Cationization guide TEXAMIN ECE-new – special colouration effects

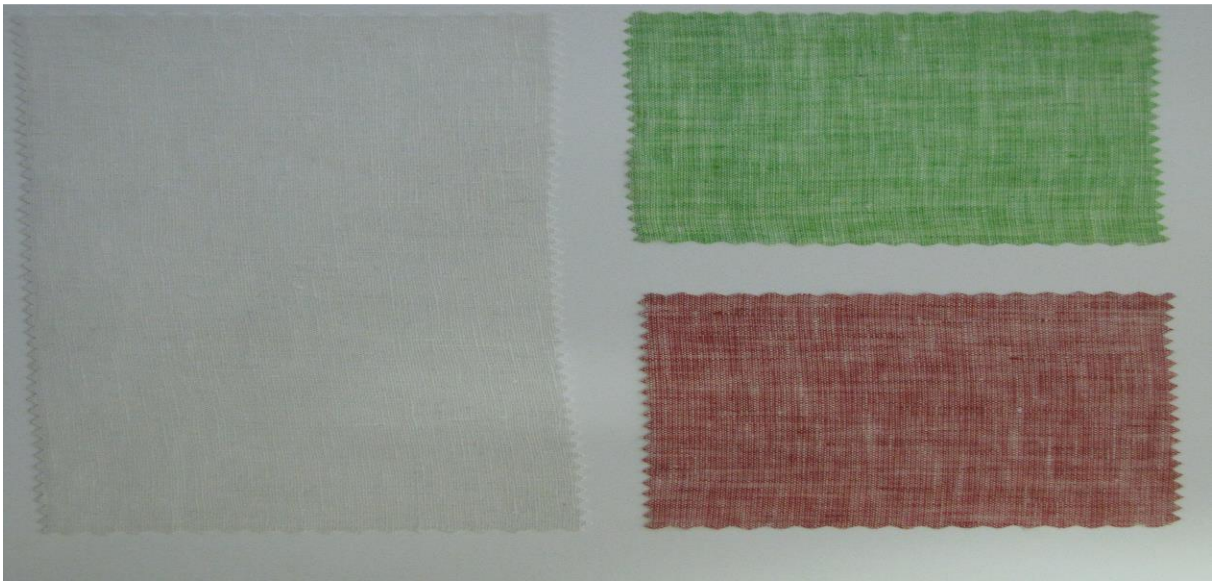
An innovative system of chemical modification – implementation of cationic groups into the textile fibre polymer structures enable to realize a broad range of attractive colouration effect based on the differentiation of cationized substrate affinity to the anionic dyes.

During the following single bath dyeing step significantly increases the deepness of shade of the precationized part of the substrate while the colour of the non-modified part remain lighter. Combinations of the precationized by TEXAMIN ECE new system (eventually used in various intensities of cationization – to vary the precationization degree) and non-cationized components opens the end-less variability of alternatives on the way to the unique textile fashion design. This system can be applied on cellulose (natural or regenerated) as well as protein (wool) fibres.

Within the whole textile production and design concept following integration alternatives of pre-cationization can be used:

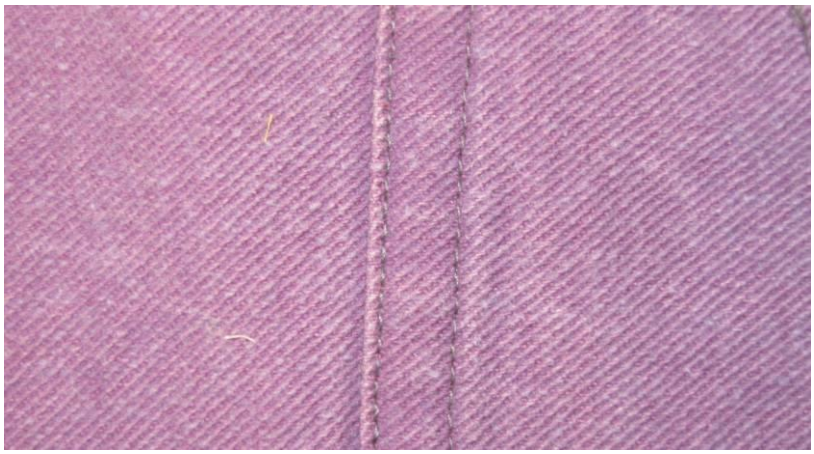
a) **Loose fibres (top, flock)**
for the combination with non modified part during the (end)stage of spinning (twisting). By following single bath dyeing the unique, very attractive „tone in tone“ effects can be attained

