



Cotton
Cotton



COTTON KNIT & YARN DYEING PRETREATMENT

ANTISIL CONZ 1

- It has properties as;
Sequestering,
Ca+2 160 ppm (at pH 11)
Ca+2 145 ppm (at peroxide bleaching bath)
Dispersing,
Peroxide stabilizer.
- It is recommended in;
Scouring or bleaching baths
ANTISIL CONZ 1 0,5 % (In package bleaching 1 %)
In dyeing-except Blue 19 and 21
ANTISIL CONZ 1 0,5 %
In soaping, to have brightness and dust free look
ANTISIL CONZ 1 0,5 %

E WET WELL

- It is sophisticated and concentrated scouring agent, having
Foam free,
Antifoam free,
Degreasing,
Dispersing.

PRD Bleaching (Prior to Dyeing)

	<u>95 °C</u>	<u>110 °C</u>
E WET WELL	0,4 - 0,8 %	0,4 - 0,6 %
ANTISIL CONZ 1	0,5 %	1 %
NaOH, flake	1 - 2 %	1 %
Peroxide, 50 %	2 - 3 %	2 %
Time, min.	45	20

OBA Bleaching

	95 °C	110 °C
E WET WELL	0,4 - 0,6 %	0,4 - 0,5 %
ANTISIL CONZ 1	1 %	1,5 %
NaOH, flake	2,5 - 3 %	2 %
Peroxide, 50 %	4 - 5 %	3 - 4 %
Time, min.	60	20 - 30

REACTIVE DYEING

Reactive dyes are dyestuff which carries a reactive group and gives a reaction with the cellulose fabric. Reactive dyes group according to their reactive groups.

CLASSIFICATION OF REACTIVE DYES ACCORDING TO THEIR REACTIVE GROUPS

REACTIVE GROUP	TRADE MARK	DYE PRODUCER
MONOCHLOROTRIAZINE(MCT)	CIBACRON CIBACRON E PROCION H,HE,SP DRIMAREN P SUMUFIX H	CIBA-GEIGY DYSTAR DYSTAR CLARIANT SUMITOMO
SULFATOETHYL-SULFONE(VS)	REMAZOL SUMUFIX SYNOZOL VIVIZOL	DYSTAR SUMITOMO KISC&KISCO EKSOY
TRICHLOROPYRIMIDINE(TCP)	CIBACRON T-E DRIMAREN X	CIBA-GEIGY CLARIANT
DICHLOROQUINOXALINE(DCQ)	LEVAFIX E	DYSTAR
DIFLUOROCHLOROPYRIMIDINE (DFCP)	LEVAFIX E-A DRIMAREN K	DYSTAR CLARIANT
MONOFLOROTIAZINE(MFT)	CIBACRON F LEVAFIX E-N	CIBA-GEIGY DYSTAR
FLOROCHLOROMETHYL PYRIMIDINE	LEVAFIX PN	DYSTAR
MONOCHLOROTRIAZINE/ B-SULFATOETHYL SULFONE (SUPRA)	SUMUFIX SUPRA REMAZOL SN SYNOZOL VIVIZOL	SUMITOMO DYSTAR KISC&KISCO EKSOY

BIFUNCTIONAL REACTIVE DYES

These bifunctional dyes carry two reactive groups on the same chromophore group as,

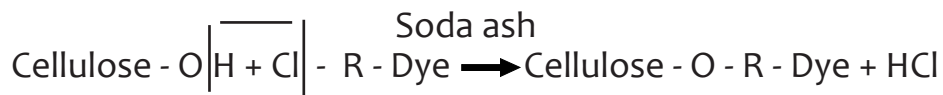
Vinyl sulphone - Monochlorotriazine (VS-MCT)

Vinyl sulphone - Vinyl sulphone (VS-VS)

Vinyl sulphone - Monofluortriazin (VS-MFT)

