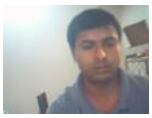


A Practices of dyeing (Reactive & Sulfure dye)

Square related:

$(a + b)^2 = a^2 + 2ab + b^2$

$(a - b)^2 = a^2 - 2ab + b^2$

$(a + b + c)^2 = a^2 + + b^2 + c^2 + 2(ab + bc + ca)$

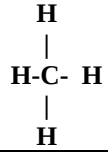
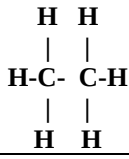
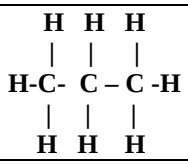
Quebec Related:

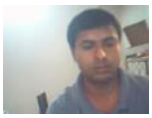
$(a + b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$

$(a - b)^3 = a^3 - 3a^2b + 3ab^2 - b^3$

$a^3 + b^3 + c^3 - 3abc = 1/2(a + b + c) \{(a - b)^2 + (b - c)^2 + (c - a)^2\}$

Fundamental: 1st class

	**Methane**
	**Ethane**
	**Propane**
Cn H2n+2	**Methylene**
Cn H2n-2	**Acetylene**
CnH2n	**Ethylene**

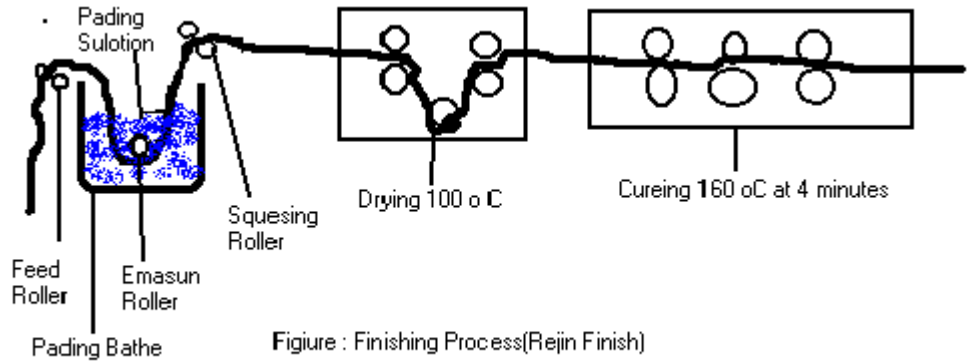


2nd Class

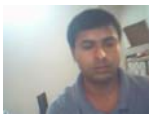
Rejin Finishing(synthetic finishing affect)
To remove crease marks from the cotton fabrics,
crease marks mechanism makes many crystalline region and amorphose region and change from one to another and make long and short , so crease marks make.
Remove by 180 degree temp ironing

Crease resistance: CH_3 - COOH Acetic acid
Cries Resistance finish:
Recipe:
100gm/litre knitex LE
20 gm/liter Avivan SI
20 gm /liter Vibatex HKN
15 gm / liter $MgCl_2$

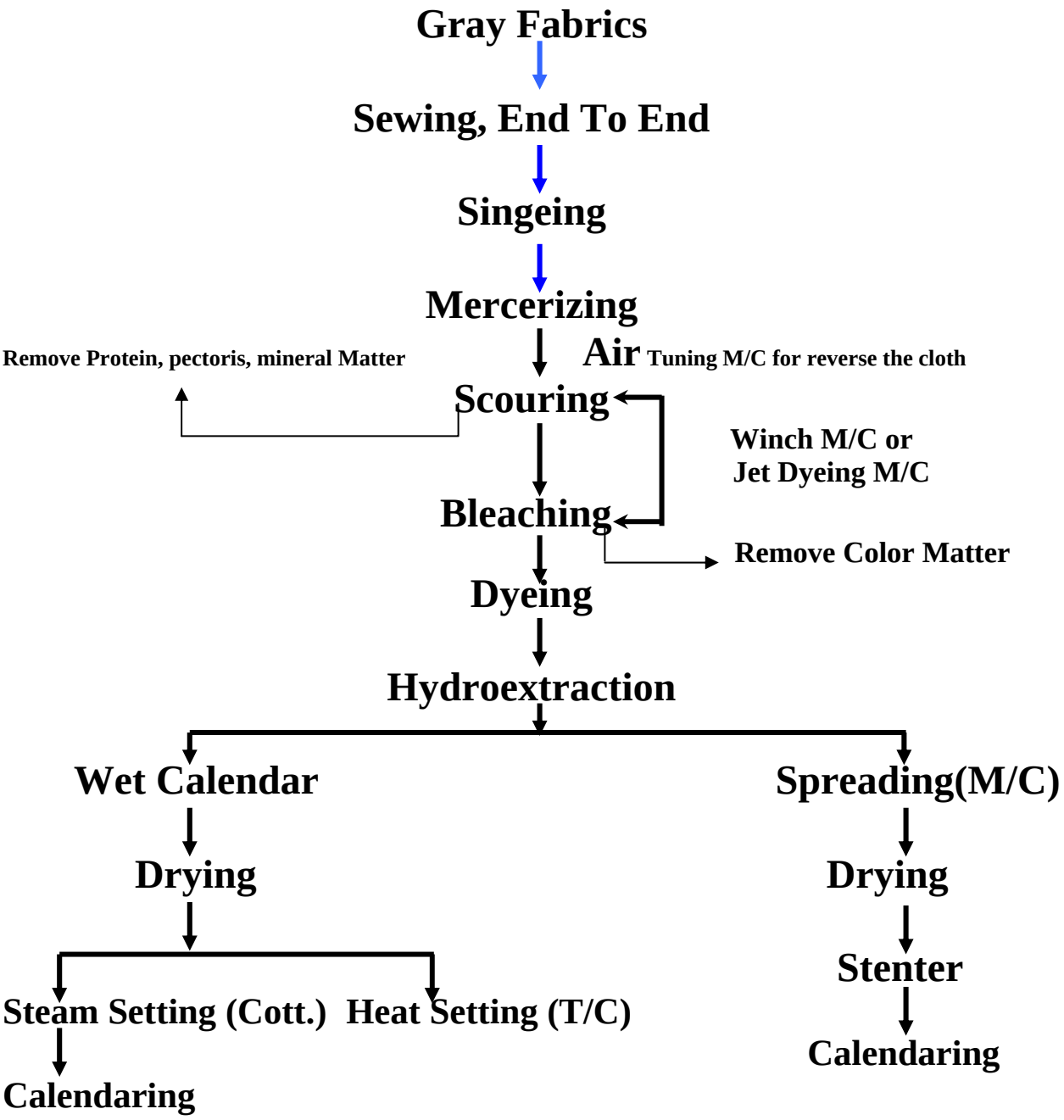
Pading ----------Drying ----------Cureing
100 oC 160 o C

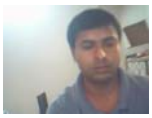


Figiure : Finishing Process(Rejin Finish)



Process flow chart for knit fabrics dyeing





Dyeing Printing and Finishing Dept.

