2 – 5.0	ml/l	Caustic soda solution 38 °Bé (add progressively within 45 min)
D	1.0 – 2.0	g/l	COTOBLANC SEL
E	1.0	ml/l	Acetic acid 80 %
	3.0	%	REWIN ACP

▸ Salt and alkali requirements for BEZAKTIV GO

For non-mercerised cotton

		GO process*		60 °C dyeing		
		Alkali compound		Alkali compound		
Dye [%]	Salt [g/l]	Sodium carbona-te [g/l]	Caustic soda solution 38 °Bé [ml/l]	Sodium carbona-te [g/l]	Caustic soda solution 38 °Bé [ml/l]	only sodium carbonate [g/l]
< 0.1	10	5	1.5	5	–	5
0.1 – 0.5	20	5	2.0	10	–	10
0.5 – 1.0	30	5	2.5	5	1.0	15
1.0 – 2.0	40	5	3.0	5	1.5	15
2.0 – 3.0	50	5	3.5	5	2.0	20
3.0 – 4.0	60	5	4.0	5	2.5	20
4.0 – 5.0	70	5	4.0	5	3.0	25
5.0 – 6.0	80	5	5.0	5	3.5	25
> 6.0	90	5	5.0	5	3.5	25

For mercerised cotton and viscose

		GO process*		60 °C dyeing		
		Alkali compound		Alkali compound		
Dye [%]	Salt [g/l]	Sodium carbona-te [g/l]	Caustic soda solution 38 °Bé [ml/l]	Sodium carbona-te [g/l]	Caustic soda solution 38 °Bé [ml/l]	only sodium carbonate [g/l]
< 0.1	5	5	1.2	5	–	5
0.1 – 0.5	10	5	1.5	7.5	–	7.5
0.5 – 1.0	20	5	1.9	5	0.8	10
1.0 – 2.0	30	5	2.3	5	1.2	15
2.0 – 3.0	40	5	2.7	5	1.5	15
3.0 – 4.0	50	5	3.0	5	1.7	20
4.0 – 5.0	60	5	3.3	5	2.0	20
5.0 – 6.0	70	5	3.6	5	2.2	25
> 6.0	80	5	4.0	5	2.5	25

*recommended pH range from pH 11.8 – 12.3

Liquor ratio	Factor
1:5	1.30
1:10	1.00
1:15	0.80
1:20	0.65

Convariant factors to determine the lye requirements depending on the liquor ratio

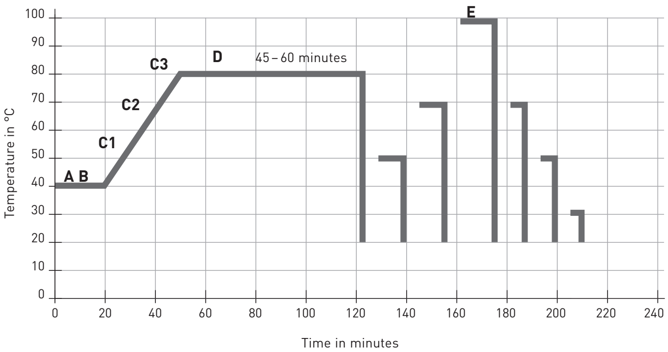
Liquor ratio	Factor
1:5	– 10 g/l salt
1:10	Standard
1:15	+ 10 g/l salt
1:20	+ 20 g/l salt

Convariant factors to determine the salt requirements depending on the liquor ratio

6.3 Exhaust process for BEZAKTIV HE

▶ Standard process

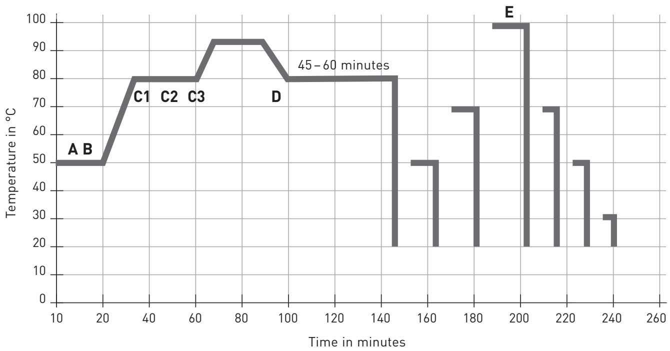
The 80 °C standard process is used for dyeing articles with negative levelling and dye penetration properties. Dosing of the salt in portions slowly and regularly increases the substantivity and a level dyeing result is achieved. The high dyeing temperature increases the migration and diffusion of the dyes.



A	1.0 – 2.0	g/l	SARABID LDR or SARABID MIP
	1.0 – 2.0	g/l	BIAVIN BPA
	2.0	g/l	MEROPAN XR GRANULAT
B	x	%	BEZAKTIV dye
C1	(10 % of) 20.0 – 80.0	g/l	Glauber's salt (add within 10 min)
C2	(30 % of) 20.0 – 80.0	g/l	Glauber's salt (add within 10 min)
C3	(60 % of) 20.0 – 80.0	g/l	Glauber's salt (add within 20 min)
D	5.0 – 15.0	g/l	Sodium carbonate (add within 20 min)
	0 – 3.0	ml/l	Caustic soda solution 38 °Bé (add within 30 min)
E	1.0 – 2.0	g/l	COTOBLANC SEL

▶ Migration process

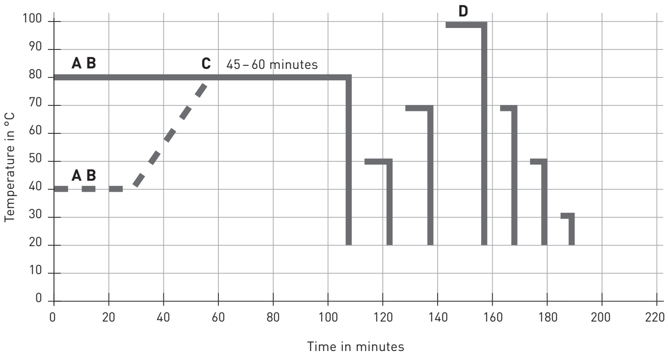
Increasing the temperature in the neutral phase enables even better penetration in critical articles. Especially regenerated fibres can be reliably dyed with level results with this process. The high migration temperature is also advantageous with very dense articles or when dyeing wound packages with a very high winding density.



A	1.0 – 2.0	g/l	SARABID LDR or SARABID MIP
	1.0 – 2.0	g/l	BIAVIN BPA
	2.0	g/l	MEROPAN XR GRANULAT
B	x	%	BEZAKTIV dye
C1	(10 % of) 20.0 – 80.0	g/l	Glauber's salt (add within 10 min)
C2	(30 % of) 20.0 – 80.0	g/l	Glauber's salt (add within 10 min)
C3	(60 % of) 20.0 – 80.0	g/l	Glauber's salt (add within 10 min)
D	5.0 – 15.0	g/l	Sodium carbonate (add within 20 min)
	0 – 3.0	ml/l	Caustic soda solution 38 °Bé (add within 30 min)
E	1.0 – 2.0	g/l	COTOBLANC SEL

▶ Isothermal process

Isothermal dyeing with BEZAKTIV HE dyes is particularly recommended when dyeing fibres which swell such as viscose or modal. Salt and dye are added at a neutral pH value. Dosing of the fixing alkali at 80 °C results in less swelling of the regenerated fibres. This increases the dye penetration and therefore levelness.



A	1.0 – 2.0	g/l	SARABID LDR or SARABID MIP
	1.0 – 2.0	g/l	BIAVIN BPA
	2.0	g/l	MEROPAN XR GRANULAT
	20.0 – 80.0	g/l	Glauber's salt
B	x	%	BEZAKTIV dye (add within 20 – 30 min)
C	5.0 – 15.0	g/l	Sodium carbonate (add within 20 min)
	0 – 3.0	ml/l	Caustic soda solution 38 °Bé (add within 30 min)
D	1.0 – 2.0	g/l	COTOBLANC SEL

Salt and alkali requirements for BEZAKTIV HE

	for non-mercerised cotton			for mercerised cotton and regenerated cellulose*			only sodium carbonate
Dye [%]	Salt [g/l]	Sodium carbonate [g/l]	Caustic soda solution 38 °Bé [ml/l]	Salt [g/l]	Sodium carbonate [g/l]	Caustic soda solution 38 °Bé [ml/l]	[g/l]
< 0.1	10	5	–	10	5	–	5
0.1 – 0.5	20	10	–	15	7.5	–	10
0.5 – 1.0	30	5	1.0	20	5	0.8	15
1.0 – 2.0	40	5	2.0	30	5	1.0	15
2.0 – 3.0	50	5	2.0	40	5	1.5	20
3.0 – 4.0	60	5	2.5	50	5	1.7	20
4.0 – 5.0	70	5	2.5	60	5	2.0	25
> 5.0	80	5	3.0	70	5	2.5	25

* Regenerated cellulose should generally only be dyed with 5 – 20 g/l sodium carbonate. The salt quantity should be increased by 10 g/l for higher liquor ratios (1:20).

Liquor ratio	Factor
1:5	1.30
1:10	1.00
1:15	0.80
1:20	0.65

Convariant factors to determine the lye requirements depending on the liquor ratio

Liquor ratio	Factor
1:5	– 10 g/l salt
1:10	Standard
1:15	+ 10 g/l salt
1:20	+ 20 g/l salt

Convariant factors to determine the salt requirements depending on the liquor ratio

6.4 Semi-continuous process

Woven and knitted fabric made of cellulose or regenerated cellulose can be dyed very economically with the cold pad batch (CPB) process with BEZAKTIV V/S and HP dyes. When selecting the dye it should be ensured that dyes with the same dyeing properties such as fibre affinity, liquor stability and fixing speed should be used. This information is given in the respective tables. Urea can be used in the case of very dark dyeing or also for cooling the padding liquor.
The urea should be added at a temperature of below 50 °C. To prevent change of shade from selvedge to centre during padding, a high liquor circulation should be ensured. With lightweight fabrics dyeing should be performed with a low trough level and a high fabric speed. To ensure a high liquor stability it should be ensured that the temperature of the padding liquor is not higher than 25 °C. Addition of urea makes the padding liquor cool. A low liquor stability results in tailing. Dye and alkali solutions with a 4:1 ratio are combined just before the padder with a mixing pump or doser and added to the dye trough. The application amounts of dye, auxiliaries and fixing alkalis are based on the overall volume of the padding liquor. It is important that the fabric has cooled properly to ensure reproducibility. If the fabric temperature is too high, the liquor stability is lowered which results in a change of shade from selvedge to centre. A constant production speed should generally be ensured. Different speeds influence the liquor pick-up and result in tailing. After padding the fabric is loaded with a straight line edge. In order to ensure optimum fixation of the dye, the dyed fabric must be packed in an air-tight plastic film and left for a certain time at room temperature to suit the dyes used. Packing the fabric in an airtight package prevents carbon dioxide from the air partially neutralising the fixing alkali and stops the top layers of fabric and the edges of the fabric drying out. Caustic soda solution is partially converted to sodium carbonate under the influence of carbon dioxide, which in turn prolongs the fixing time and can also cause a change of shade from selvedge to centre. The correct dwelling time is shown in the table for technical application information. When dyeing with several dyes the dwelling time of the dye with the longest dwelling time should be taken.