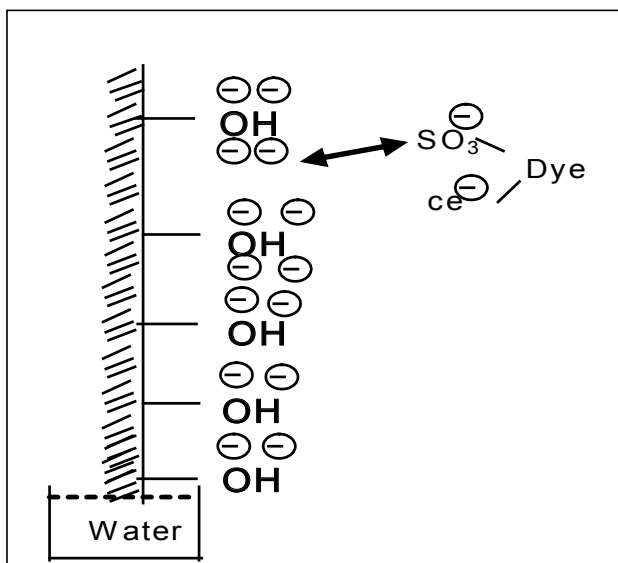
Dyeing Reaction and Role of Alkali

During the dyeing of cellulose with reactive dyes, Hydrogen ion of cellulose react with Chloro(Cl) or Sulfone(SO₃) of the reactive group and forms a strong acids like Hydrochloric Acid (HCl) or Sulphuric Acid H₂SO₄. Alkali (Soda Ash or Caustic soda) is important to neutralize this strong acid which will otherwise cease the reaction. Addition of alkali controls rate of reaction of the dyeing mechanism. Therefore it is important to add the alkali slowly. If pH of dyebath increases at full speed, reaction to the right goes very fast and hence patchy dyeing is inevitable.

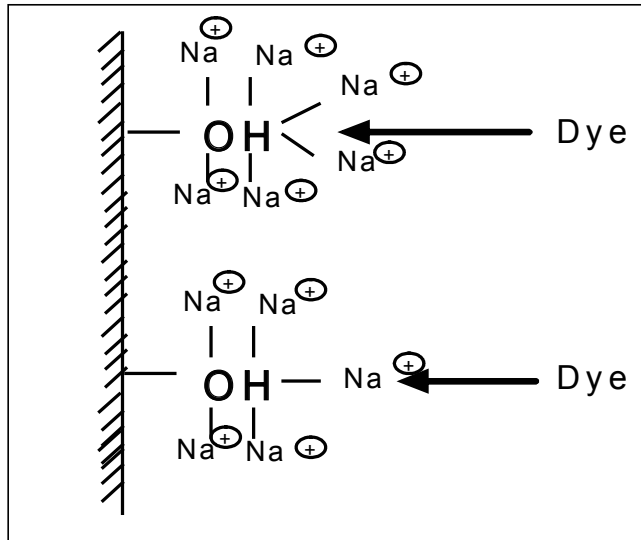


Role of Elektrolyte (Salt) with Reactive Dyeing

Reactive dyes for cotton have negatively charged active groups, they are anionic. When cotton or viscose fiber immersed into water, its surface due to hydroxly ions become also anionic, hence they- the dye particles and the cellulosic fiber-tend to repel each other.



The addition of salt, creates an electrical positive double layer which hides negative electrostatic charge of cotton surface. This allows the dye approach the fiber.

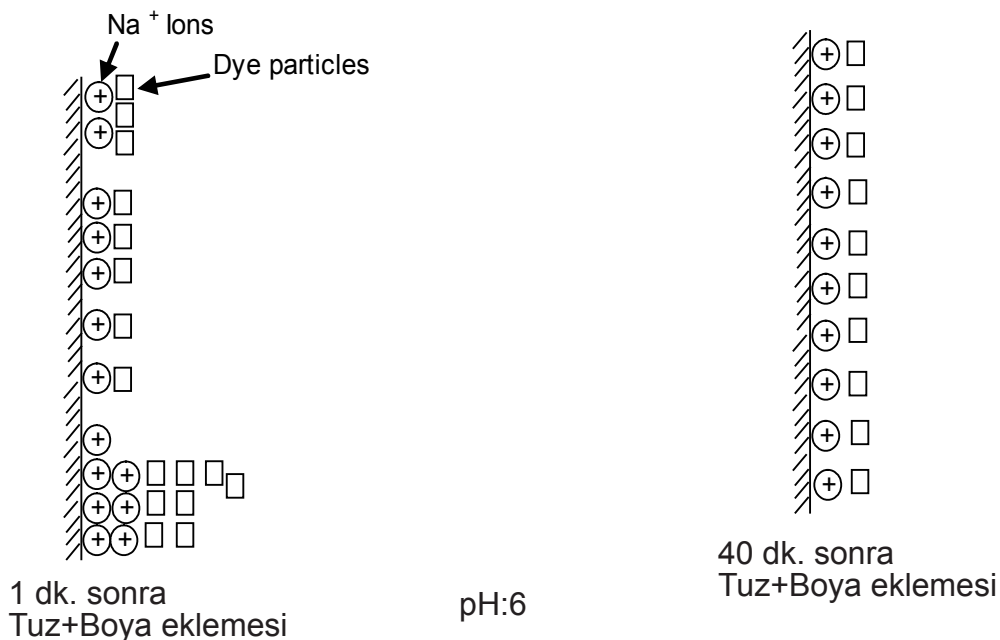


If electrolyte is not spreaded-out uniformly on cotton surface, dye distribution will not be even also and patchy dyeing is unavoidable.