b) **Yarn cationization**
combination of pre-cationized and non-modified part by:
- production of twisted yarn and its next variable use in knitted/woven constructions
- diverse combinations of pre-cationized and non-cationized yard in warp and weft of woven fabrics
- attractive and unique effects by combination of pre-cationized and non-cationized yarns by knitting



c) Linen fabric – pre-cationized weft yarn, coloured by reactive dyes.

d) **Cationization of knitted and woven fabrics**
Effective dyeing of very deep and unique brilliant shades particularly by reactive dyes.
Fashion „old-look“ effects can be realised by pre-cationization of fabric followed by coloration and enzymatic after treatment of readymade garment (tumbler dyeing, washing units).



e) **Garment cationization**
An alternative way to the „old-fashioned“, „vagabond“, „stone-wash“ like effects. Completely done on the tumbler garment dyeing machines. Similar local effects attainable by spraying of alkaline cationization system followed by prewashed garment dyeing.
Next way to the differential colouration of garment is spraying of modified alkaline cationization system followed by drying and prewash before garment dyeing – unique local colouration effects occur.

f) **Local printing application**
Starts by padding of the fabric by alkali and dry. Followed by printing of design with TEXAMIN ECE new in form of paste which viscosity is optimized by a special non-ionic thickener (TEXAPRINT CAT). Cationized printing design is

fixed by hot air or steam. After the proper wash-out of thickener fabric is coloured with reactive dyes. Way to attain „tone in tone“ motifs.

Cationization procedure

Cellulose materials

Pre-cationization of yarns and loose fibres (flock)

Device for yarn /flock dyeing.

Bath ratio: 1:10

Scouring/pre-wetting:	Nonionic wetting agent 1 ml/l 60°C, 20 min. Rinsing 5 min.
Cationization:	TEXAMIN ECE new 5% NaOH (s) 4%

Start 10 min. by 20-25°C with TEXAMIN ECE new, add NaOH within the next 10 min., heat to the 50°C and circulate next 30 min. by this temperature. Drain, rinse with cold water, neutralise with acetic acid by 50°C. Finally wash in hot and cold water.

Jig cationization of cellulose fabrics

1. Pass	TEXAMIN ECE new 4-6%	20°C
2. Pass		20°C
3. Pass	NaOH 3,2-4,8%	20°C
4. Pass		20°C
5.-8. Pass		50°C
9.-10. Pass	washing, overflow	20-30°C
11.-12.Pass	neutralization, acetic acid 2ml/l	50°C
13.-14. Pass	washing	20-30°C

PAD-BATCH Impregnation

Pretreated cellulose fabric. Padding (foulard):

TEXAMIN ECE new	40-80g/l
Sodium carbonate	10-15 g/l
Nonionic wetting agent	1 ml/l
Wet pick up	70-85%

Dry – hotflue or stenter 100-110°C, fix min. 20 sec. by 150°C. Followed by washing and neutralization on the full width washing unit or jig.

Garment cationization on tumbler device

Bath ratio 1:20			
20°C	Nonionic wetting agent	1 g/l	10 min.
20°C	Texamin ECE new	4 – 6 %	dosing 5 min.+10 min.
20°C	NaOH	3,2 -4,8%	dosing 5 min.

Temp. increase to 50°C	gradient 2°C/ min.,	run 30 min. by 50°C	
Cold washing	2 x 5 min		
Neutralization	acetic acid 1 ml/l	40°C	10 min.
Cold rinsing	5 min. ; centrifugation.		

Applicable dyestuffs sorts

Direct dyes

With respect to the limited level of colour fastnesses use of this group of dyes is of limited importace only. Primarily used by special „wash-out“ effects.