▸ Cold pad batch process with reduced silicate quantity
The reduced silicate variant is the standard variant and has a high pad liquor stability in the temperature range of 20 – 30 °C. The application amount of silicate 38° Bé is generally 50 ml/l. Addition of the dye with the fixing alkali is performed with a mixing pump with a ratio of 4:1. Silicate deposits can occur on the rollers if silicate is used. Furthermore the use of silicate during the soaping process requires an intensive washing process before neutralisation to prevent silicate precipitation.

Dye solution:

x	g/l	BEZAKTIV dye
0 – 100	g/l	Urea
1 – 3	g/l	COLORCONTIN VGP

Alkali solution:

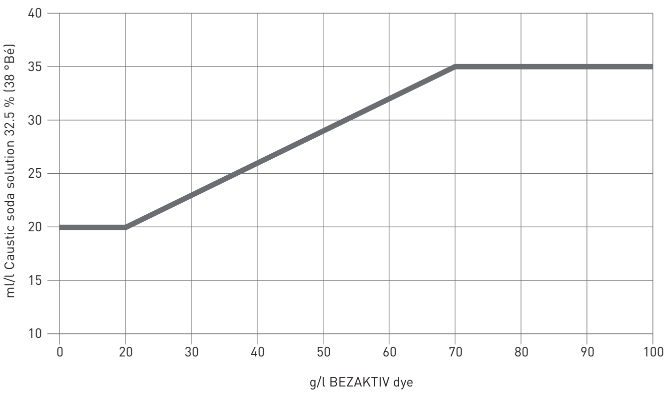
50	ml/l	Silicate 38 °Bé
y	ml/l	Caustic soda solution 32.5 % (38 °Bé)

Mixing ration:
The stated quantities g/l of dye, ml/l of silicate and ml/l of caustic soda solution 32.5 % (38 °Bé) are based on the total volume of the padding liquor.
Dye and alkali solution are combined with a mixing pump with a normal mixing ratio of 4:1 and form the total padding liquor volume.

Padding liquor temperature:
20 – 30 °C

Dwelling time:
6 – 24 hours, up to 40 hours no colour losses or changes in colour occur.

Alkali concentration for the reduced silicate process:



▸ Cold pad batch process sodium carbonate/lye variant
This variant is an alternative to the alkali systems containing silicate at padding liquor temperatures of 20 – 25 °C. The bath stability is lowered considerably at higher temperatures, which can result in change of shade from selvedge to centre. For this reason trough cooling and operation with a mixing pump is necessary. This method does not cause silicate deposits on the rollers. Furthermore the soaping process is shortened as a complex rinsing process to remove silicate is not necessary. In contrast to the reduced sodium silicate version, the required fixing time is 1.5 times longer when dyeing with the sodium carbonate/alkaline solution version.

Dye solution:

x	g/l	BEZAKTIV dye
0 – 100	g/l	Urea
1 – 3	g/l	COLORCONTIN VGP

Alkali solution:

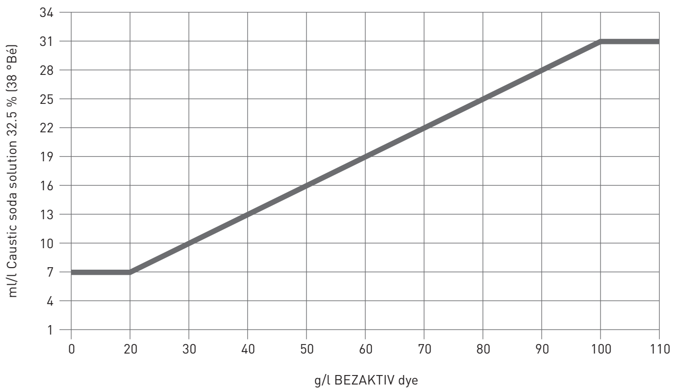
20	g/l	Sodium carbonate
y	ml/l	Caustic soda solution 32.5 % (38 °Bé)

Mixing ratio:
The stated quantities g/l of dye, g/l of sodium carbonate and ml/l of caustic soda solution 32.5 % (38 °Bé) are based on the total volume of the padding liquor.
Dye and alkali solution are combined with a mixing pump with a normal mixing ratio of 4:1 and form the total padding liquor volume.

Padding liquor temperature:
20 – 30 °C

Dwelling time:
9 – 36 hours, up to 40 hours no colour losses or changes in colour occur.

Alkali concentration for the sodium carbonate/lye solution process:



Important note:
The dyes BEZAKTIV Turquoise V-G conc., BEZAKTIV Turquoise S-BF 150 and BEZAKTIV Green V-6B 175 are not always suitable for the Cold pad batch process sodium carbonate/lye variant. Minimum dwelling time: 48 h
The dyes BEZAKTIV Blue V-RN spec., BEZAKTIV Blue V-RN 150, BEZAKTIV Royal S-B, BEZAKTIV Blue S-GN 150, BEZAKTIV Navy S-2GL are not suitable for the Cold pad batch process sodium carbonate/lye variant.

▶ Silicate-free process variant

EGASOL SF is a silicate-free alkali compound for CPB dyeing with BEZAKTIV V/S and HP dyes in a padding liquor temperature range of 20 – 30 °C. In comparison to the reduced silicate variant, the fixing time is extended by 1.5 times when dyeing with EGASOL SF, but a very good liquor stability is ensured. It is added with a mixing pump with a ratio of 4:1. As EGASOL SF is free from silicates, no deposits form on the rollers during padding. In addition the soaping process can be shortened, as a complex rinsing process before neutralisation to remove silicate is no longer necessary.

Dye solution:

x	g/l	BEZAKTIV dye
0 – 100	g/l	Urea
1 – 3	g/l	COLORCONTIN VGP

Alkali solution:

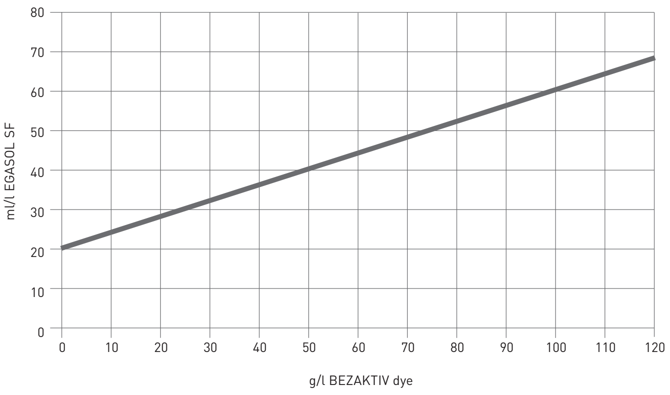
y	ml/l	EGASOL SF

Mixing ratio:
The stated quantities g/l of dye and ml/l of EGASOL SF are based on the total volume of the padding liquor.
Dye and EGASOL SF solution are combined with a mixing pump with a normal mixing ratio of 4:1 and form the total padding liquor volume.

Padding liquor temperature:
20 – 30 °C

Dwelling time:
9 – 48 hours

Application amount of EGASOL SF:



▶ Cold pad batch tropical variant

The tropical method permits dyeing in countries with a tropical climate. Increasing to 100 ml/l of silicate and reducing the lye quantities results in a high liquor stability at temperatures of 30 – 35 °C. The higher application amounts of silicate can result in a higher quantity of deposits on rollers. In addition, an intensive washing stage is necessary before neutralisation to prevent silicate precipitation and resulting marks on the fabric.

Dye solution:

x	g/l	BEZAKTIV dye
0 – 100	g/l	Urea
1 – 3	g/l	COLORCONTIN VGP
2 – 4	g/l	HEPTOL SF4

Alkali solution:

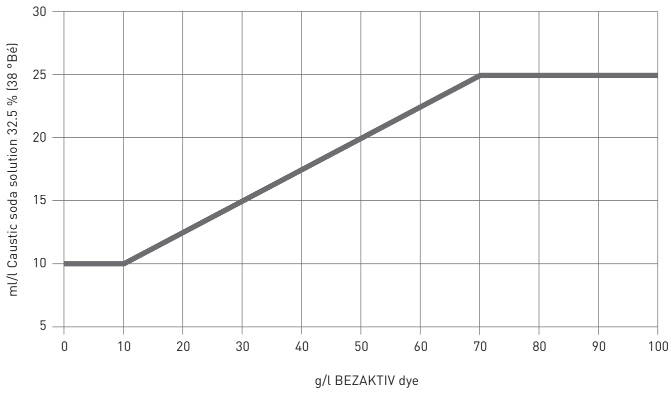
100	ml/l	Silicate 38 °Bé
y	ml/l	Caustic soda solution 32.5 % (38 °Bé)

Mixing ratio:
The stated quantities g/l of dye, ml/l of silicate and ml/l of caustic soda solution 32.5 % (38 °Bé) are based on the total volume of the padding liquor.
Dye and alkali solution are combined with a mixing pump with a normal mixing ratio of 4:1 and form the total padding liquor volume.

Padding liquor temperature:
30 – 35 °C

Dwelling time:
6 – 24 hours, up to 40 hours no colour losses or changes in colour occur.

Alkali concentration for the tropical method:



Important note:
The dyes BEZAKTIV Blue V-RN spec., BEZAKTIV Blue V-RN 150, BEZAKTIV Royal S-B, BEZAKTIV Blue S-GN 150, BEZAKTIV Navy S-2GL are not suitable for the silicate-free process variant.