After the addition of salt and dye, sufficient period of time should pass, for the even distribution of salt and the dye .

This levelling period us between 30 and 45 minutes, depending upon,

- Circulation speed.
- Flotte ratio.
- Primary exhaustion property of dyes.



Uniform dyeing results with acceptable fastness properties can be obtained by controlling these parameters, properly.

<u>Parameter</u>	<u>Effect</u>	<u>Result</u>
A) Temperature Increase	Reactivity increases Substantivity decreases Migration improved Hydrolization increased	Low built-up Beter levelling
B) pH, Increase	Reactivity increases	Substantivity increases Built-up increases Migration improved Hydrolization increased
C) Electrolyte	Substantivity increases	High built-up Low migration Low dye solubility
D) Low Bath Ratio	Less hydrolization High economy	High build-up less unlevelling

NOTES

- Since sodium sulphate generates less sodium ion with respect to NaCl, cotton surface becomes less substantive. Which is precondition for light shades. So sodium sulphate is preferred;

Light shades,
Blue 19 and Blue 21,
Viscose fiber.

- In case low bath ratio and high circulation dyeing machines, electrolyte concentration should be decreased. Please check back side tables.
- If bath ratio is increased, e.g. in sample dye units, salt amount should be increased.
- After the addition of salt and dye, at least 40 min should be elapsed, to obtain perfect dye distribution and migration.
- In case of high bicarbonate content of process water, final pH is around 9,8 - 10,2 which is very low for good fixation and shade repeatability. Optimum pH should be around 10,8 - 11.

- EKSOY developed, a sophisticated buffer alkali which keeps the pH between 10,8 - 11 to obtain;

High fixation,
Better shade repeatability,
Shorter wash-off period.

- Pls. consult our local agents, to obtain more detailed information, concerning
BUFFERON R11 .

HOW to SELECT BEST EKSATIVE COMBINATION

LIGHT SHADES

Both Light and deep shades have different problems respectively. Therefore different characteristics should be required during dyestuff selection. The main problems in light shades are;

Low light fastness
Unleveled dyeing
Poor Repeatability

When the dyestuff amount in a combination becomes trace amount, the dyeing yield varies enormously from batch to batch and hence shade changes. In order to solve the above problems Eksoy, suggest to use following dyes in the combination below OWF 1 %. This specially designed group is less sensitive to parameters like liquor ratio, temperature, electrolyte, soaping time etc. and they had higher light fastness.

For higher light fastness good compatibility, we advise (light fastness 4 and 4/5)

Vivizol Yellow HFL
Vivizol Red HFL
Vivizol Blue HFL
Vivizol Grey HFL

MEDIUM SHADES 1 - 4 %

The main problem with medium & dark shades are;

Long dyeing & washing time,
Low wash fastness,
Metamery,
Unevenness of braun, khaki and an anthracite shades.

Substantivity of conventional Yellow 145 and Red 195 and Navy Blue in three chrome recipes are not overlapping. Navy is a fast dye, whether the other two, are slow exhausting dyes. So uneven dyeing is inevitable especially in sensitive shades, like braun, khaki, anthracite.

EKSOY developed new range of dyes with similar substantivity, to produce uniform dyeing of above mentioned shades.

Vivizol Yellow BM-FS 150 %
Vivizol Red BM-FS 150 %
Vivizol Blue BM-FRS
Vivizol Navy Blue BM-FS

DARK SHADES >4 %

- EKSOY developed, DBR series, for the purpose of;

Low dye cost
Excellent compatibility
High wash fastness
High hydrolyzation stability
High repeatability
Low dyeing residue
High levelled dyeing

- Our DBR range covers;

Vivizol Yellow DBR
Vivizol Red DBR
Vivizol Navy DBR
Vivizol Orange DBR
Vivizol Deep Red DB

TURQUOISE SHADES

- Major problems existing in Turquoise dyeing;

Unevenness,
Dye deposits,
Long washing time,
Repeatability,

- Most of the Blue 21 dyes, have lower solubility, in the presence of electrolyte. Dye tend to agglomerate and deposit on substrate as dye flecks. Due to fine selection of raw materials of Eksative Turquoise Blue, our dye has high solubility in the presence of salt and never gives dye deposits.