Construction of raw cotton:

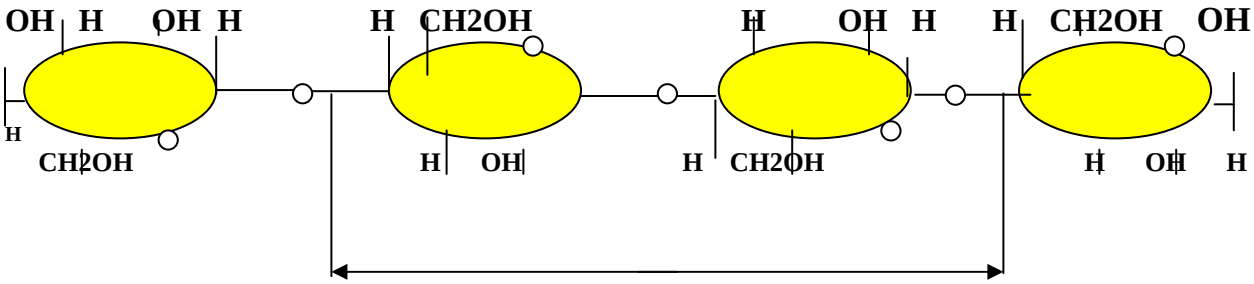
Raw Cotton Contains in addition to cellulose the usual constituents of vegetable cell. These are and WAX & OIL, Pectoses, and pectin's, Protein and simpler related nitrogen compounds organic acids, mineral matter and natural coloring matter. Cotton yarns or piece goods may contain, in addition, adventitious dirt size and machine oil. The approximate composition of raw cotton is as follows:

Cellulose	**: 85.5 %**
Oil and Wax	**: 0.5%**
Protein, pectose and coloring matter	**: 5.0%**
Mineral matter	**: 1.0%**
Moisture	**: 8.0%**

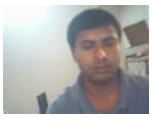
When all the impurities have been removed the main constituent of the fiber, cellulose remains.

Cellulose has an empirical formula of $(C_6 H_{10}O_5)n$. Pure cellulose is a while substance.

The Accepted structural formula for cellulose is there fore,



The -OH Group of the cotton structure chemically Combination with the dyestuff and make the fiber colored for those the fabrics became colored. The main theme of the dyeing depends upon the chemical bond of the fiber and dyestuff. That s is -OH & chemicals +ve (Electron)

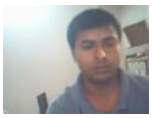


Mercerizing:

The term mercerizing describes the high-tension treatment of cotton yarns and woven and knitted fabrics with the cold caustic soda. The technology is based on observation by J. mercer in 1844 that woven cotton fabrics shrinks under the effect of caustic soda. While its strength, density and dye uptake increase (1st mercer paten 1850). The increase in luster with the use of tension was first discovered by Mr. Low in 1890, and technically evaluated by Thomas and provost krefeld in 1895. Up permanent silk-like lustre with a good fabric appearance and handle.
The high reputation of mercerized cotton goods and blends thereof above all characterized by:

- permanent lustre:
- silky , soft handle :
- high elasticity :
- increased affinity of dyestuff with saving between 20% and 35 %;
- increase strength;

It is custmary to mercerize at room temperature with 55 to 65 0 TW (31.1 to 35.4 0 Be') NaOH and the period of treatment is generally 30 to 50 second



Scouring (Natural fibers mainly cotton)

Natural fibers contain oils, fats and waxes, together with other impurities. The term scouring applies to the removal of these impurities

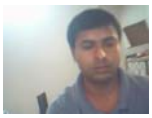
The actual scouring process is often refereed to as kier boiling, kiers (Steel container) may be either low pressure, which are open to the atmosphere, or high pressure, which are sealed and can operate at temperature well above 1000C With alkaline liquors (caustic soda) and other chemicals.

During the caustic soda boil all the impurities, with the exception of the coloring matter and wax are converted to soluble substances which are washed away when the rinsing take place. The oils and fats converted to soap and these in turn emulsify the waxes. The proteins are broken up into the sodium salts of simple amino acids and the adventitious dirt falls away when the oils are removed and is held in suspension by the soap. It is necessary to use soft water during kier boiling to avoid troubles due to the precipitation of calcium and magnesium soaps. Mainly assistants are used to improve penetration or keep insoluble impurities in suspension.
J-boxes, which are extensively used in, continue scouring and bleaching cotton goods with hydrogen per oxide. Now day's new types of scouring and bleaching ranges are available. Its advantages are as follows - shorter processing time, higher degree of whiteness, better extraction of impurities, less fiber damages, softer handle and energy saving etc.

General Recipe for Scouring:

Caustic Soda	: 3% - 4% (wt of goods)	Solution
Soda Ash	: 1%	
Detergent	: 0.5%	

L:R	1:20
Time	: 4 hrs [For practical]
Temperature	: Boiling



Bleaching:

Scouring generally removes all impurities except the natural coloring matters, which have to be broken down by bleaching, either with an oxidizing or reducing agent. Almost invariably the oxidizing agents give a more permanent white. When the color is acted upon by a reducing agent, there is always the possibility that the oxygen in the air may deoxidize/reoxidize it to its original state.

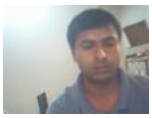
The bleaching process is essential for a good white effect and may be carried in two ways.

a) Bleaching with dilute hypochlorite solution at room temperature.
Bleaching with peroxide solution at temperature 90^0 - $110^{0.}$

The traditional oxidizing bleaching agent for cellulosic fibers was powder, which behaves as if it were calcium hypochlorite. For all practical purpose it has now been replace by sodium hypochlorite, which is more convenient to handle and more constant in composition. Hydrogen peroxide and sodium chlorite, which are both powerful bleaching agents, have to very great extent replaced hypochlorites.

General Recipe for Bleaching:

Bleaching Powder	: 1%
Soda Ash	: 0.75%
L:R	: 1:20
Time	: 30 min
Temperature	: Room temp.

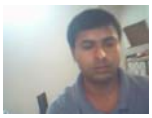


Souring: (Need for Dyeing with Bleaching Powder)

The practies of the souring by treatment with mineral acid after bleaching originated when bleaching powder was available. During bleaching a certain amounts of calcium carbonate was formed through contact with atmospheric carbondioxide and this became deposit in the cloth or yarn as an insoluble perccipited and its presence gave a harsh handle. It is therefore removed by the action of sulfuric or hydrochloride Acid followed by through washing with water.