Technical application information

BEZAKTIV V dyes

Dye designation	Fibre affinity	Liquor stability	Fixing speed	Minimum fixing time
BEZAKTIV Yellow V-5GL	low	medium	slow	16 h
BEZAKTIV Yellow V-GL 150	low	low	medium	12 h
BEZAKTIV Yellow V-GR 133	medium	medium	fast	6 h
BEZAKTIV Yellow V-R	low	low	fast	6 h
BEZAKTIV Yellow V-2R 150	low	low	fast	6 h
BEZAKTIV Red V-GG	low	low	fast	6 h
BEZAKTIV Red V-RB 133	medium	high	medium	8 h
BEZAKTIV Red V-F3B	medium	low	fast	6 h
BEZAKTIV Red V-3B	medium	high	fast	6 h
BEZAKTIV Red V-BB 150	medium	low	fast	6 h
BEZAKTIV Bordeaux V-B	medium	medium	fast	6 h
BEZAKTIV Violet V-5R	high	low	fast	6 h
BEZAKTIV Blue V-RN spec.	low	medium	fast	6 h
BEZAKTIV Blue V-2B 133	medium	medium	medium	12 h
BEZAKTIV Turquoise V-G conc.	low	high	slow	24 h
BEZAKTIV Green V-6B 175	low	high	slow	24 h
BEZAKTIV Brown V-GR	medium	high	fast	6 h
BEZAKTIV Navy V-2G 133	low	medium	medium	8 h
BEZAKTIV Black V-RL 150	high	low	fast	6 h
BEZAKTIV Black V-B 150	high	medium	medium	8 h
BEZAKTIV Black V-BD 133	high	high	fast	8 h
BEZAKTIV Black V-GRA	high	medium	medium	8 h

BEZAKTIV S dyes

Dye designation	Fibre affinity	Liquor stability	Fixing speed	Minimum fixing time
BEZAKTIV Yellow S-8GN	low	low	medium	12 h
BEZAKTIV Yellow S-MAX	medium	medium	medium	8 h
BEZAKTIV Yellow S-3R 150	medium	medium	medium	8 h
BEZAKTIV Yellow S-LF	medium	medium	medium	12 h
BEZAKTIV Orange S-RL 150*	medium	high	medium	12 h
BEZAKTIV Scarlet S-2GF 150	low	low	medium	6 h
BEZAKTIV Red S-GT 150	medium	high	medium	16 h
BEZAKTIV Red S-2B	medium	medium	medium	12 h
BEZAKTIV Red S-3B 150	low	high	medium	16 h
BEZAKTIV Red S-LF	medium	high	medium	12 h
BEZAKTIV Blue S-2G	medium	medium	medium	8 h
BEZAKTIV Royal S-B	medium	medium	fast	6 h
BEZAKTIV Blue S-FR 150	medium	low	medium	8 h
BEZAKTIV Blue S-RN	medium	medium	fast	8 h
BEZAKTIV Blue S-GN 150	medium	low	medium	8 h
BEZAKTIV Blue S-GLD 150	medium	low	medium	12 h
BEZAKTIV Blue S-NX	medium	high	medium	12 h
BEZAKTIV Turquoise S-BF 150	low	high	slow	24 h
BEZAKTIV Navy S-LF	medium	medium	medium	12 h
BEZAKTIV Navy S-3G 150	medium	medium	medium	16 h
BEZAKTIV Navy S-2GL	medium	medium	medium	8 h
BEZAKTIV Navy S-CR	high	medium	medium	8 h
BEZAKTIV Navy S-BL	high	medium	medium	8 h
BEZAKTIV Navy S-G	medium	medium	medium	8 h
BEZAKTIV Green S-4B 150	medium	high	medium	12 h
BEZAKTIV Brown S-5BR	medium	high	medium	16 h
BEZAKTIV Black S-NN 02	high	medium	medium	8 h
BEZAKTIV Black S-GR*	high	medium	medium	8 h
BEZAKTIV Cosmos S-MAX	high	medium	medium	8 h

*not suitable/recommended for CPB

BEZAKTIV S-MATRIX dyes

Dye designation	Fibre affinity	Liquor stability	Fixing speed	Minimum fixing time
BEZAKTIV Yellow S-MATRIX 150 01	low	medium	medium	12 h
BEZAKTIV Red S-MATRIX 150 01	low	high	medium	12 h
BEZAKTIV Blue S-MATRIX 150 01	low	medium	medium	12 h

BEZAKTIV COSMOS S-C dyes

Dye designation	Fibre affinity	Liquor stability	Fixing speed	Minimum fixing time
BEZAKTIV COSMOS Yellow S-C	medium	low	medium	8 h
BEZAKTIV COSMOS Gold S-C	medium	low	medium	8 h
BEZAKTIV COSMOS Orange S-C	medium	medium	fast	6 h
BEZAKTIV COSMOS Carmine S-C	low	high	medium	16 h
BEZAKTIV COSMOS Red S-C[2]	medium	high	fast	6 h
BEZAKTIV COSMOS Blue S-C	medium	low	fast	6 h
BEZAKTIV COSMOS Dark Blue S-C	high	high	medium	12 h
BEZAKTIV COSMOS Navy S-C	high	medium	fast	6 h
BEZAKTIV COSMOS Deep Navy S-C	high	high	medium	8 h
BEZAKTIV COSMOS Black S-C	high	medium	medium	8 h

BEZAKTIV S-W dyes

Dye designation	Fibre affinity	Liquor stability	Fixing speed	Minimum fixing time
BEZAKTIV Brilliant Yellow S-W	low	low	medium	12 h
BEZAKTIV Yellow S-W	medium	low	medium	16 h
BEZAKTIV Red S-W	medium	low	medium	12 h
BEZAKTIV Scarlet S-W	medium	low	fast	6 h
BEZAKTIV Blue S-W	medium	medium	medium	8 h
BEZAKTIV Dark Blue S-W	high	high	medium	8 h
BEZAKTIV Navy S-W	high	high	medium	8 h
BEZAKTIV Black S-W	medium	medium	fast	6 h

BEZAKTIV GO dyes

Dye designation	Fibre affinity	Liquor stability	Fixing speed	Minimum fixing time
BEZAKTIV Brilliant Yellow GO	low	medium	medium	8 h
BEZAKTIV Golden Yellow GO[1]	medium	low	fast	6 h
BEZAKTIV Orange GO	medium	medium	fast	6 h
BEZAKTIV Scarlet GO	medium	low	fast	6 h
BEZAKTIV Red GO	medium	medium	fast	6 h
BEZAKTIV Blue GO	medium	low	medium	8 h
BEZAKTIV Dark Blue GO	medium	low	fast	6 h
BEZAKTIV Navy GO	high	medium	fast	6 h
BEZAKTIV Black GO	high	medium	fast	6 h
BEZAKTIV Velvet Black GO	high	high	fast	6 h
BEZAKTIV ZERO Orange GO	low	low	fast	6 h
BEZAKTIV ZERO Scarlet GO	medium	low	fast	6 h
BEZAKTIV ZERO Navy GO	medium	high	fast	6 h
BEZAKTIV ZERO Black GO	low	medium	fast	6 h

[1] This offer is not valid in Mexiko.
[2] This offer is not valid in Japan.

BEZAKTIV HP dyes

Dye designation	Fibre affinityt	Liquor stability	Fixing speed	Minimum fixing time
BEZAKTIV Brilliant Yellow HP-M	low	medium	medium	8 h
BEZAKTIV Yellow HP-F	low	high	medium	8 h
BEZAKTIV Yellow HP-NP	medium	medium	medium	12 h
BEZAKTIV Brilliant Red HP-G	medium	low	medium	8 h
BEZAKTIV Red HP-BL	medium	medium	medium	8 h
BEZAKTIV Red HP-3B	medium	medium	medium	8 h
BEZAKTIV Blue HP-R	medium	medium	medium	8 h
BEZAKTIV Dark Blue HP-W	medium	high	medium	8 h
BEZAKTIV Olive HP-B	medium	medium	medium	12 h
BEZAKTIV Brown HP-5R	medium	high	medium	16 h
BEZAKTIV Grey HP-N	medium	medium	medium	12 h

Table information:
The given dye specifications were determined with use of the reduced silicate method (50 ml/l) and caustic soda solution 38 °Bé with a dye application amount of 30 g/l at a padding temperature of 25 °C and a dwelling temperature of 25 °C.

Fibre affinity:
The fibre affinity was determined by adding alkali and specifies the specific exhaustion properties of a dye. To counter tailing problems, the use of low-affinity dyes or at least the use of dyes with the same fibre affinity is advantageous.

Padding liquor stability:
The padding liquor stability is given in minutes. A period of time for hydrolysis of 10 % of the employed dye is determined. This theoretical value cannot be implemented directly in practice, as the dye and alkali solution are constantly added to the trough. For this reason the actual value of the liquor replacement in the trough should not exceed three minutes. The values of the BEZAKTIV dyes were determined at a temperature of 25 °C and with the use of the reduced silicate variant. A higher temperature and different alkali systems influence the liquor stability.
The BEZAKTIV dyes are categorised as follows:

low	< 10 minutes
medium	10 – 20 minutes
high	> 20 minutes

Fixing speed:
The fixing speed depends greatly on the dwelling temperature. A regular temperature of the fabric, liquor and environment is a requirement for regular fixation. The stated values of the BEZAKTIV dyes are based on an ambient temperature of 25 °C during dwelling. If the ambient temperature is lower, the dye is fixed more slowly. For this reason it is necessary to adapt the dwelling time accordingly.

slow	> 16 hours
medium	8 – 16 hours
fast	< 8 hours

6.5 Continuous process

▶ Pad dry pad steam process

The pad dry pad steam process is the classic continuous process for dyeing woven fabric with BEZAKTIV V/S and HP dyes. It is primarily used for cellulose articles with a high yardage. This process is characterised by a high productivity, a good fabric appearance as well as a good colour yield.
The use of a dosing pump is not necessary with this process.

Dye pad:

x	g/l	BEZAKTIV dye
1.0 – 3.0	g/l	COLORCONTIN VGP
1.0 – 5.0	g/l	MEROPAN XR GRANULAT
5.0 – 10.0	g/l	MIGRASOL SAP

Liquor pick-up:
60 – 80 %

Padding temperature:
20 – 30 °C

Pre-drying to:
a residual moisture content of 30 – 35 % in the IR zone

Drying:
110 – 140 °C

Padding of chemicals:

250	g/l	Common salt
20	g/l	Sodium carbonate
y	ml/l	Caustic soda solution 38 °Bé

Liquor pick-up:
80 – 100 %

Padding temperature:
20 – 30 °C

Fixation:
Steaming with 102 °C saturated steam for 30 – 75 seconds.