- Since phthalocyanine dyes are very sensitive non-ionic wetting agents, scouring agents in the bleaching bath should be chosen accordingly and prior to addition of Turquoise dye into the dyeing bath, fabric should be treated with

PES CLEAN	1 g/L
Temp.	40 °C
Time	10 min

- Without draining, dyeing is processed.
- As mentioned before, as electrolyte, sodium sulfate is preferred.
- In color matching with Turquoise Blue, we recommend

Brill. Yellow 3GL 150 %
Navy RN
Blue HFL
Blue BM-FRS
Yellow 3RS 150 %
Blue Rsp
Brill. Blue DBR

- Since reactivity of matching shades increases considerably at 80 °C, sometimes, due to high pH increase at the beginning of dyeing, uneven results can be obtained. In such cases, we recommend 80/60 °C cooling process (eg mercerised cotton, viscose, heavy fabrics, fine yarn knits)
- If Brill. Blue Rsp is minor portion in the recipe, 80/60 cooling method or if it is major item, 60/60 isothermal system preferred.

BLUE RSP COMBINATIONS

- As electrolyte, Na₂SO₄ is preferred and maximum dosage amount is 50 g/L.
- As lubricant, sequestrant or wetting agent, anionic-nonionic blends should be selected and total amount should not exceed 0,5 ml/L.
- Blue R loose its power at 80 °C, so 30/60 °C or 60/60 °C dyeing methods are more practical.
- If the raw fabric contains too much calcium salts, preliminary proton cleaning with,

PROSIL D CONZ	2 ml/L
E WET LFN	0,5 ml/L
Temp.	60 °C
Time	20 min

Drained and bleaching is started.

- For complete build-up and goods reproducibility, final pH of Blue R dyeings should be around pH: 11.
- As complementary dye, we recommend with Blue R,

Yellow HF-3GN
Yellow 3GL 150 %
Red 3BL

VIOLETT COLORS

- It is advisable to match the violett shades from original violett colors. For this purpose we recommend, with less metameri,

Vivizol Violet HFL

- If dyemaster insist on Blue Rsp combination to make violett as complementary colors, we advise,

Yellow HF-3GN
Red 3BL
Yellow 3GL 150 %

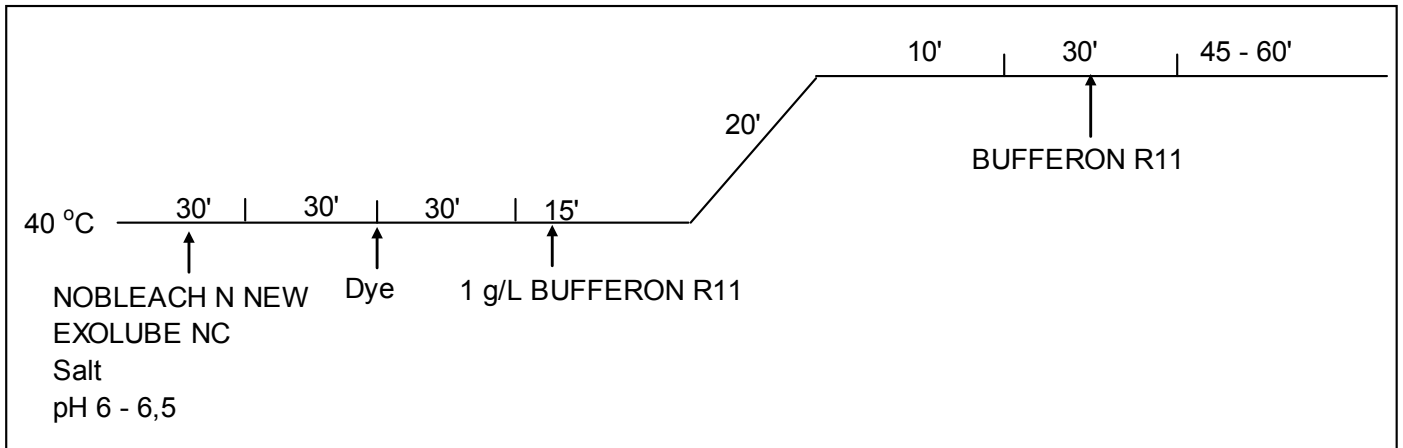
GREY COLORS

Vivizol Grey HFL is a unique dye with high light fastness. All light grey shades can be approached, with bi-color combination in a safe way.