Reactive dyes

Most suitable group of dyes for pre-cationized susbstrates. In comparison with common dyeing processes much dense, brillant shades can be obtained. The most suitable for the various special dyeing procedures which allow to realise plentiful colour appearances. Pre-cationized substrates can be coloured without addition of electrolyte (salt). In case of dyeing of blends (cationized/noncationized part of the substrate) conditions of dyeing can be adjusted to reach „tone in tone“ effects. The extreme contrast effects („black and white“) are manageable by combination of deep/brilliant shades of strongly pre-cationized and noncationized parts.

Vat dyes

With respect to their character vat dyes are of minimum importance. One of limiting factors – dyeing in strong alkaline bath plays the reasonable role. An exceptional case represents the bath colouration with indigo in the mild alkaline conditions.

Acid dyes

Resulting colorations have almost the poor colour fastness properties.

Premetalised (Metal -complex) dyes

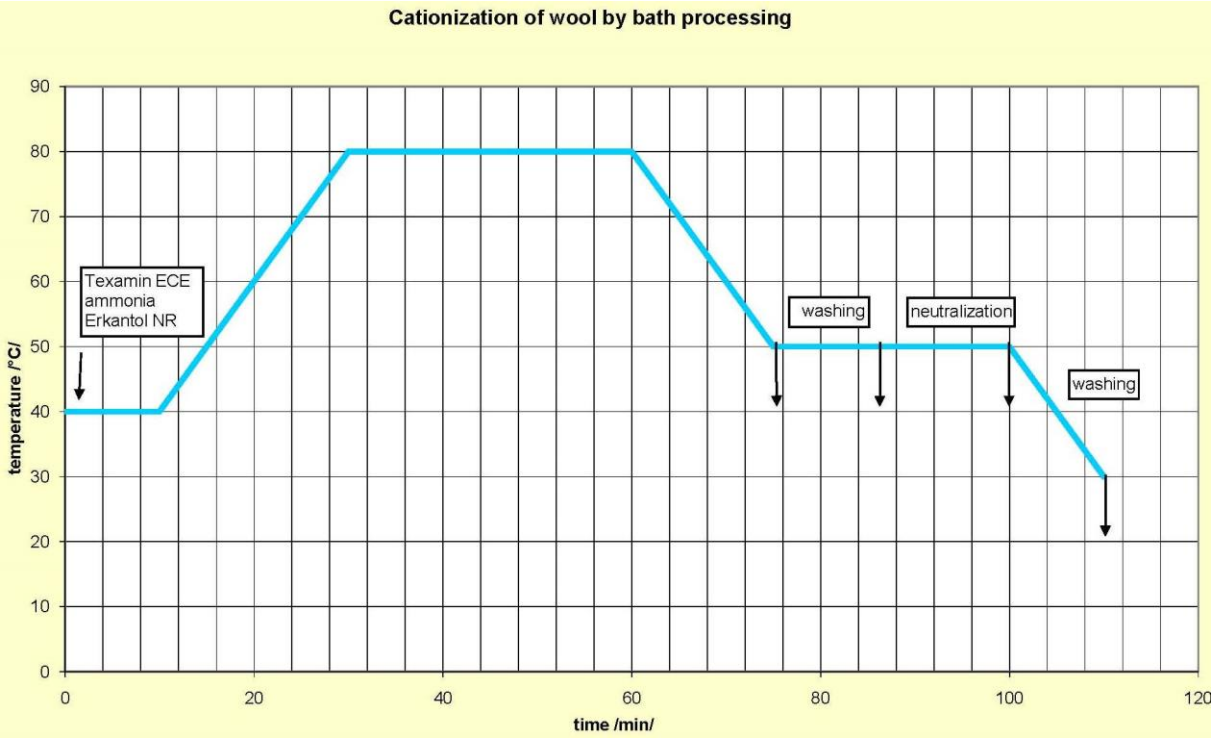
In the contrary to the acid dyes, by use of premetalised dyes significantly better colour fitness properties can be reached. Their main area of use belongs to the production of special wash-out (old- fashion) effects realised on tumbler dyeing devices.

Pigments

They have very good substantivity to the pre-cationized substrates; therefore they are widely used by garment dyeing for special wash-out effects. Risk of dyeing machine fouling (deposit of pigment) must be anticipated.