Alkali requirements

Dye	[g/l]	< 20	20 – 40	> 40
Caustic soda solution [38 °Bé]	[ml/l]	7.5	10	15

Remark:
Regular pre-drying is necessary to ensure optimum reproducibility and a level fabric appearance.
For phthalocyanine dyes the caustic soda solution must be increased by 5 ml/l.

▶ Pad dry thermofix process

The pad dry thermofix process is a single-bath and salt-free continuous process. Particularly suitable for light to medium shades.
A lower light fastness level is achieved than with the pad dry pad steam process. No dosing pump is required for this process. Fixation is performed with hot air. Sodium bicarbonate or sodium carbonate can be used as a fixing alkali, whereby sodium bicarbonate has a higher liquor stability than sodium carbonate. For this reason bicarbonate is recommended for BEZAKTIV V/S and HP dyes and sodium carbonate for BEZAKTIV PS dyes.
To ensure sufficient fixation of the dye it is necessary to ensure a certain moisture content on the fabric. For this reason the use of 50 – 150 g/l urea is necessary.

Dye pad:

x	g/l	BEZAKTIV dye
1.0 – 3.0	g/l	COLORCONTIN VGP
1.0 – 5.0	g/l	MEROPAN XR GRANULAT
5.0 – 10.0	g/l	MIGRASOL SAP
50 – 150	g/l	Urea
y	g/l	Sodium bicarbonate or soda carbonate

Liquor pick-up:
60 – 80 %

Padding temperature:
20 – 30 °C

Pre-drying to:
30 – 35 % residual moisture content

Drying:
110 – 140 °C

Thermofixing:
60 – 180 s at 160 °C

Alkali requirements (sodium bicarbonate)

Dye	[g/l]	5	10	20	30	> 30
Sodium bicarbonate	[g/l]	10	15	20	25	30

Alkali requirements (sodium carbonate)

Dye	[g/l]	5	10	20	30	> 30
Sodium carbonate	[g/l]	5	10	15	20	25

Remark:
Regular pre-drying is necessary to ensure optimum reproducibility and a level fabric appearance. The dyes should be preselected due to the specific conditions during thermofixing.

▶ Pad steam process

The pad steam process is a single-bath continuous process in which the dye is fixed immediately after impregnation using saturated steam. The method is preferred for voluminous articles such as terry towelling that cause high intermediate drying costs and migration problems. Sodium bicarbonate, sodium or sodium carbonate/caustic soda solution 38° Bé can be used as fixing alkalis. It is not necessary to use a mixing pump, whereby the formulation with sodium bicarbonate has the higher liquor stability.

Dye pad:

x	g/l	BEZAKTIV dye
1.0 – 3.0	g/l	COLORCONTIN VGP
1.0 – 5.0	g/l	MEROPAN XR GRANULAT
50 – 100	g/l	Urea (if dye solubility is required)
0.0 – 30.0	g/l	Common salt
x	g/l	Sodium bicarbonate

Liquor pick-up:
60 – 80 %, pile fabrics and terry towelling 100 – 120 %

Padding temperature:
20 – 30 °C

Steaming:
60 – 90 s saturated steam

Alkali and salt requirements (sodium bicarbonate)

Dye	[g/l]	5	10	20	30	> 30
Sodium bicarbonate	[g/l]	10	15	20	25	30
Common salt	[g/l]	10	10	20	30	30

Alkali and salt requirements (sodium carbonate)

Dye	[g/l]	5	10	20	30	> 30
Sodium carbonate	[g/l]	5	10	15	20	25
Common salt	[g/l]	10	10	20	30	30

Alkali and salt requirements (sodium carbonate/NaOH)*

Dye	[g/l]	5	10	20	30	> 30
Sodium carbonate	[g/l]	5	10	15	20	25
NaOH [38 °Bé]	[ml/l]	5	5	7,5	10	10
Common salt	[g/l]	10	10	20	30	30

Remark:
This process is preferred for light to medium colour depths. In dark shades, more dye is used than with the pad dry pad steam process. Urea is only necessary if required by the solubility of the dye.

* Dosing pump required, mixing ratio of dye to alkali is 4:1 as in the cold pad batch process.

▶ Pad steam dry process

The pad steam dry process makes it possible to dye continuously with BEZAKTIV V/S and HP dyes in light to deep shades on cellulose materials with good colour yield, without the addition of salt with excellent reproducibility. To use the process described the following process parameters/fixing conditions must be met (guide values):

Circulating temperature:
120 – 130 °C

Steam content:
25 – 30 % percent by volume

Fixing time:
Approx. 2 – 4 minutes, depending on the substrate to be dyed and the fabric speed

Air circulation:
Depending on the related substrate

The use of a mixing pump is necessary on the usage of sodium carbonate/caustic soda solution as alkali. The mixing ratio of dye to alkali is, as for the CPB process, 4:1.
This also defines the stability of the padding liquors.

Composition of the padding liquor:

x	g/l	BEZAKTIV dye
1.0 – 3.0	g/l	COLORCONTIN VGP
5.0 – 10.0	g/l	MEROPAN XR GRANULAT
5.0 – 10.0	g/l	MIGRASOL SAP
20 – 25	°C	Temperature

Urea can be used if required by the dye solubility.

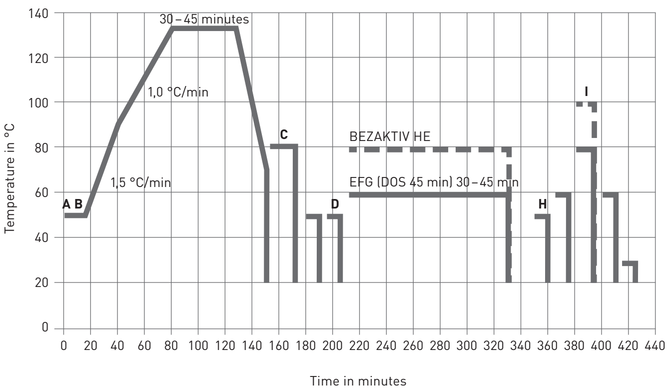
Liquor pick-up:
60 – 80 %

BEZAKTIV V/S/HP dye	[g/l]	≤ 20	20 – 40	40 – 60	≥ 60
Sodium carbonate	[g/l]	20	20	20	20
Caustic soda solution 32.5 % (38° Bé)	[ml/l]	7	10	16	20

6.6 Dyeing of PES blends with the exhaust process

▶ Two-bath dyeing with BEZAKTIV/BEMACRON dyes

This process is the most frequently employed process for blends of cellulose and polyester with reactive and disperse dyes. The PES is pre-dyed at < 130 °C and then subsequently cleaned. The cellulose is then subsequently dyed with reactive dyes, whereby the dyeing temperature depends on the selected dye class. BEZAKTIV V/S and HP dyes are used at 60 °C. BEZAKTIV HE dyes have an optimum dyeing temperature of 80 °C.



A	1.0 – 2.0	g/l	BIAVIN BPA
	0.5	g/l	KOLLASOL CDS
	2.0 – 3.0	g/l	NEUTRACID BO 45
	0.0 – 1.0	g/l	CHT-DISPERGATOR XHT-S
	0.0 – 2.0	%	EGASOL MD or UP
B	x	%	BEMACRON dye
C	1.0	g/l	SARABID DLO conc.
	4.0	ml/l	Caustic soda solution 38 °Bé
	1.0 – 2.0	g/l	REDULIT F
D	0.5	ml/l	Acetic acid 80 % (neutralize)
E	1.0 – 2.0	g/l	BIAVIN BPA
	0.5	g/l	KOLLASOL CDS
	2.0	g/l	SARABID LDR or SARABID MIP
	10.0 – 80.0	g/l	Common salt/Glauber's salt
F	x	%	BEZAKTIV dye
G	5.0 – 20.0	g/l	Sodium carbonate
	0.0 – 4.5	ml/l	Caustic soda solution 38 °Bé
H	0.5	ml/l	Acetic acid 80 %
I	1.0 – 2.0	g/l	COTOBLANC SEL

6.7 Dyeing of blends with PES with the continuous process

▶ Pad (dry) thermosol pad steam process

Standard continuous process for cellulose/PES blends. This method permits an unlimited batch size. High quantities of salt are necessary to achieve a high degree of fixing. No dosing pump is required for this process. An extensive range of dyes permits a wide selection of shades.

Dye pad:

1.0 – 3.0	g/l	COLORCONTIN VGP
5.0	g/l	MEROPAN XR GRANULAT
0.0 – 10.0	g/l	MIGRASOL SAP
0.5	ml/l	Acetic acid 80 %
x	g/l	BEZAKTIV dye and BEMACRON dye

Padding at room temperature

Pre-drying with infrared to a residual moisture content of

Thermosoling at 200 – 220 °C for 45 – 60 s

Alkali pad:

250	g/l	Common salt
20	g/l	Sodium carbonate
7.5 – 15	ml/l	Caustic soda solution 38 °Bé

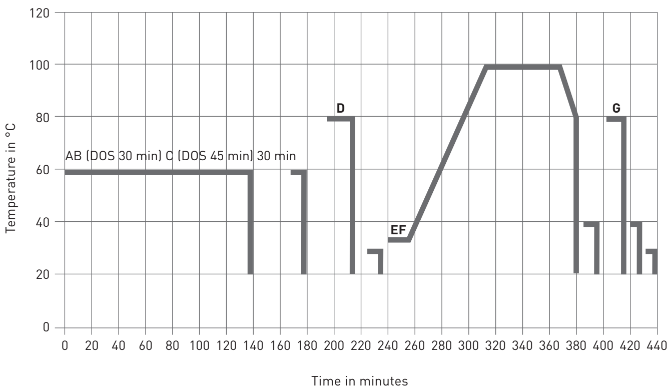
Steaming with saturated steam at 102 °C for 30 – 90 seconds.

Remark:
With phthalocyanine dyes the caustic soda solution quantity must be increased by 5 ml/l.

6.8 Dyeing of PA blends with exhaust process

- Two-bath 2-stage process with BEZAKTIV and BEMACID | BEMAPLEX

Standard process for all shades with high fastness level. With this method the cellulose content is pre-dyed. Reactive dyes with a low level of PA staining should be preferably used. Thorough rising or soaping out with COTOBLANC SEL at pH 8 – 8.5 is necessary to ensure that there is no hydrolizate in the bath. Neutralisation using acetic acid prior to soaping should not be used, as in the acidic medium the hydrolizate colours the PA to varying degrees. Intermediate cleaning is not necessary for light shades. After reactive dyeing the PA content is dyed from a fresh bath. Depending on the fastness requirements, acid or metal complex dyes can be used. Anionic after-treatment additionally increases the fastness level of the PA dye.