General Recipe for Souring:

Hydrochloride	: 1%
L:R	: 1:20
Time	: 15 min
Temperature	: Room temp.



Dyeing of cotton fabrics with reactive dyes:

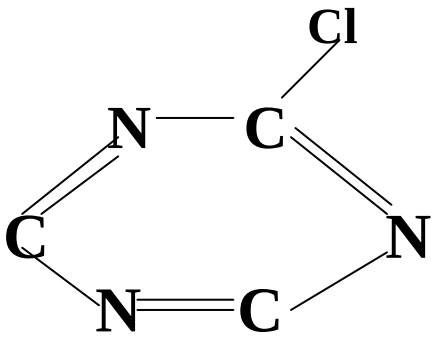
The first ranges of these dyes, the procaine MX and procion H dyes (ICI) were introduced in 1956 and were followed by the Cibacron (CIBA), Remazol (Hoechst), levafix (Bayer), Basilen (BASF) , drimarene(SANDOZ), Yoracron (YORKSHIRE) and other ranges. An essential feature of every member of the each of these groups of dyes is the presence within the molecule of an atom or group that can react covalently with the hydroxyl (-OH) group in the cellulose molecule.

The dye- fibber reaction is promote by alkaline conditions, as is also reaction of the dye with water to give a non- reactive dye . The efficiency of the dyeing process is increased by promoting dye - fiber combination and suppressing reaction with water. Indeed, the wet fastness of the dyeing depends upon this. The development of maximum fastness to wet treatments. However, depend upon the completeness of the removal from the fiber of dye not chemically bound to it.

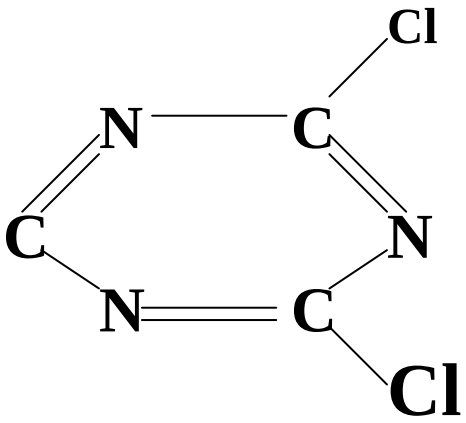
The dyes differ in their reactivity:

a) **A dichlorotriazinly dye of high reactivity , particularly suitable for application at low temperature (M - series temp not more then 40 ^{o}C)**
b) **Monochlorotriazinyl dye of low reactivity, they require more strongly alkaline condition and higher temperature (60 ^{o} - 80 ^{o} C) for fixation. These are H.P.E. series. P type of dyes is used mainly in continuous dyeing and printing.**
c) **Reactive dyes continuing vinyl-sulfone groups as a reactive radical, suitable for exhaust dyeing (60 ^{o} - 80 ^{o} C), continuous dyeing and printing.**

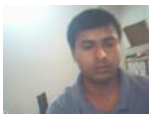
$-SO_2 - CH = CH_2$
Vinyl- sulfone group



Monochlorotiazinyl group

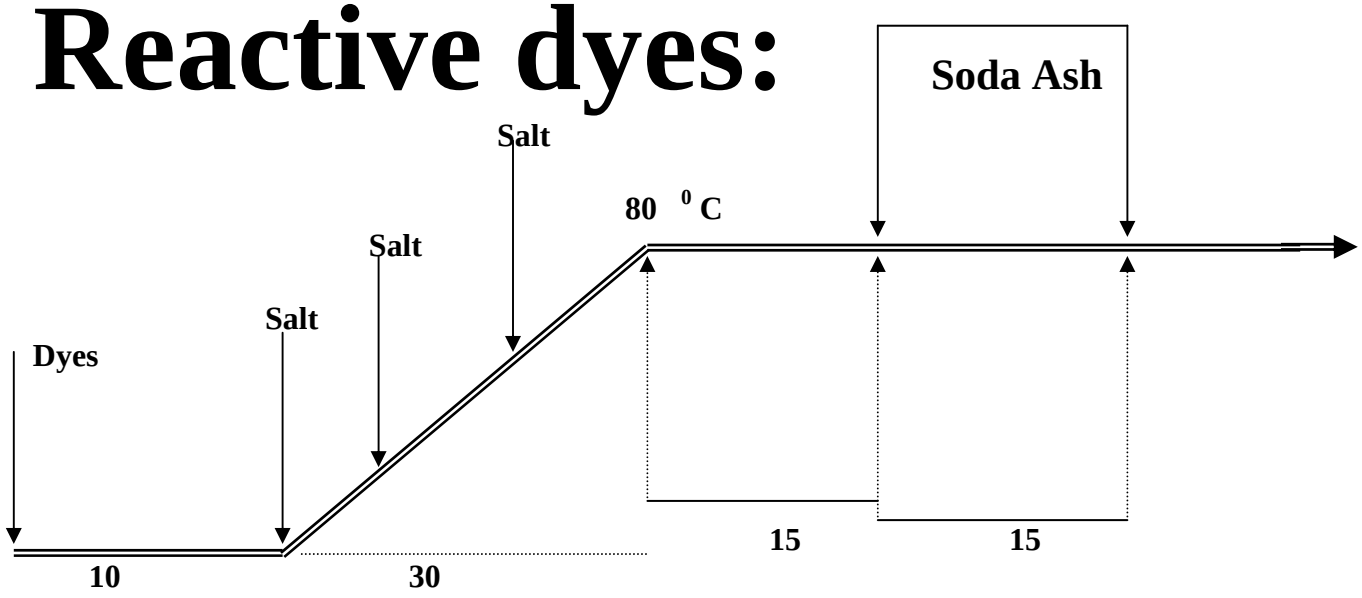


Dichlorotiazinyl

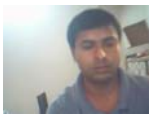


Exhaust Dyeing Process (Knit fabrics in winch m/c's)

Reactive dyes:



	Minutes	
		Load m/c's run liquor and/or fabric revolution ensure that s that the pH is below 7.
Raise Temp to 50 ^{0}C		Adjust with acetic acid if necessary and 1 - 2 g/l, oxidizing agent
	5 →	Add pre - dissolved dye
	10 →	Continue dyeing
	2 →	Add 5 g/l common salt (2.5 g/l for very light shade)
Raise Temp to 80 ^{0}C	10 →	Continue dyeing
(At approximatly 1^{0}C Per minute while the Salt is being Added)	3 →	Add 20 g/l common salt (10 g/l for very pale shades)
	10 →	Continue dyeing
	5 →	Add remainder salt
	15 →	Continue at 80 C to allow a uniform temp. to be achieved through the m/c. allow 15 min after the last salt addition if slat is still being added when the temp. reaches 80 C.
	15 →	Add alkali at 80C slowly . if soda ash alone is used as alkali this should be added over 10 min. if mixture of soda ash and caustic soda