ONE-STEP, NO SCOUR, DYEING of DARK SHADES

In case of Black, Navy, Dark green and Brown shades, No Bleach N is an effective emulsifier to perform scouring and dyeing in the same bath, hence saving water, energy, labor and time

NOBLEACH N NEW	3 ml/L
EXOLUBE NC	1 ml/L
Salt	80 - 100 g/L
BUFFERON R11	4 - 5 g/L



DISCHARGEABLE DYES

- Vivizol Yellow 3GL 150 %
- Vivizol Yellow HF-3GN
- Vivizol Yellow HF-4GR
- Vivizol G.Yellow SHF-3RD
- Vivizol G.Yellow SHF-3RD 150 %
- Vivizol Red BB 150 %
- Vivizol Red SHF-GD
- Vivizol Black B 150 %
- Vivizol Black N Konz
- Vivizol Extra Black R
- Vivizol Navy DBR
- Vivizol N.Blue SHF-GFN 150 %
- Vivizol N.Blue SHF-BR 145 %

BUFFERON R11

BUFFERON R11 is a stabilised alkaline buffer for reactive dyeing. It ensures non-variable pH value at the end of dyeing, disregarding bicarbonate content of process water (see prospect)

It ensures;

- Slower pH increase at the beginning of dyeing and hence better levelling
- Higher pH approached compared to soda ash, hence color repeability, shorter wash-off time.

Application amount is $\frac{1}{4}$ of sodyum carbonate usage. It is a powder product. In laboratory, salt amount is increased by 10 percent. In bulk, BUFFERON R11 amount is increased by 20 %, compared to Lab. recipe. Salt amount is increased also by 10 - 15 %.

LABORATORY – DYE PLANT CONSISTENCY

In order to decrease the difference between lab. and the plant, the following items should be checked.

- Check the temp of both machine by the same IR temp. controller.
- Check the bath ratios.
- Consider the weight-loss of lab. prebleached fabric.
- Since in the lab, peroxide trace amount on the fabric decomposed by time and during drying, in the plant, core peroxide should be eliminated by

One more hot washing,
or

Increase the amount of catalase enzym.

- Elapsing time between soda start-up to the end of dyeing should be the same in lab and in plant.
- If liquid salt or alkali are used, dosage unit should be the same, as g or millilitre.
- In the plant, electrolyte amount can be decreased by 10 - 15 %, due to circulation speed difference.

SOAPING AND RINSING

EKSOY is very famous world wide about foamless soaping compounds. Soaping is performed in a short period and with brilliant shades. We recommend,

Cold rinsing, 10 min

Neutralizing, 15 min 50 °C

Soaping, 95 °C, 15 min

EXOLIINE 1025, 3025 or 3027

0,5 - 1 ml/L

ANTISIL CONZ or ACC(if necessary)

0,5 - 1 ml/L

Light (below 0,5 %)

No soaping

Rinsing, 90 °C, 10 °C

Rinsing, 80 °C, 10 °C

Softening

Medium (0,5 - 3 %)

One time

Dark (above 3 %)

Double

STRIPPING THE FAULTY DYED REACTIVES

5 - 10 % Fading off:

Our soaping agent, EXOLINE 3025, act also as fading off agent in alkaline conditions.

EXOLINE 3025	5 ml/L
Na ₂ CO ₃ ,	2 g/L
EXOLUBE NC	1 ml/L
Temp.	95 °C
Time	30 min

Stripping by Reductive Chemicals:

Hydrosulfite/ NaOH combination is the most popular reactive stripping process. But since Hydro decomposon above 70 °C rapidly, stripping is not uniform and chemical consumption is excessive. Besides, unpleasant odor and sulphate in effluent water is beyond acceptable limits. EKSOY introduced a stabilised reducing agent, MEGACLEAR 12; which is stable even at 130 °C, 3 - 5 times active then hydro and enviromentally friendly.

MEGACLEAR 12 is applied at pH 11 - 12 with NaOH or POLYSTRIP 7 at pH 7 - 8. POLYSTRIP 7 is a buffer alkaline and more interesting for viscose and/or weak cotton stripping. Due to low pH, degradation of viscose or cotton is negligible

EXOLINE 1025 or 3025	5 ml/L
Soda,	10 - 20 g/L
EXOLUBE NC	1 ml/L
Temp.	95 °C
Time	45 - 60 min

Hot washed and neutralized.