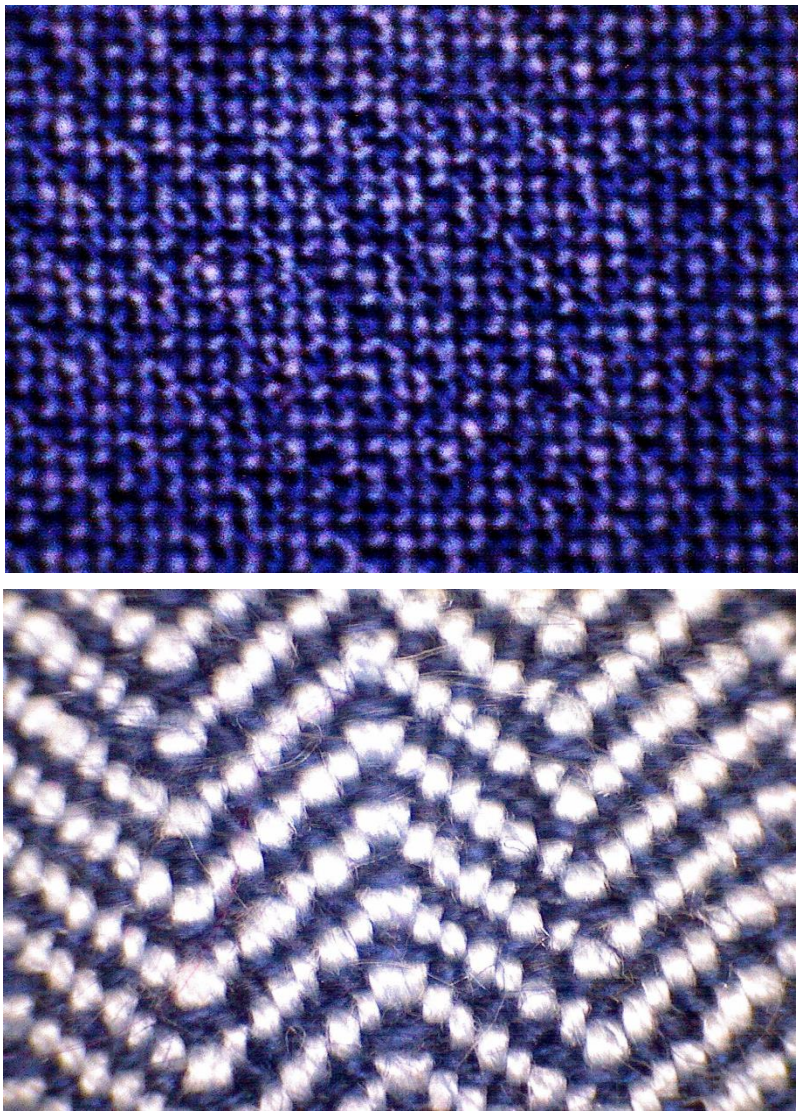
Woolen materials

In the contrary to the cellulose materials cationization of wool must be realised by significantly reduced alkalinity. The optimal effects can be achieved by use of ammonia by the optimum temperature 80°C. Following optimised procedure recommended:



Dosing of chemicals:	TEXAMIN ECE new	3% o.w.f.
	Ammonia 25%	2 ml/l
	Nonionic wetting agent	1 ml/l

Cationized woolen substrate obtain the reasonably higher affinity to the anionic dyestuffs. Particularly in case of reactive dyes. This higher affinity in accompanied by the possibility to reduce dyeing temperature of 20°C with no influence on the exhaustability and dyeing fastness properties.



Resulting effects of cationization (pre-cationized weft yarn) on the wool fabrics (magnified 10x).

Next highly appreciated effect of cationization comprises the reasonable increase of its dimensional stability. This stabilization effect was confirmed on yarns as well as woven/knitted fabrics. The slide below demonstrates both – higher dye affinity and dimensional stabilization as attained on the pre-cationized yarn (on the cone) compared with the non cationized yarn. Both were coloured afterwards in the hank

form in the same reactive dye bath. The longer hanks demonstrate the stabilization effect in the contrary to the shrunk hanks of non-modified wool.

Cationization of wool seems to be a new, environment friendly alternative with the potential to replace chlorine antifelting treatment. The microscopic (SEM) texture of woollen fibre structure as well as any other mechanical-physical properties remain unchanged.

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