45-75	**in used , the pre-mixture should be added over 15 min .** **Dye at 80 C** **Check shade.**

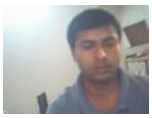
	Sodium Chloride Anhydrous sodium sulfate g/l.		**Alkali (g/l)**		
Depth of shade (%)	**Unmerc. Cotton**	**Merc. Cotton**	**Soda Ash only**	**Mixed Alkali**	
				Soda Ash	**Caustic Soda**
Up to .10	**10**	**5**	**10**	**5**	**0.2**
0.11 -0.30	**20**	**10**	**10**	**5**	**0.2**
0.31 - 0.50	**30**	**20**	**10**	**5**	**0.2**
0.51 - 1.00	**45**	**30**	**15**	**5**	**0.2**
1.01 - 2.00	**60**	**40**	**15**	**5**	**0.5**
2.01 - 4.00	**70**	**55**	**20**	**5**	**0.5**
Above 4.00	**90**	**65**	**20**	**5**	**0.5**

Soaping After Exhaust dyeing (Knit Fabrics)

For maximum fastness, wash off efficiently after dyeing.

<u>Minutes</u>.

	Drop dye bath
10 - 20	**Rinse hot (70^{0}C)**
15 - 30	**'Soap' at the boil. For very heavy shades two 15 min. 'Soap' are prefered**
10	**Rinse hot (70^{o}C) (0.05 g/l Detergent)** **Rinse cold until clear and soften as required** **(Use softening agent as necessary)** **Drop dye bath immediately after softening agent treatment and unload.**
Softening	**1% - 2% Softening agent** **Time: 10 - 20 min.** **Temp: 40 ^{o}C**



Exhaust Dyeing Process (Woven fabrics in Jigger m/c's)

On the Jig, the dyeing temperature must be control across the full width of the fabrics and throughout its length.

Dyeing procedure:

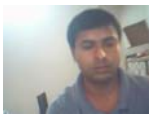
1st end ……..% Dye (1/2 the total amount)
2nd end ……% Dye(1/2 the total amount) with full shades, at the dye should be added ever 4 ends.
3rd end ……g/l common salt (1/2 the total amount)
4th end ……g/l ' '
5th end ……g/l soda ash + sodium hydroxide(1/2 the total amount)
6 th end ----------g/l (if necessary ends will be increased)
(4 ends in dyeing , 4 ends in salt , 6 ends in alkali)

After treatment of the dyeing:

After dyeing, salt and unfixed dye must be washed out rinsing and soaping.
The duration of the treatment depends on the nature of the textile material, the depth of shade the substantively of the dye, the machinery available.
The efficiency of the washing off treatment can be checked by means of a wet-ironing test.
The processing stages are cooling, rinsing, soaping rinsing-cooling with piece of goods, where too rapid cooling lead to fixation of creases, the dye liquor must first be cooled from 80 - 60 ^{o}C.
Rinsing- Rinsing is the first carried out with cold or warm water preferably with overflow, and then finally with hot water.
Soaping- once or twice nears to the boil, with detergent.
Rinsing- Rinse first with hot, then cold water.

Salt and alkali addition for cotton fabrics.

Dye	Short liquor		
	Salt	Soda ash	Sodium hydroxide(38 ^{0} Be)
%	G/l	G/l	Ml/l
0.2 - 0.5	10 - 20	5	1
0.51 - 1.0	20-30	10	1
1.01 - 2.0	30-40	15	1
2.01 - 3.0	40	15	2
3.01 - 4.0	40-50	20	2



above 4.0	**60**	**20**	**2**

Sulphur dyes:

Introduction:

As early as 1873 a frence chemist Groissant, Brontonaiere heated saw-dust and other substances with sulphur and ythe resulting dyestuff was known as Cachou do Laval. After this R. Vidal found that on heating a mixture Of quinone and phenata with sulpher and alkali sulphide in the presence of amonia an intensely colored substance was produced Vidal Black was the outcome of similar further works.

The sulphur black being main representative of the sulphur dyestuff group which is the fasted dye. With the few exception no sulphur dyestuff is as fast to light as sulphur black of all the sulphur dyes black, blue & brown dyes are the most important from point of view of tonnage. Sulphur dyes are generally faster to washing and light and are brighter in shade when applied to rayon then to cotton.

Dye - vessels:

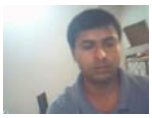
The dyes should be stored in cool dry place and the cover of the container replaced immediately after any dyestuff has been withdrawn because they deteriorate rapidly by oxidation of exposed to the atmosphere. The use of copper and aluminum or their alloys should be avoided as they are strongly attached by sodium sulphide , dye -vassals made of stainless steel cast or wrought iron, monel motel lead or wood etc. may be used.

Application:

The required amount of sulfur dyestuff is paste with soda ash and sodium sulfide, 2 gm/l of soda ash is generally used on the column of the dye bath. The quantity of sodium sulfide varies between half & twice the weight of the dyes.

But it is not always the case shown in table.

Sulfur dyestuff	Weight of sodium sulfide required
1. Sulfur Yellow	1.5 X wt of dye
2. Sulfur Blue	0.5 X wt of dye
3. Sulfur Blue-13	1 - 1.5 X wt of dye



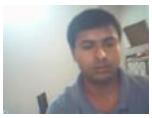
Boiling water is then added to the paste until it has all dissolved and if necessary, it is boiled up again. If circumstances permit, it is desirable to strain the dissolved dye before it is added to the dyebath because the sulfur dyes are liable to contain more insoluble impurities then other classes.
The dye bath is made up with dyestuff and from 25% common salt should be added the actual amount of variety according to the depth of shade
The salt may be added at the commencement but if there is any risk of unleveled dyeing it is preferable to add it after the temperature has roaches 100 0 C and then in several portions. He addition of a surface active penetrating agent is recommended. With most sulfurs dyes the liquor brought to the boil and dyeing continued at that temperature for 30 minutes. The steam is then turned off and the application continued in cooling liquor for further 30 minutes. There is some sulfur dyes, however, which exhaust best at 70 0c - 75 0 c.
On account of the readiness with which the reduced dye oxidizes
In the presence air it is desirable that the application should be in a machine in which the goods are totally increased the whole of the time.