A	1.0 – 2.0	g/l	BIAVIN BPA
	2.0	g/l	SARABID LDR or SARABID MIP
	10.0 – 80.0	g/l	Common salt/Glauber's salt
B	x	%	BEZAKTIV dye
C	5.0 – 20.0	g/l	Sodium carbonate
	0.0 – 3.5	ml/l	Caustic soda solution 38 °Bé
D	1.0 – 2.0	g/l	COTOBLANC SEL
E	1.0	g/l	MEROPAN EF 150
	0.3 – 2.0	%	SARABID IPD/IPF/IPM
F	x	%	BEMACID | BEMAPLEX dye
G	3.0	%	PAFIX No1
	1.5	ml/l	Formic acid 85 %

Dye selection with good polyamide reserve:
BEZAKTIV Red V-3B
BEZAKTIV Violet V-5R
BEZAKTIV Black V-RL 150

BEZAKTIV Yellow S-W
BEZAKTIV Scarlet S-W
BEZAKTIV Red S-W
BEZAKTIV Blue S-W
BEZAKTIV Dark Blue S-W
BEZAKTIV Black S-W

BEZAKTIV Yellow S-3R 150
BEZAKTIV Orange S-RL 150
BEZAKTIV Red S-GT 150
BEZAKTIV Red S-3B 150
BEZAKTIV Brilliant Red S-3G
BEZAKTIV Blue S-2G
BEZAKTIV Blue S-RN
BEZAKTIV Blue S-GLD 150
BEZAKTIV Navy S-3G 150
BEZAKTIV Green S-4B 150
BEZAKTIV Brown S-5BR
BEZAKTIV Black S-GR
BEZAKTIV Cosmos S-MAX

BEZAKTIV COSMOS Carmine S-C

BEZAKTIV Brilliant Yellow HP-M
BEZAKTIV Yellow HP-NP
BEZAKTIV Brilliant Red HP-G
BEZAKTIV Red HP-BL
BEZAKTIV Red HP-3B
BEZAKTIV Blue HP-R
BEZAKTIV Brown HP-5R

BEZAKTIV Brilliant Yellow GO
BEZAKTIV Scarlet GO
BEZAKTIV ZERO Orange GO
BEZAKTIV ZERO Scarlet GO
BEZAKTIV ZERO Navy GO
BEZAKTIV ZERO Black GO

7. Soaping of reactive dyes

In addition to the dye selection, the soaping process has a decisive effect on the wear fastness. A high fastness level of reactive dyes can only be achieved if the fabric is subjected to after-treatment according to their colour depth after dyeing. Reactive dyes have a fixing degree range of 60 – 90 % depending on the characteristics and colour depth. The remaining dye is contained in the bath or on the fabric as a hydrolizate. This hydrolizate must be removed from the fabric.
The classic after-treatment of reactive dyes comprises the following:

- a rinsing process to remove the electrolyte and non-fixed hydrolysed dye
- neutralisation, normally with acetic acid to lower the pH value in the soap bath and reduce an alkaline hydrolysis of the dye
- a soaping process to remove the dye hydrolizate from the surface
- a subsequent rinsing process to wash out the released hydrolizate and to achieve the required fastness level

The rinsing process should be performed with sufficient water to achieve a high bath replacement. Rinsing is a dilution process which is necessary to remove high quantities of electrolyte, alkali and non-fixed dye from the dye bath.
The substantivity of the reactive dye hydrolysate influences its washability. The lower this is, the more easily the hydrolysed dye can be washed out.
If there is a high salt concentration in the rinsing or soaping bath, it is very difficult to remove the hydrolizate from the fibre. The electrolyte lowers the solubility of the dye, increases its affinity and reduces its wash-out properties.
The use of hard water also lowers the solubility of the dyes and results in negative wash-out properties. For this reason it should be ensured that soft production water is also used for rinsing and soaping processes. The soaping temperature influences the diffusion of the dye hydrolizate. High temperatures promote diffusion. The non-fixed reactive dye can be more easily removed from the fabric to the soap bath. The recommended soaping temperature is 98 °C, whereby soaping should be performed for 10 – 15 minutes. The soaping process can be repeated with very dark shades. A slightly alkaline pH value can increase the soaping effect, depending on the dye type. BEZAKTIV HE dyes are, for example, not neutralised before soaping. With polyester blends it is advisable to lower the soaping temperature to 80 °C to prevent migration of the disperse dye to the polyester surface. Soaping at 98 °C would otherwise have a negative effect on the fastness. When washing off and soaping CPB dyes which were dyed with the silicate method, neutralisation is not performed until after soaping. Neutralisation before soaping would result in silicate precipitation.

8. Remedying faulty dye results

8.1 Lightening

Lightening is possible with the following method:
5 – 10 g/l sodium carbonate; 30 min at 95 °C; hot and cold rinsing. The degree of lightening depends on the dye, its application amount and the liquor ratio. Changes of colour can occur during combination dyeing with several dyes.

8.2 Stripping

Reactive dyes can be stripped with both reductive and oxidative methods. Depending on the dye it can be necessary to use a combination of both methods to achieve a good stripping effect. When stripping dyes containing a metal complex element, a suitable sequestering agent should be added to the stripping bath.

Stripping method I:

10.0	ml/l	Caustic soda solution 32.5 % (38 °Bé)
5.0	g/l	Sodium dithionite
2.0	g/l	RETINOL M

Treatment for 30 min at 80 °C followed by hot and cold rinsing; neutralise.

Stripping method II:

3.0	g/l	Active chlorine
x	ml/l	pH 10 – 11 with caustic soda solution 32.5 % (38 °Bé)

Treatment for 30 min at 25 °C followed by cold rinsing.

1.0	g/l	Sodium bisulphite

Treatment for 10 min at 40 °C followed by hot and cold rinsing.

Stripping method III:

10.0	ml/l	Caustic soda solution 32.5 % (38 °Bé)
5.0	g/l	Sodium dithionite
2.0	g/l	RETINOL M

Treatment for 30 min at 80 °C followed by hot and cold rinsing.

3.0	g/l	Active chlorine
x	ml/l	pH 10 – 11 with caustic soda solution 32.5 % (38 °Bé)

Cold treatment for 30 min followed by cold rinsing.

1.0	g/l	Sodium bisulphite

Treatment for 10 min at 40 °C followed by hot and cold rinsing.

Remark:
To ensure the stable state of vat reduction during reductive stripping it is necessary to adapt the quantities of caustic soda solution and sodium dithionite accordingly on machines with an air volume. The following is required for 1 m^3 air:
1.7 l Caustic soda solution 32.5 % (38 °Bé)
1.7 kg Sodium dithionite

9. Fastness

9.1 General information

Generally the fastness level of BEZAKTIV dyes is good. This level depends on the dye itself, the employed dye quantity and the dyed material. The latter can have a considerable influence on the fastness properties. Effective pretreatment is a requirement for good fastness properties. On mercerised cotton the fastness can be < one grade higher depending on the dye type and colour depth.
To offer customers more comprehensive information, all BEZAKTIV dyes were subjected to in-depth fastness tests in compliance with DIN EN ISO and additionally to AATCC standard requirements.
In addition to changes in the colour after a fastness test, the staining behaviour on other fibres was also assessed.
The following fastness properties were tested:

Fastness to light	DIN EN ISO 105-B02
Perspiration and light fastness	DIN EN ISO 105-B07
Washing fastness 60 °C	DIN EN ISO 105-C06/C2S
Washing fastness 95 °C	DIN EN ISO 105-C06/E2S
Fastness to multiple washing 60 °C	DIN EN ISO 105-C09
Colour fastness to water	DIN EN ISO 105-E01
Perspiration fastness acid/alk.	DIN EN ISO 105-E04
Colour fastness to chlorinated water 20/50 ppm	DIN EN ISO 105-E03
Chlorine washing 70 °C	DIN EN ISO 105-C06/D3S
Peroxide bleaching fastness	DIN EN ISO 105-N02
Cold bleaching fastness	CHT CH Norm 107F
Ozone fading fastness	CHT CH Norm 111 F (O_3)
Nitrogen oxide fastness	DIN EN ISO 105-G01
Hydrolysis stability	CHT CH Norm 106F
Mercerising fastness	DIN EN ISO 105-X04

Fastnesses to AATCC	
Fastness to light	TM 16E 20 AFU
Washing fastness 120 °F (49 °C)	TM 61-2A
Washing fastness 160 °F (71 °C)	TM 61-3A

Cold bleaching fastness – CHT CH Norm 107F:

5	ml/l	FELOSAN JET
7	ml/l	CONTAVAN GAL
20	ml/l	Sodium silicate 38 °Bé
40	ml/l	NaOH 32.5 % (38 °Bé)
60	ml/l	Hydrogen peroxide 35 %

Padding

20 – 24 h dwelling time

Washing 95 °C

Rinsing 80 °C

Rinsing 60 °C

Rinsing 40 °C

Neutralisation with acetic acid

Cold rinse

Drying

Hydrolysis stability – CHT CH Norm 106F:
Test solution:

	dist. Wasser (50 °C ± 2 °C)	
4	g/l	ECE test detergent
1	g/l	Sodium persulphate-tetrahydrate ($NaBO_3 6H_2O$)
		cool to 20 °C ± 5 °C

Moisten sample (3 ml solution on 1 g fabric)

Drying bei 20 °C ± 5 °C

Heavy-duty testing of water fastness

Dry at 20 °C ± 5 °C

9.2 Rubbing fastness

Rubbing fastness = Colour resistance of textiles of all types to rubbing and staining of other textiles in normal use

The dry and wet rubbing fastness is particularly important in the selection of fastness tests. The following information focuses on the problems of rubbing fastness with reactive dyes.
It is often only possible with reactive dyes, especially in dark shades, to achieve a wet rubbing fastness in the range of 2 – 3. This applies although reactive dyes bind chemically with the cellulose fibre, and this bond cannot be separated by friction.