	<u>Conventional Dyes</u>	<u>Blue 19 and 21</u>
MEGACLEAR 12	3 - 4 g/L	5 - 8
NaOH, fl.	4 - 6 g/L	6 - 12
	or	or
POLYSTRIP 7	3 - 4 g/L	4 - 7
EXOLUBE NC	1 g/L	1
Temp.	95 °C	
Time	60 min	

CORRECTION (TOPPING) OF REACTIVE DYEING

In case of trace amount shading required into yellowish, reddish or blueish hue, Eksoy developed special reactive dyes for this purpose. Shade dyes are originally reactive dyes that are applied at boiling temp. and neutral pH simply during soaping. Levelling property of these dyes are excellent and does not impair wash and light fastness of original base color.

SHADE dye	x %
EXOLUBE NC	1 g/L
or	
BUFFERON 7	1 g/L
Sodium sulphate	10 g/L
Temp.	95 °C
Time	30 min

AFTER TREATMENTS to IMPROVE of WET FASTNESS of REACTIVE and DIRECT DYES

Principle of these after treatments is to create a larger molecular complex with anionic dye on the fabric and cationic fixing agent and hence to reduce the solubility and lower rate of desorption.

COLORFIX NF 250, is a non formaldehyde based, cationic fixing agent. Due to its enriched concentration, application amount is minute.

Exhaust

COLORFIX NF 250,	0,5 - 1 %
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Impregnation

COLORFIX NF 250,	5 - 10 ml/L
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THE AMOUNT OF DYE, SALT and SODA

DYE (%)	UNMERCERIZED COTTON			MERCERIZED COTTON/VISCOSE		
	SODIUM SULPHATE ANHYDROUS / SODA g/L			SODIUM SULPHATE ANHYDROUS /SODA g/L		
	F;1:1 4	F;1:1 0	F;1:6	F;1:1 4	F;1:1 0	F;1:6
Below 0,5	25/8	20/10	15/12	20/8	15/10	11/12
0,5 – 1	40/10	30/13	20/16	25/10	20/13	15/16
1 - 1,5	65/12	50/15	35/18	45/12	35/15	25/18
1,5 - 3	80/14	60/18	40/22	60/14	45/18	30/22
3 - 6	105/16	80/20	55/25	80/16	60/20	40/25
6 - 8	115/16	90/20	65/25	90/16	70/20	50/25
Above 8	130/16	100/20	70/25	95/16	75/20	55/25

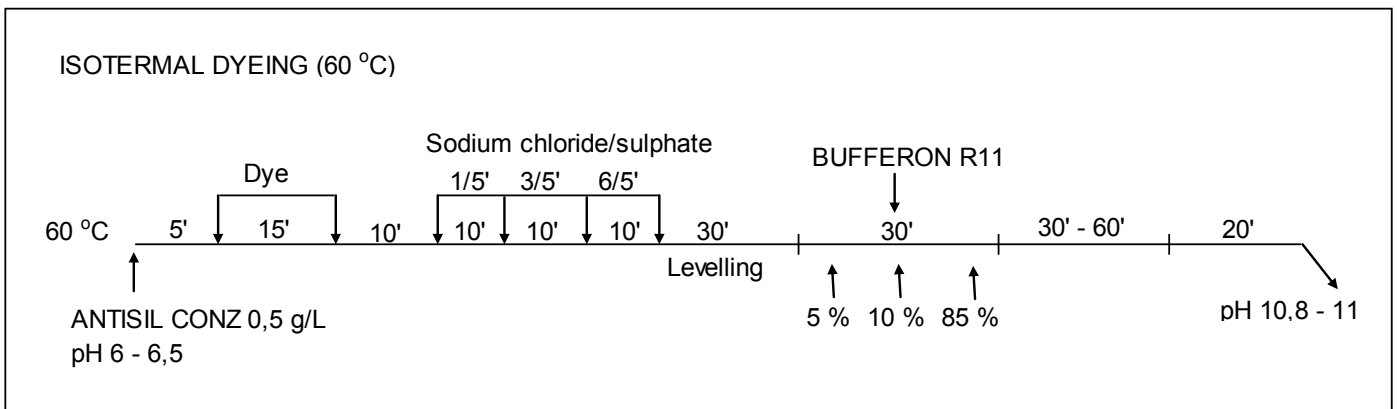
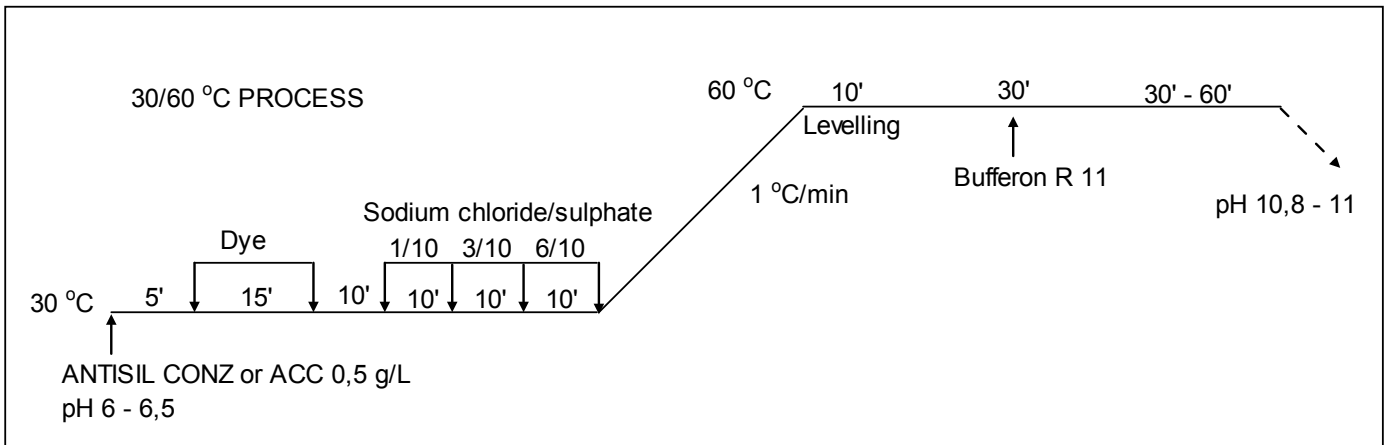
NOTE: In Tencel Dyeing ,the amount of sodium sulphate which is given for viscose should be decreased by 10 %.