After treatment

These are the readiness employed to improve various properties like brightness, fastness to light and washing etc. few of the commons after treatments are described below:

a) Sodium perborate treatment:
   It improves the brightness of the shade particularly used for sulfur blues. Dyes textile materials treated with 1 - 2 % perorate show approximately the shade which would have reached after complete oxidation, oxidation of .05 t 1 gm/l of treatment for about 20 minutes at 60-70 0C quizzed and dried treatment with .06 to 1.00 % of H2O@ also increase the brightness of shade.

b) Treatment with potassium dichromate/ copper sulfate:
   While dichromate increases the washing fastness, the dyed fabrics treated with copper sulfate have better light fastness. The two may be add alone or together but about not be used with sulfur black, 1 - 3% acetic acid with the above may be used. (Converts sulfuric acid which credes the

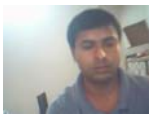


cellulose). The material is treated with the liquor at 50-60 ^{o}C for 20-30 minutes. After treatment the material thoroughly washed to above any traces or acid, soda ash being added in the last wash waters. Or preparing treatment bath, copper sulfate should be added after the addition of acetic acid and dichromate has been made.

a) 1 - 3 % - copper sulfate
b) 1 - 3 % acetic acid

Or

c) 1 - 1 1 /2 % Dichromate
   1 - 1 1 /2 % copper sulfate
   1 - 1 1 /2 % acetic acid



Dyeing process for the knit fabrics with sulfur dyes

Step x:

a) Take Sample Fabrics For Sewing and Check Properly
b) Take Necessary Dyes
c) Take Boume / Towdeal For Checking The Chemical and Water
d) Take Hot Water Pots
e) Take Chemical Pots
f) Make Stock Solution
g) Wet The Fabrics
h) Run The Burner

Name of the experiments ----------
Date -----/----/----- Time----------AM/PM

Experiment: R-01,

Teacher / instructor:----------

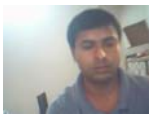
Method:

General Scouring and Bleaching:

- H_2O_2 = 52 gm/l [that means 52 grams H_2O_2 will add in one liter liquor]
- Stabilizing Agents = 14gm/l [14 Agts]
- NaOH = 16gm/l [16 NaOH]
- Detergent = 3 gm/l [03 Det]
- Time = 1 hrs
- Temp. = Boiling(Knit fabrics)
- L:R = 1: 10

Sample Fabrics. Knit fabrics.

1. Fabrics. Wt = 25.3 gm
2. Water = 25.3 x 10 = 253 cc
3. H_2O_2 = 24.53 cc (36 ^{o} Be)
4. Prestogen) stb. = 7.08 gm
5. NaOH = 8.09 gm



6. Detergent = 1.51 gm

Water adding unto maintain level:

Step 1:
Select apparatus:

Biker(600cc) = 3 nos
Biker (150 cc) = 2 nos.
Pipet = 1
Borate = 1
Test tube = 3 nos.
Fresh Paper = 10 pcs.
Chemical balances = 1 nos.
Glass rode
Glass pipe
Etc

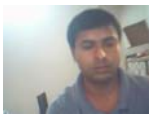
Step2: chemical weighting

At first weight the sample fabrics
Next take biker for 600 cc
Next take distill water about 500 cc
Next take 100cc water in biker
Next weight the chemical according to the ratio
Next H_2O_2 in a test tube
Next take stabilizer agent (prestogen pl)
Next take NaOH in a test tube
Detergent in a paper

Procedure:

1.For reactive dyeing bleaching and scouring process done in same way that means the chemical of above wt dilute in to the biker and start to heating in gas burner/heater when rise the temperature up to 60^0 C - 80^0 C boiling point then wet the sample fabrics and drop to the biker and moving by the glass rode continuing the heating 1 hr for weaven fabrics and knit fabrics 45 mints to 60 mints depend upon process controller.

2. Adding the water (boiling) unto liquor ratio maintain (water level maintain)


3. After 1 hr boiling the fabrics color will changed and the foreign materials will remove from the fabrics l**ike color mater**, **Protein, pectoris, mineral Matter** etc.
4. And fabrics will be white and bright..
5. Then the fabrics will ready for dyeing in dyeing section.
6. Please go to the dyeing unit of our laboratory. Ok

Reactive dyes:

Step 1:
Take all apparatus like Bleaching and scouring process:
Step 2:
Take chemical like previous process
But
Stock solution making required at here like that

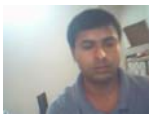
Process of stock solution making like that
1 gm dyestuff mixed with 100 cc water.
In 3% shade
25.3gm fabrics, dyestuff required = (3 X 25.3) / 100 gm = 0.75 gm
Make stock solution by 0.75 gm dyestuff as below

1 gm dyestuff is required water =100 cc
So 0.75 gm " " " " =100X0.75 cc = 75 cc
Or
So stock solution reqiuired is = (W x P)/C = (25.3 X 3%)/ 1 = 75 cc

(W X P)/C
Here, W= weight of fabrics in gm
P = percentage of shade (%)
C = concentration of stock solution
Sample Fabrics. Knit fabrics.

3% shade making practices done at this classes.

Fabrics. Wt = 6.5 gm
Water = 6.5 x 10 x 2 = 130 cc
Common salt = 9.5gm [70gm/l]
Soda Ash. = 2.6 gm [20gm/l]
Detergent = 1.51 gm



Dyes = 26 cc(Stock solution)

Water adding unto maintain level:

Biker(600cc) = 3 nos
Biker (150 cc) = 2 nos.
Pipet = 1
Borate = 1
Test tube = 3 nos.
Fresh Paper = 10 pcs.
Chemical balances
Glass rode
Glass pipe
Etc

Procedure:

After complete the wt of fabrics and chemicals go to the near of burner and began to heating the water with dyes (S.S.) , sample fabrics and water
After 10 mints add the common salt with the heat chemicals and continue 15 mints
Next check the temperature up to rising 60^0 C - 80^0 C
Then add Soda ash in the heat chemical please care fully handle that other wise chemical may jump up & damage your eye / mouth / hand. And continuing heating up to 45 mints. **And check shade.**
[Follow the process control table given below:]

Table of process control.