The main cause of negative rubbing fastness properties is that cellulose fibres split when subjected to mechanical stress as during the test with the crockmeter. These finely split elements are broken off during the rubbing fastness test and then produce negative rubbing fastness results due to fibre wear. Furthermore the rubbing fastness depends on many other factors such as: Fibre type, surface of the yarn or fabric, stability of the textile material, type of pretreatment or after-treatment.
More negative results are generally expected with very structured or roughened textile surfaces than with smooth surfaces. The staple length of the fibres together with the yarn twist also influences the rubbing fastness.
Tests were run with different treatments to find a method to improve results. Surface-smoothing products such as film-forming polyacrylates, fatty acid condensation products, paraffin wax with fluorocarbon or also cross-linking functional epoxy hydrophilic polysiloxanes are used.
However, it was not possible to achieve a significant improvement with any of these treatments. In individual cases the rubbing fastness was even worse.
Tests under certain conditions with partially soaped polyvinyl acetate have also shown slight improvements. However, it can be assumed that the smoothing of the surface resulted in a reduction of the specific friction coefficient and that a slight improvement was therefore visible.
Due to these complex interactions any statement on the rubbing fastness in the product profiles would not be conclusive.

9.3 Suitability for resin finishing

Test recipe CHT Comfort Finish:

2	g/l	KOLLASOL HWR
40	g/l	CHT-KATALYSATOR BFM
200	g/l	REAKNITT BC

80 s at 150 °C drying & condensing

Test recipe CHT wet cross-linkage:

2	g/l	KOLLASOL HWR
80	g/l	REAKNITT-KATALYSATOR FV
200	g/l	REAKNITT B-FV

Dry to 8 – 12 % residual moisture content at 100 °C

Dwelling at 37 °C (20 – 24 h)

Rinsing

Washing

Dischargeability

Dischargeability was tested in 1/1 SD with the following print recipes:

		White discharge	Colour discharge
Soft water 20 °C	g	524	650
PRISULON 1570	g	60	60
RAPIDOPRINT SC 10	g	5	5
Glycerine	g	30	30
Potash	g	56	110
REDULIT C	g	200	130
Caustic soda solution 38 °Bé	g	110	–
RAPIDOPRINT H4	g	15	15
		1000 g	1000 g

The white discharge printing may cause loss in fibre strength. Preliminary assessment trials are advisable.

10. Annex

10.1 Solubility of process chemicals

▶ Solubility of common salt and Glauber's salt

The solubility of common salt and Glauber's salt depends on the temperature. Generally the solubility of common salt (NaCl) is higher than that of Glauber's salt (sodium sulphate, Na_2SO_4).

Temperature [°C]	Common salt [g/l]	Glauber's salt [g/l]
0	356	
20	358	161
30	362	332
40	363	351
50	367	325
60	370	318
70	371	306
100	391	299

▶ Solubility of sodium carbonate

The solubility of sodium carbonate depends on the temperature. A higher temperature does not, however, always mean a better solubility. With sodium carbonate the highest degree of solubility is already reached at 40 °C. Higher temperatures result in a slight reduction in the solubility.

Temperature [°C]	Sodium carbonate [g/l]
0	71
10	126
20	214
30	409
40	497
50	475
70	458
80	452
100	452

10.2 Convariant

▶ Convariant table for caustic soda solution

Different caustic soda solutions are used in different countries and different markets. All information in this application is based on NaOH 38 °Bé. The application amounts for other concentrations can be taken from the table.

NaOH [Bé]	NaOH [%]	Spec. weight [g/ml]	NaOH [Bé]	NaOH [%]	Spec. weight [g/ml]
1 °Bé	0.60	1.007	26 °Bé	19.65	1.220
2 °Bé	1.20	1.014	27 °Bé	20.60	1.231
3 °Bé	1.85	1.022	28 °Bé	21.55	1.241
4 °Bé	2.50	1.029	29 °Bé	22.50	1.252
5 °Bé	3.15	1.036	30 °Bé	23.50	1.263
6 °Bé	3.79	1.045	31 °Bé	24.48	1.274
7 °Bé	4.50	1.052	32 °Bé	25.50	1.285
8 °Bé	5.20	1.060	33 °Bé	26.58	1.297
9 °Bé	5.86	1.067	34 °Bé	27.65	1.308
10 °Bé	6.58	1.075	35 °Bé	28.83	1.320
11 °Bé	7.30	1.083	36 °Bé	30.00	1.332
12 °Bé	8.07	1.091	37° Bé	31.20	1.345
13 °Bé	8.78	1.010	38 °Bé	32.50	1.357
14 °Bé	9.50	1.108	39 °Bé	33.73	1.370
15 °Bé	10.30	1.116	40 °Bé	35.00	1.383
16 °Bé	11.06	1.125	41 °Bé	36.36	1.397
17 °Bé	11.84	1.134	42 °Bé	37.65	1.410
18 °Bé	12.69	1.142	43 °Bé	39.06	1.424
19 °Bé	13.50	1.152	44 °Bé	40.47	1.438
20 °Bé	14.35	1.162	45 °Bé	42.02	1.453
21 °Bé	15.15	1.171	46 °Bé	43.58	1.468
22 °Bé	16.00	1.180	47 °Bé	45.16	1.483
23 °Bé	16.91	1.190	48 °Bé	46.73	1.498
24 °Bé	17.81	1.200	49 °Bé	48.41	1.514
25 °Bé	18.71	1.210	50 °Bé	50.10	1.530

1 l NaOH 38°Bé = 441 g sodium hydroxide 100 %
= 700 g sodium hydroxide 48 °Bé
= 766 g sodium hydroxide 50 °Bé

▶ Convariant table for silicate

Silicate (sodium silicate) is available in different qualities and concentrations. The most common commercially available silicate variants are shown here.

[° Bé]	Specific weight [g/ml]	Weight ratio Na_2:SiO_2
37 – 40	1.35	1:3.3
40 – 42	1.40	1:3.3
48 – 50	1.50	1:2.6
58 – 60	1.70	1:2.1

Convariant table for water hardness

The water hardness varies in each country. The different degrees of hardness are shown with the corresponding German degree of hardness (°dH).

German hardness	British hardness	French hardness
1°	1.25°	1.79°
2°	2.50°	3.57°
3°	3.75°	5.36°
4°	5.00°	7.14°
5°	6.25°	8.93°
6°	7.50°	10.72°
7°	8.75°	12.50°
8°	10.00°	14.29°
9°	11.25°	16.07°
10°	12.50°	17.86°
11°	13.75°	19.65°
12°	15.00°	21.43°
13°	16.25°	23.22°
14°	17.50°	25.00°
15°	18.75°	26.79°
16°	20.00°	28.58°
17°	21.25°	30.36°
18°	22.50°	32.15°
19°	23.75°	33.93°
20°	25.00°	35.72°

Levels of water hardness

Classification	Total hardness [°dH]	CaO [mmol/l]
very soft	0 – 4	0 – 0.7
soft	4 – 8	0.7 – 1.4
medium hardness	8 – 12	1.4 – 2.1
quite hard	12 – 18	2.1 – 3.2
hard	18 – 30	3.2 – 5.3
very hard	> 30	> 5.3

Definition of the water hardness:
1° dH (German hardness) refers to 10 mg CaO in 1 l water.

For further information and technical advice please contact our technical department. Our technical advice imparted verbally, in writing or test reports is given to our best knowledge. It is, however, non-binding. This also applies in connection with any rights of third parties and does not free you from examining the suitability of the supplied product for your intended processes and purposes. The application, use and processing of the products is outside our control and is therefore solely your responsibility.

UNRIVALLED RESULTS AND MORE EFFICIENT PROCESSES

AUXILIARIES FROM CHT

From enzymes for the removal of residual peroxide to highly-effective soaping agents – the CHT Group offers a range of perfectly coordinated auxiliary agents for your reactive dyes that will enable you to achieve optimised and repeatable dyeing results with even more efficient dyeing processes.

Here, many of our auxiliary agents can be used very flexibly, which means that you can perfectly tailor your dyeing system with CHT to the specific requirements of your application.

Our strong R&D department is constantly working on innovative new auxiliary agents and dye solutions that will support your dyeing processes effectively and help save raw materials, time and energy in the process.

11. CHT Auxiliaries

11.1 BIAVIN BPA (no · lq)

Polymeric amides

BIAVIN BPA is a universally applicable crease preventing agent and lubricant. Sensitive qualities have better glidin properties and have a lower tendency to form creases if there is less mechanical friction and less mechanical load. BIAVIN BPA increases the liquor viscosity and therefore more liquor adheres to the product. The product is non-foaming and can be applied on all machines of cellulose dyeing and for all blends.

0.5 – 2 g/l BIAVIN BPA in long liquors
1 – 2 g/l BIAVIN BPA in short liquors

11.2 BIAVIN TCC (n · liq)

Polyethylene emulsion

Crease preventing agent and lubricant for cellulose fibres, mixtures and synthetic fibres. It is particularly suitable for microfibres and blends with elastane. BIAVIN TCC is low foaming and can be used in dyeing on all machines.
Application quantities:
0.5 – 2 g/l BIAVIN TCC

11.3 CHT-CATALASE BF (no · liq)

Catalase

Enzymatic auxiliary for destroying residual peroxide after bleaching. The following advantages are achieved through the application of CHT-CATALASE BF:

- less water consumption
- no ecological wastewater pollution
- dyeing in the same bath possible

0,2 – 0,5 g/l CHT-CATALASE BF
pH range: 4 – 9
Temperature: cold – 60 °C

KEY

no = without ionic character
a = anionic
n = non-ionic
c = cationic
psc = pseudocationic
d = amphoteric
liq = liquid
fla = flakes
pow = powder
pas = paste
gran = granulate

11.4 CHT-DISPERGATOR XHT-S (a/n · liq)

Preparation of polyglycol ether derivatives

Low-foaming and APEO-free dispersing/levelling agent for dyeing polyester and blends. CHT-DISPERGATOR XHT-S stands out for its very good dispersing and levelling capacity. It promotes the fine distribution and thus migration of disperse dyes throughout the entire temperature range and in this way prevents dyestuff agglomerations. Its outstanding property is stabilisation of the dispersion. Problems with unlevelness due to lack of dispersion stability can be solved with CHT-DISPERGATOR XHT-S. Light fastness of polyester dyed with CHT-DISPERGATOR XHT-S is not impaired.
0.5 – 3 g/l CHT-DISPERGATOR XHT-S (depending on the application)

11.5 CHT-KATALYSATOR BFM (no · liq)

Synergetic mixture of organic acids and metal salts

CHT-KATALYSATOR BFM is a special catalyst for the low formaldehyde easy-care finish together with REAKNITT BC. This combination is used for the low-temperature process CHT-COMFORT-FINISH and facilitates an easy care finish with excellent „wash and wear" properties.
The application quantity is 20 % based on the crosslinker quantity of REAKNITT BC.