WATER QUALITY

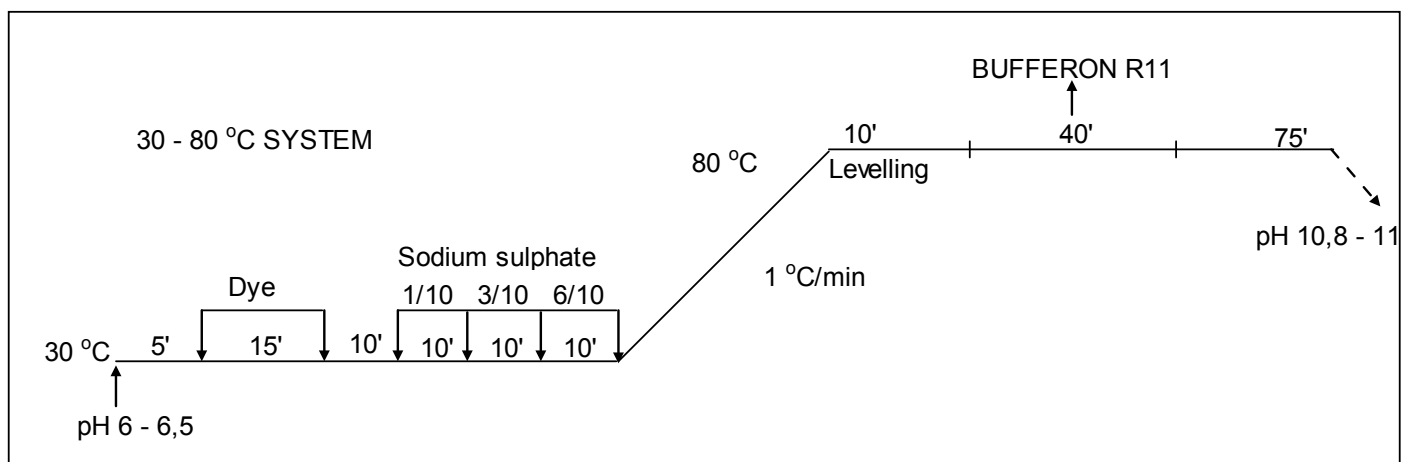
Ideal processing water quality should be near to the following specifications.

Color	Colorless
Oder	Oderless
Hardness	Below 5 german degree
Insolubeless	“ “ 50 ppm
Organic content	“ “ 20 mg/L (KMNO ₄)
Inorganic salt	“ “ 500 ppm
Manganese	“ “ 0,1 ppm
Copper	“ “ 0,005 ppm
Nitrate	“ “ 50 ppm
Nitrite	“ “ 5 ppm
Bicarbonate	“ “ 200ppm