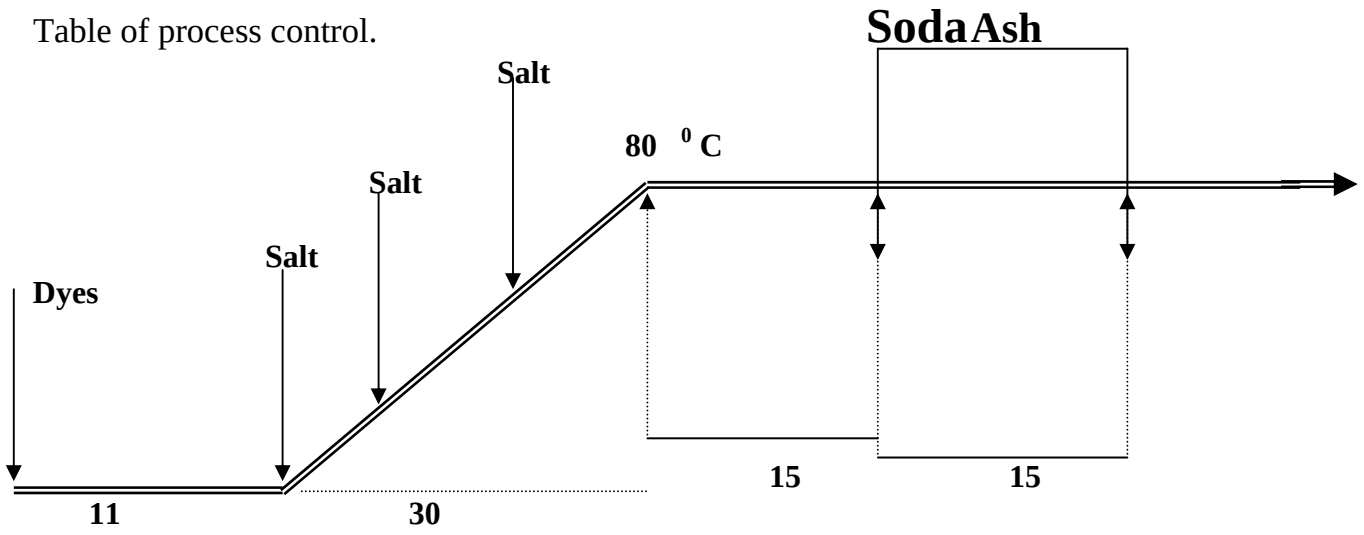
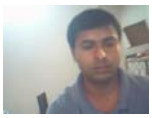


Table-1

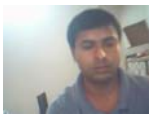


	Minutes	
		Load m/c's run liquor and/or fabric revolution ensure that s That the pH is below 7.
Raise Temp to 50 ^{0}C		**Adjust with acetic acid if necessary and 1 - 2 g/l, oxidizing agent**
	5 →	**Add pre - dissolved dye**
	10 →	**Continue dyeing**
	2 →	**Add 5 g/l common salt (2.5 g/l for very light shade)**
Raise Temp to 80 ^{0}C	**10** →	**Continue dyeing**
(At approximately 1^{0}C Per minute while the Salt is being Added)	**3** →	**Add 20 g/l common salt (10 g/l for very pale shades)**
	10 →	**Continue dyeing**
	5 →	**Add remainder salt**
	15 →	**Continue at 80^0 C to allow a uniform temp. to be achieved through the m/c. allow 15 min after the last salt addition if slat is still being added when the temp. Reaches 80^0 C.**
	15 →	**Add alkali at 80^{0}C slowly. If soda ash alone is used as alkali this should be added over 10 min. if mixture of soda ash and caustic soda in used, the pre-mixture should be added over 15 min.**
		Dye at 80^0 C
	45-75 →	**Check shade.**

After complete the dyeing process check wash the sample with normal process/ normal water.
Next wash with hot water in normal fabrics
Next wash with detergent 0.05 gm/l with boiling water or wash in detergent + sample fabrics + heating in the burner .
Next wash it normal water
Then dry and check the shade .

Table-2

	Sodium Chloride Anhydrous sodium sulfate G/l.		Alkali (g/l)		
Depth of shade (%)	**Unmerc. Cotton**	**Merc. Cotton**	**Soda Ash only**	**Mixed Alkali**	
				Soda Ash	**Caustic Soda**
Up to .10	**10**	**5**	**10**	**5**	**0.2**
0.11 -0.30	**20**	**10**	**10**	**5**	**0.2**
0.31 - 0.50	**30**	**20**	**10**	**5**	**0.2**



0.51 - 1.00	**45**	**30**	**15**	**5**	**0.2**
1.01 - 2.00	**60**	**40**	**15**	**5**	**0.5**
2.01 - 4.00	**70**	**55**	**20**	**5**	**0.5**
Above 4.00	**90**	**65**	**20**	**5**	**0.5**

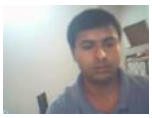
Soaping After Exhaust dyeing (Knit Fabrics)

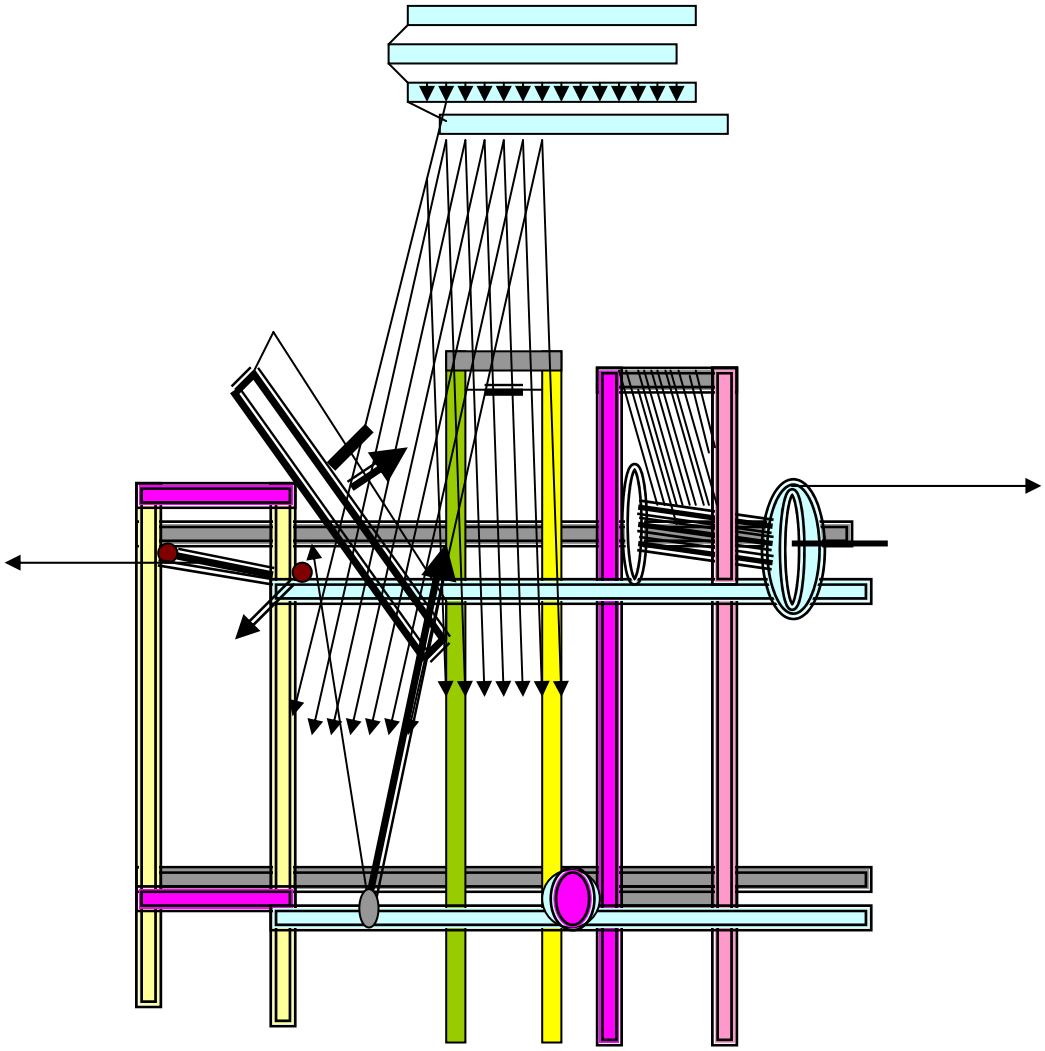
For maximum fastness, wash off efficiently after dyeing.