11.6 COLORCONTIN VGP (a · liq)

Phosphor acid ester

Padding auxiliary for continuous dyeings on cellulose fibres and cellulose fibre mixtures. COLORCONTIN VGP is applied as penetration agent and deaerating agent including cold pad batch dyeing, for pad-jig procedures and for deaerating wound packages. It is most efficient at cold temperatures and up to 40 °C. COLORCONTIN VGP is compatible with reactive, vat, direct, sulphur and dispersion dyes. It is not retarding.
2 – 5 g/l COLORCONTIN VGP for pad dyeing
0.5 – 2 g/l COLORCONTIN VGP in long liquors

11.7 CONTAVAN GAL (a · liq)

Organic chelate former based on hydroxycarboxylic acids

Non-foaming stabiliser stable to alkali for the peroxide bleach. CONTAVAN GAL has excellent peroxide stabilising properties in presence of catalytic heavy metals like iron, copper and manganese.
Discontinuous process: 0.5 – 1 % CONTAVAN GAL
Continuous process: 5 – 10 g/l CONTAVAN GAL

11.8 COTOBLANC SEL (a · liq)

Mixture of sequestrants and polymers with affinity to the dyestuff

COTOBLANC SEL dissolves non-fixed reactive dyes from cellulose substrates. The product holds dissolved hydrolysate in the liquor and prevents its reabsorption. The efficiency of COTOBLANC SEL helps to save rinsing baths and also soaping baths because residues of salt and dyestuff hardly disturb the soaping process. Depending on the reactive dyestuff anchor, neutralisation is done after rinsing and the correct pH value is adjusted before afterwashing at the boil. The recommendations from the dyestuff producers are to be observed: for reactive dyestuffs with a vinyl sulphone anchor a pH value of 6.5 – 8 is recommended, for reactive dyestuffs with other anchor systems (such as monochlorite triazine) a pH value between 7 and 9 is recommended. COTOBLANC SEL can be applied on continuous plants, yarn dyeing machines and jets or the like. On dark dyeings, best fastnesses are achieved using COTOBLANC SEL. When rewashing yarn-dyed materials, bleeding of the light colours or white is prevented to a large extent. COTOBLANC SEL does not contain any surfactant and is therefore absolutely foam-free. It has no surface tension and is not subject to the European regulation concerning detergents.
Continuous treatment:
0.5 – 2 g/l COTOBLANC SEL
Piece dyeing machines:
0.3 – 2 g/l COTOBLANC SEL

11.9 EGASOL MD (a · liq)

Aromatic carboxylic acid ester

Low foaming levelling agent for polyester in the HT range with levelling, dispersing and migrating properties. EGASOL MD has an affinity to dyes and fibres, and it has a dyeing accelerating effect. Due to the dyeing accelerating and levelling effect EGASOL MD is also well suitable for polyester microfibres.
0.5 – 2 % EGASOL MD

11.10 EGASOL SF (no · liq)

Inorganic buffer solution

EGASOL SF is used as an alkali donor for reactive dyeing on CEL and its blends. EGASOL SF guarantees an optimum pH control throughout the entire dyeing process
1.5 – 3.5 g/l EGASOL SF (depending on the colour depth)

11.11 EGASOL UP (a · liq)

Aromatic carboxylic acid ester

During heating up EGASOL UP makes dispersion dyes to be synchronously absorbed. Furthermore, EGASOL UP improves the migration capacity of dyes, so that levelled dyeings can be supplied. Due to its excellent dispersing effect EGASOL UP prevents agglomerations of dispersion dyes. The application of additional dispersing or levelling agents is not absolutely necessary. EGASOL UP has a good oil emulsifying effect. Oily soiling caused by greases or coning oils of looms and knitting machines is emulsified and dispersed by corresponding application quantities applied for dyeing even without pretreatment, so that there are no markings in the end. The product keeps high oil quantities emulsified during dyeing under HT conditions, without any stain formation. EGASOL UP is low foaming and excellently suited to be applied on jets and overflow machines. For thread dyeing we recommend applying CHT DISPERGATOR XHT-S due to its improved dispersion stability and oligomer dispersion in combination with EGASOL UP. There is no influence on the light fastness properties of the polyester dyed with EGASOL UP with application quantities of 0.5 – 2.0 g/l. The product can be used for dyeing automotive parts. For dyeing Trevira CS, microfibres and Coolmax EGASOL UP is also suited, for darker shades the addition of a diffusion accelerator may be necessary.
1 – 2 % EGASOL UP

11.12 FELOSAN JET (a/n · liq)

Modified fatty alcohol ethoxylates, low foaming washing and wetting agent

FELOSAN JET has a good wetting power and a high washing and cleaning power. Therefore FELOSAN JET is highly suited to wash and clean all fibre types. The product is low foaming without siliconecontaining antifoam system, so that it can also be applied on washing machines and discontinuous dyeing machines with high turbulences. Since the activities of bacterial compositions and pancreas amylases are not impaired by FELOSAN JET, it may also be added to desizing liquors as wetting agent and for emulsifying size fats.
Discontinuous process: 1 – 2 % FELOSAN JET
Continuous process: 5 – 10 g/l FELOSAN JET

11.13 HEPTOL SF 4 (a · liq)

Synergetic mix of different phosphonates

HEPTOL SF 4 has a very high sequestering power on alkaline earth ions and prevents the formation of alkaline earth silicates, alkaline earth carbonates and alkaline earth hydroxides and of heavy metal ions in an alkaline medium. HEPTOL SF 4 can be applied as sequestering agent in processes of pretreatment and dyeing.
0.5 – 3 g/l HEPTOL SF 4 (depending on the metal content)

11.14 KERIOLAN A2N (d · liq)
Polyglycol ether derivative
Levelling agent for dyeing wool and wool blends. The product controls the absorption rate of dyestuffs and increases their migration properties, so that even dyeings are achieved. KERIOLAN A2N does not impair the fastness level of the dyeings. If PAN/WO blends are dyed with cationic or anionic dyes according to the singlebath dyeing process, KERIOLAN A2N will guarantee a good dye bath stability due to its good dispersing effect.
0.5 – 2 % KERIOLAN A2N

11.15 KOLLASOL CDS (n · liq)
Organomodified siloxanes in combination with alkoxylates
KOLLASOL CDS is applied in case of foam formation in washing, bleaching and dyeing liquors. In addition to the defoaming effect the product also shows a good deaerating effect and is thus also suitable for this application field. The deaerating agent and penetration accelerator is particularly suitable for the dyeing of polyamide fibres.
0.1 – 0.5 g/l KOLLASOL CDS

11.16 KOLLASOL HWR (n · liq)
Combination of fatty alcohols, fatty alcohol ethoxylates and fatty alcohol alkoxylates
Penetration accelerator and wetting agent with excellent low foaming properties for finishing and easy-care finish. KOLLASOL HWR causes an immediate penetration of the material and makes the finishing chemicals get evenly absorbed. KOLLASOL HWR has a very good emulsifying capacity and acts as solubiliser for finishing components. With its very good emulsifying effect KOLLASOL HWR can be also applied in desizing, washing and bleaching processes on jets.
1 – 10 g/l KOLLASOL HWR

11.17 MEROPAN DPE (a · liq)
Polycarboxylic acids and modified phosphonates
MEROPAN DPE is a protective colloid with sequestering properties for hardening agents when prewashing and dyeing cellulose and cellulose fibre blends. MEROPAN DPE disperses the cotton accompanying substances insoluble in alkaline liquors. Dyestuffs containing metal are not stripped. MEROPAN DPE is non-foaming and has no dyestuff retaining.
1 – 4 g/l MEROPAN DPE

11.18 MEROPAN EF 150 (n · liq)
Special esters
Acid donor when dyeing polyamide and wool. MEROPAN EF 150 is slowly saponified during the heating and boiling phase of the dyeing process. The acid being released in this way slowly and evenly moves the pH value into the acid range. Thus, favourable conditions for achieving even dyeings are created. In combination with suitable levelling agents (e.g. SARABID IPD, SARABID IPF, SARABID IPM and KERIOLAN A2N), an excellent colour levelness is achieved.
0.5 – 2 ml/l MEROPAN EF 150

11.19 MEROPAN KP (no · liq)
Mixture of organic acids and salts
MEROPAN KP is a phosphate-free buffer and is applied to adjust pH values to approx. 3.5 – 7. The product is applied in dyeing baths for polyamide, polyamide carpets, polyester and wool. MEROPAN KP makes sure the pH value remains stable during the dyeing process. The product forms complexes with heavy metal ions and prevents changes of colour shade when applying dyestuffs containing iron or copper. Metalliferous dyes are not impaired by MEROPAN KP and the product can be pumped. The application quantities depend on the water quality and the additions to the dyeing liquors.
With 0.5 – 1 g/l MEROPAN KP pH values between 4 – 5.5 are achieved.
With 1.5 – 3 g/l MEROPAN KP pH values between 3 – 3.5 are achieved.

11.20 MEROPAN XR GRANULAT (a · gran)
Sodium-m-nitrobenzene sulphonate
MEROPAN XR GRANULAT is used as a mild oxidising agent for textile finishing and prevents the unwelcome reducing effects during the various finishing steps. In direct and reactive dyeing MEROPAN XR GRANULAT prevents the dyestuff from boiling off in direct and reactive dyeing processes. In the pad steam process with direct and reactive dyes, MEROPAN XR GRANULAT avoids damages caused by chemicals which are contained in the steam. For vat dyeing it is used as mild oxidising agents.
1 – 2 g/l MEROPAN XR GRANULAT for reactive and direct dyeing.
5 – 10 g/l MEROPAN XR GRANULAT for the pad-steam process with reactive dyes.
approx. 3 g/l MEROPAN XR GRANULAT in vat dyeing during oxidation.