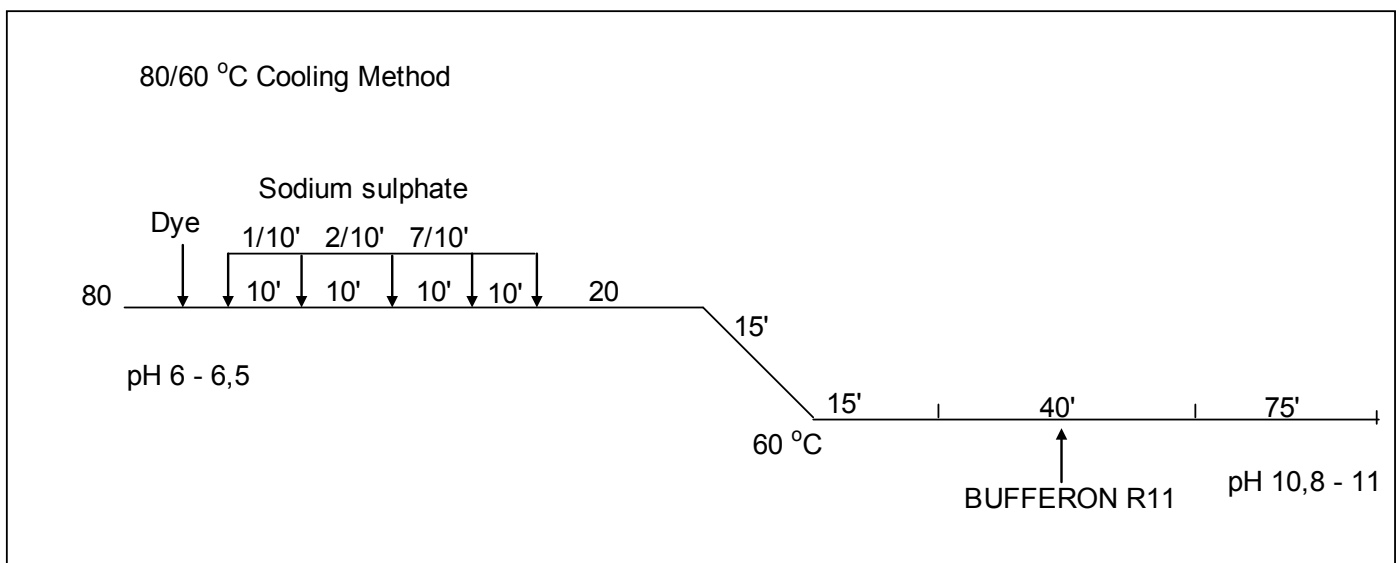
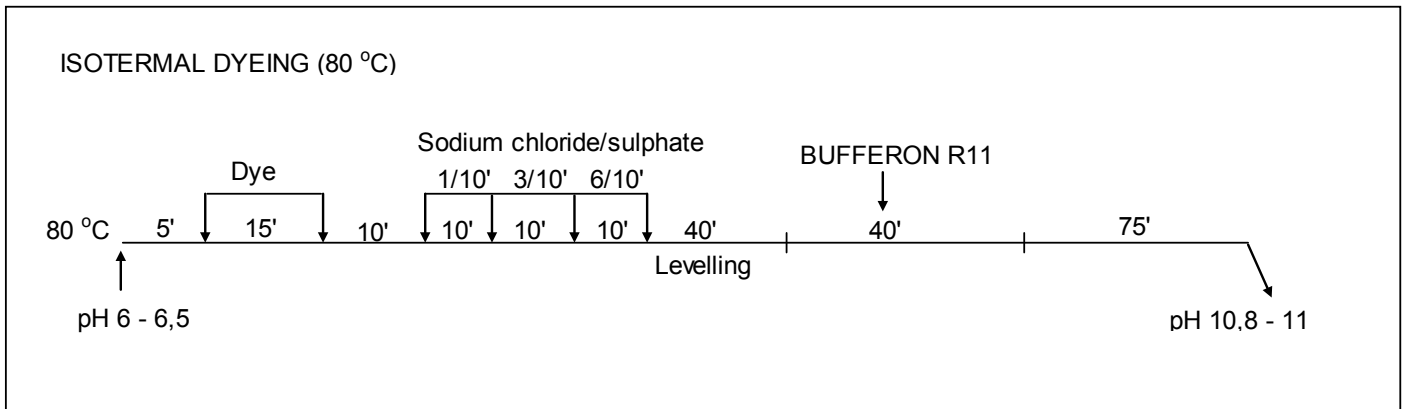
VIVIZOL DYEING DIAGRAMS



VIVIZOL TURQUOISE DYEING DIAGRAMS



VIVIZOL TURQUOISE DYEING DIAGRAMS



BLUE RSP DYEING DIAGRAMS