Minutes.

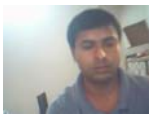
	Drop dye bath
10 - 20	**Rinse hot (70^0C)**
15 - 30	**'Soap' at the boil. For very heavy shades two 15 min. 'Soap' are preferred**
10	**Rinse hot (70^oC) (0.05 g/l Detergent)** **Rinse cold until clear and soften as required** **(Use softening agent as necessary)** **Drop dye baths immediately after softening agent treatment and unloads.**
Softening	**1% - 2% Softening agent** **Time: 10 - 20 min.** **Temp: 40 ^{o}C**

-:The end:-





Rana's Loom/Weaving M/C's
Rana's Dyeing systems



Name of the experiments ----------

Date -----/----/----- Time----------AM/PM

Experiment: R-02,

Teacher / instructor:----------

Method:

General Scouring and Bleaching:

- H_2O_2 = 52 gm/l [that means 52 grams1` H_2O_2 will add in one liter liquor]
- Stabilizing Agents = 14gm/l [14 Agts]
- NaOH = 16gm/l [16 NaOH]
- Detergent = 3 gm/l [03 Detg]
- Time = 1 hrs
- Temp. = Boiling (Knit fabrics)
- L:R = 1: 10

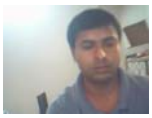
Sample Fabrics. Knit fabrics.

7. Fabrics. Wt = 100 gm
8. Water = 100 x 10 = 1000 cc
9. H_2O_2 = 96.95 cc (36 o Be) [L:R 1:20]
10. (Prestogen) stb. = 28.32 gm
11. NaOH = 32.36 gm
12. Detergent = 6.04 gm

Water adding unto maintain level:

Step 1:
Select apparatus:

Biker(600cc) = 3 nos
Biker (150 cc) = 2 nos.
Pipet = 1



Borate = 1
Test tube = 3 nos.
Fresh Paper = 10 pcs.
Chemical balances
Glass rode
Glass pipe
Etc

Step2: chemical weighting.

At first weight the sample fabrics
Next take biker for 600 cc
Next take distill water about 500 cc
Next take 100cc water in biker
Next weight the chemical according to the ratio
Next H_2O_2 in a test tube
Next take stabilizer agent (prestogen pl)
Next take NaOH in a test tube
Detergent in a paper

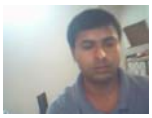
Procedure:

1.For reactive dyeing bleaching and scouring process done in same way that means the chemical of above wt dilute in to the biker and start to heating in gas burner/heater when rise the temperature up to 60^0 C - 80^0 C boiling point then wet the sample fabrics and drop to the biker and moving by the glass rode continuing the heating 1 hr for weaven fabrics and knit fabrics 45 mints to 60 mints depend upon process controller.

2. Adding the water (boiling) unto liquor ratio maintain (water level maintain)
3. After 1 hr boiling the fabrics color will changed and the foreign materials will remove from the fabrics l**ike color mater**, **Protein, pectoris, mineral Matter** etc.
7. And fabrics will be white and bright..
8. Then the fabrics will ready for dyeing in dyeing section.
9. Please go to the dyeing unit of our laboratory. Ok

Reactive dyes:

Step 1:



Take all apparatus like Bleaching and scouring process:

Step 2:

Take chemical like previous process

But

Stock solution making required at here like that

Process of stock solution making like that

1 gm dyestuff mixed with 100 cc water.

In 4% shade

100gm fabrics, dyestuff required = (4 X100) / 100 gm = 4 gm

Make stock solution by 4 gm dyestuff as below

1 gm dyestuff is required water =100 cc

So 4 gm " " " =100X4 = 400 cc

Or

So stock solution reqiuired is = (w x p)/c = (100 X 4%)/ 1 = 400 cc

(W X P)/C

Here

W= weight of fabrics in gm

P = Percentage of shade (%)

C = concentration of stock solution

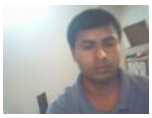
Sample Fabrics. Knit fabrics.

3% shade making practices done at this classes.

13. Fabrics. Wt = 100 gm
14. Water = 100 x 10 x 2 = 2000 cc [L:R 1:20]
15. Common salt = 146.15gm [70gm/l]
16. Soda Ash . = 40 gm [20gm/l]
17. Detergent = 23 gm
18. Dyes = 400 cc(stock solution)

Water adding unto maintain level:

Biker(1000cc) = 3 nos



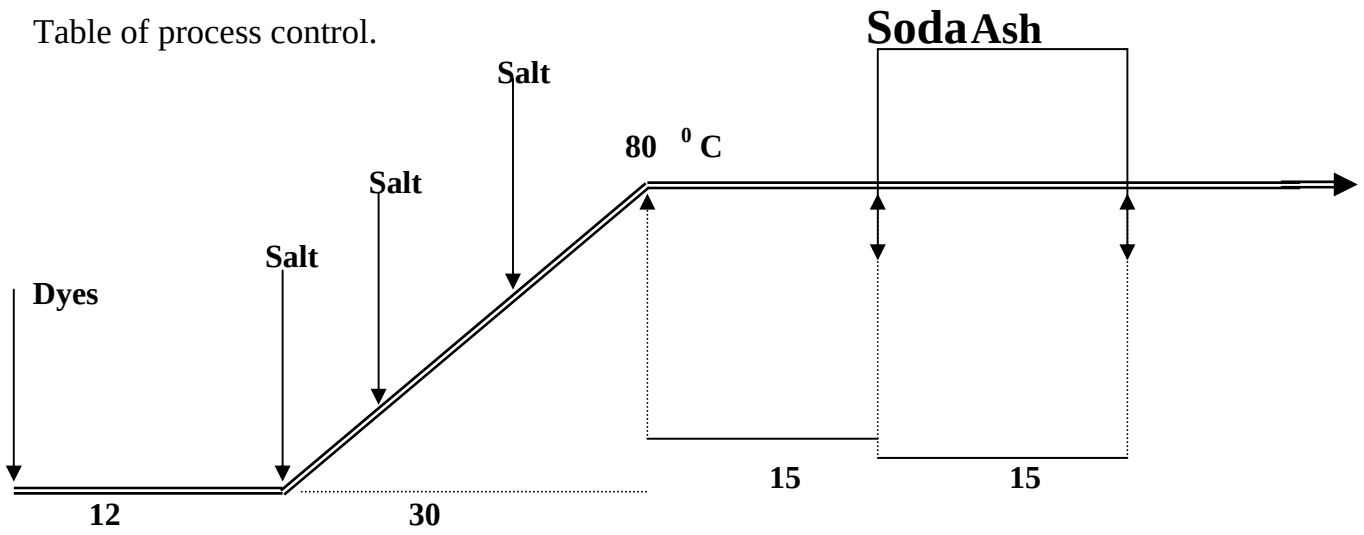
A Practices of dyeing (Reactive & Sulfure dye)