11.21 MIGRASOL SAP (a · liq)
Aqueous solution of a polymer Na-acrylamide/acrylate
Migration inhibitor for continuous dyeing. MIGRASOL SAP prevents migration of disperse, vat, sulphur and pigment dyes in pad dyeing procedures on cotton, polyester and their blends. Due to the better penetration and because of the lower surface migration, a more even fabric appearance is obtained. MIGRASOL SAP is most efficient in pH ranges between 5 and 9. MIGRASOL SAP can be rinsed out easily and is non-foaming.
Cotton fabric: 10 – 15 g/l MIGRASOL SAP
Synthetic fabric: 10 – 20 g/l MIGRASOL SAP
PES/CO blends: 5 – 15 g/l MIGRASOL SAP

11.22 NEUTRACID BO 45 (a · liq)
Organic/inorganic buffer mix
Slightly acid buffer, preferably for polyester and wool dyeings in a pH range of 4 – 5. The product has an outstanding buffer capacity which guarantees the highest possible pH constancy in dyeing baths.
1 – 2 ml/l NEUTRACID BO 45 (polyester dyeings)
2 – 5 ml/l NEUTRACID BO 45 (wool dyeings; depending on the wool quality a stronger buffer such as MEROPAN KP may have to be added).
The product is also highly suitable for optically brightening polyamide/cellulose mixtures.
0.5 – 2 ml/l NEUTRACID BO 45

11.23 PAFIX No1 (a · liq)
Condensation product of aromatic sulphonic acids
PAFIX No1 is an all-round fixing agent for PA dyeings. Being a phenolfree product PAFIX No1 is excellently suited both for standard shades and for brilliant PA dyeings with fluorescent dyestuffs.

PAFIX No1 has the following advantages:

- stable to acids: can be dosed, stable to jets, suited for continuous procedures (PA tape dyeing)
- heat-stable: subsequent heat-setting or steaming processes do not influence the effects or if so, only to a minor extent
- hardly any influence on the shade or on yellowing and therefore ideal for pastel shades and brilliant colours
- neutral with regard to the light fastness

The post-treatment process with PAFIX No1 must be adjusted to the corresponding shade.

Standard shades:
2 – 4 % PAFIX No1, pH 4 – 5, 70 – 80 °C
Brilliant fluorescent dyestuffs:
2 – 5 % PAFIX No1, pH 5.5, 65 °C

11.24 PRISULON 1570 (a · pow)
Combination of polysaccharide ethers
PRISULON 1570 is a low viscosity thickener compound, 12 % in the stock paste, especially for discharge vat printing and direct vat printing (1-phase process).

11.25 RAPIDOPRINT H 4 (n · liq)
Hydrocarbon compound, contains emulsifier
Self-emulsifying printing oil makes the printing pastes supple and improves the gliding of the squeegee. The printing paste films are less brittle which can prevent splintering.

11.26 RAPIDOPRINT SC 10 (n · liq)
Combination of aliphatic hydroxylic compounds
RAPIDOPRINT SC 10 is a defoamer, deaerating agent and penetration auxiliary with considerable screen release effect.

11.27 REAKNITT BC (no · liq)
Modified DMDHEU reactant resin
REAKNITT BC facilitates in combination with CHT-KATALYSATOR BFM an easy care finish with outstanding „easy-care" properties on cellulose fibres and and their blends with synthethic fibres. If applied and processed properly (CHT Comfort Finish), the limit value of formaldehyde according to OEKO-TEX® Standard 100 for clothes worn close to the skin (according to Japanese Law 112: formaldehyde < 75 ppm) is reached. Depending on the fabric quality, the application quantity is 120 – 200 g/l.

11.28 REAKNITT B-FV (no · liq)
Modified DMDHEU reactant resin
REAKNITT B-FV is suitable for easy-care finishes low in formaldehyde and resistant to chlorine of textiles made of cellulose fibres and their blends with synthetic fibres, especially suitable for moist cross-linking. Together with REAKNITT KATALYSATOR FV this results in very good easy-care effects, which are resistant compared to boiling and dry cleaning. Depending on the fabric quality, the application quantity is 150 – 200 g/l.

11.29 REAKNITT-KATALYSATOR FV (no · liq)
Mixture of a mineral acid with an alcohol
REAKNITT-CATALYSATOR FV is a catalyst for the acidic moist crosslinking of textiles made of cellulose fibres and their blends with synthetic fibres together with REAKNITT B-FV. The application quantity is 35 – 40% based on the crosslinker quantity of REAKNITT B-FV.

11.30 REDULIT C (no · pow)
Sodium formaldehyde sulfoxylate
Stabilised reducing agent. Reduces the vat dye which is not soluble in water into acid leuco vat dye. Water-soluble leuco vat dye salt is formed because of the presence of alkali.

11.31 REDULIT F (no · pow)
Sulfinic acid derivative
REDULIT F is a very stable reducing agent. Its reductive power is best at a temperature above 70 °C and in the presence of alkali. Due to its considerable redox potential, a small quantity of application is sufficient.
Application quantity:
Reductive after-cleaning of dyeings and prints with disperse dyestuffs: 0.3 – 0.6 g/l REDULIT F + NaOH
Cleaning of dyeing machines:
1 – 2 g/l REDULIT F + NaOH
Further Applications: as a reducing agent to dye cotton with sulphur dyes. The product may also be used for reductive bleaching of various fibres.

11.32 RETINOL M (n · liq)
Polyfunktionelle Stickstoffverbindung
RETINOL M can be used for stripping dyeings in blind vat and for pulling down dyeings which turned out too dark. Good stripping and pulling down effects are mainly achieved with vat, sulphur, direct and reactive dyestuffs. RETINOL M is also applied for washing out prints. Due to the dyestuff affinity, a staining of the white can be prevented.
1 – 3 g/l RETINOL M for brightening
2 – 5 g/l RETINOL M for stripping in the blind vat
approx. 2 g/l RETINOL M for washing out prints

11.33 REVOFIX WET (c · liq)
Polyurethane dispersion
Distinctly improves the dry rubbing fastness and especially the wet rubbing fastness on CEL and synthetic fibres. The product is applied for the aftertreatment of dyeings and prints. REVOFIX WET is universally applicable. Main application fields are PES/dispersion, CEL/reactive, vat, sulphur, pigment. Preliminary tests have to be carried out on Indigo to check if the necessary fastnesses are impaired.
Exhaust process:
3.0 – 5.0 % REVOFIX WET
Padding process:
30 – 60 g/l REVOFIX WET
Its compatibility with softeners and easy-care finishes has to be checked in preliminary trials.

11.34 REWIN ACP (c · liq)
Polyammonium compound
REWIN ACP improves the wash fastness and wet fastnesses of dyeings with reactive and direct dyestuffs on natural and regenerated cellulose fibres. REWIN ACP meets highest fastness demands made to an aftertreatment agent today.
2 – 3 % REWIN ACP

11.35 SARABID DLO CONC. (n · liq)
Combination of special ethoxylates
Dyestuff affinity auxiliary for pretreatment, dyeing and aftertreatment. Due to its dyestuff affinity character, its good dispersing capacity and high washing power the product has a broad field of application, e.g.:

- pre-washing of CV, CA and synthetic fibres
- intermediate and aftercleaning of PES and PES/WO qualities
- dyeing of wool, semi-wool and PA fibres
  1 – 2 g / l SARABID DLO CONC
- dyeing of wool, semi-wool and PA fibres
  1 – 2 g / l SARABID DLO CONC.

11.36 SARABID IPD (n · psc)
Fatty amine polyglycol ether
SARABID IPD is a low foaming, highly efficient levelling agent for dyeing polyamide with acid and 1: 2 metal complex dyes.
SARABID IPD is a levelling auxiliary with affinity to the dyestuff. It controls the absorption speed of the dyestuffs in the heating up phase and promotes an even distribution of the dyestuffs in the migration phase. The product forms addition compounds with anionic dyestuffs which split again during the heating up and migration phase. This results in good bath exhaustion. SARABID IPD does not impair the wet and light fastnesses of the dyeings. It increases contrasts when continually dyeing anionically differentiated polyamide carpet fibres. Depending on the kind of polyamide fibre and the dye class, SARABID IPD is applied to the dyeing bath alone or in combination with the levelling agent SARABID IPF which has affinity to the fibre.
0.5 – 3 % SARABID IPD

11.37 SARABID IPF (a · liq)
Aromatic sulphonate
Levelling agent with affinity to the fibre for streaky dyed polyamide fibres. SARABID IPF is a levelling agent with affinity to the fibre which levels out streaky dyeing of PA with acid and 1: 2 metal complex dyes. SARABID IPF is active as anionic retarder. It slows down and evens out absorption of the dyestuffs during the heating up phase and levelled dyeings result. The product is low foaming and therefore well suited for application on jet dyeing machines. It does not impair the colour fastnesses or the light fastnesses. Depending on the polyamide fibre and dyestuff class, SARABID IPF is applied either alone in the dyebath or in combination with the dyestuff affine levelling agent SARABID IPD.
0.5 – 4 % SARABID IPF

11.38 SARABID IPM (a · liq)

Composition of fatty amine polyglycol ether and aro matic sulphonates

SARABID IPM is a low foaming, multifunctional levelling agent when dyeing polyamide with acid and 1: 2 metal complex dyestuffs. The product has affinity to the polyamide fibre as well as to the dyestuffs which guarantees an exact control of the dyestuff composition and a levelled dyeing, even on streaky dyed articles. SARABID IPM stands out for the following properties:

- low foaming
- affinity to dyestuff and fibre
- imparts best surface levelness
- evens out streakiness caused by the material
- absorption speed of the dyestuffs is decelerated and therefore even absorption of the dyestuffs
- good and even dyestuff penetration
- no impact on the wet and light fastnesses of the dyeings

1 – 4 % SARABID IPM

11.39 SARABID LDR (a · liq)

Special polymers

SARABID LDR improves the solubility of reactive dyestuffs and disperses the dyes excellently. Due to the prevention of agglomerates, the levelness of the dyeing is improved. Dyes containing metals are not stripped. SARABID LDR is almost foam-free and can therefore be applied on all machines types. The product is stable to salt up to 120 g/l.
0.5 – 2 g/l SARABID LDR in the exhaust process
3 – 10 g/l SARABID LDR in the continuous process

11.40 SARABID MIP (a · liq)

Mixture of special polymers, fatty alcohol ether phosphate, enzyme

Multiprocess product for prewashing, dyeing and aftersoaping cellulose fibres and their blends. SARABID MIP is a mixture of numerous components with parts of very stable enzymes. Due to its large activity spectrum, it can be applied in many different processes and on all kinds of fibres. SARABID MIP has sequestering, washing, pectine degrading and anti-crease properties. It masks disturbing non-ionic parts and increases the liquor throughput in apparatus. When applied in the dyeing bath, the product can improve the fastnesses, particularly on dyeings with vat and sulphur dyes or on wool blends.
0.5 – 3 g/l SARABID MIP

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More information available on our website: visit www.cht.com/reactive-dyes or scan the QR code!

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For more information check our Bezema Colour Solutions dyestuff app. Free download for iOS or Android.

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