Biker (600 cc) = 2 nos.
Pipet = 1
Borate = 1
Test tube = 3 nos.
Fresh Paper = 10 pcs.
Chemical balances
Glass rode
Glass pipe
Etc

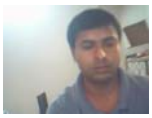
Procedure:

After complete the wt of fabrics and chemicals go to the near of burner and begain to heating the water with dyes (s.s.) , sample fabrics and water
After 10 mints add the common salt with the heat chemicals and continue 15 mints
Next check the temperature up to rising 60^{0} - 80 ^{0} C
Then add Soda ash in the heat chemical please care fully handle that other wise chemical may jump up & damage your eye / mouth / hand. And continuing heating up to 45 mints. And check the Shade.
[Follow the process control table given below:]

Table of process control.



	Minutes	
		Load m/c's run liquor and/or fabric revolution ensure that s That the pH is below 7.
Raise Temp to 50 ^{0}C		**Adjust with acetic acid if necessary and 1 - 2 g/l, oxidizing agent**
	5 →	**Add pre - dissolved dye**
	10 →	**Continue dyeing**
	2 →	**Add 5 g/l common salt (2.5 g/l for very light shade)**
	→	
	→	



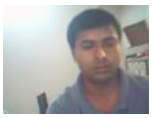
Raise Temp to 80 ^{0}C	**10**	**Continue dyeing**
(At approximately 1^{0}C Per minute while the Salt is being Added)	**3**	**Add 20 g/l common salt (10 g/l for very pale shades)**
	10	**Continue dyeing**
	5	**Add remainder salt**
	15	**Continue at 80^0 C to allow a uniform temp. to be achieved through the m/c. allow 15 min after the last salt addition if slat is still being added when the temp. Reaches 80^0 C.**
	15	**Add alkali at 80^{0}C slowly. If soda ash alone is used as alkali this should be added over 10 min. if mixture of soda ash and caustic soda in used, the pre-mixture should be added over 15 min.**
	45-75	**Dye at 80^0 C** **Check shade.**

After complete the dyeing process check wash the sample with normal process/ normal water.
Next wash with hot water in normal fabrics
Next wash with detergent 0.05 gm/l with boiling water or wash in detergent + sample fabrics + heating in the burner.
Next wash it normal water
Then dry and check the shade.

	Sodium Chloride Anhydrous sodium sulfate G/l.		Alkali (g/l)		
Depth of shade (%)	**Unmerc. Cotton**	**Merc. Cotton**	**Soda Ash only**	**Mixed Alkali**	
				Soda Ash	**Caustic Soda**
Up to .10	**10**	**5**	**10**	**5**	**0.2**
0.11 -0.30	**20**	**10**	**10**	**5**	**0.2**
0.31 - 0.50	**30**	**20**	**10**	**5**	**0.2**
0.51 - 1.00	**45**	**30**	**15**	**5**	**0.2**
1.01 - 2.00	**60**	**40**	**15**	**5**	**0.5**
2.01 - 4.00	**70**	**55**	**20**	**5**	**0.5**
Above 4.00	**90**	**65**	**20**	**5**	**0.5**

Soaping After Exhaust dyeing (Knit Fabrics)

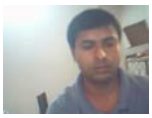
For maximum fastness, wash off efficiently after dyeing.



Minutes.

	Drop dye bath
10 - 20	**Rinse hot (70^0C)**
15 - 30	**'Soap' at the boil. For very heavy shades two 15 min. 'Soap' are preferred**
10	**Rinse hot (70^oC) (0.05 g/l Detergent)**
	Rinse cold until clear and soften as required
	(Use softening agent as necessary)
	Drop dye baths immediately after softening agent treatment and unloads.
Softening	**1% - 2% Softening agent**
	Time: 10 - 20 min.
	Temp: 40 ^{o}C

-:The end:-



Name of the experiments ----------
Date -----/----/----- Time----------AM/PM

Experiment: R-03,

Teacher / instructor:----------

Method:

General Scouring and Bleaching:

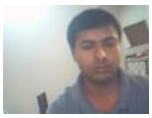
- H_2O_2 = 52 gm/l [that means 52 grams H_2O_2 will add in one liter liquor]
- Stabilizing Agents = 14gm/l [14 Agts]
- NaOH = 16gm/l [16 NaOH]
- Detergent = 3 gm/l [03 Detg]
- Time = 1 hrs
- Temp. = Boiling (Knit fabrics)
- L:R = 1: 10

Sample Fabrics. Knit fabrics.

Fabrics. Wt	= 1 kg = 1,000 gm
Water = 1,000 x 10	= 10,000 cc
H_2O_2	= 485 cc (36 ^{o} Be) [L:R 1: 10]
(Prestogen) stb.	= 139.92 gm
NaOH	= 159.88 gm
Detergent	= 30 gm

Water adding unto maintain level:
Complete;;;;;;;;;;;;;;;;;;;;;;;;;;;;
Step 1:
Select apparatus:

Biker(600cc)	= 3 nos
Biker (150 cc)	= 2 nos.
Pipet	= 1
Borate	= 1
Test tube	= 3 nos.
Fresh Paper	= 10 pcs.



Chemical balances
Glass rode
Glass pipe
Etc

Step2: chemical weighting

At first weight the sample fabrics
Next take biker for 600 cc
Next take distill water about 500 cc
Next take 100cc water in biker
Next weight the chemical according to the ratio
Next H_2O_2 in a test tube
Next take stabilizer agent (prestogen pl)
Next take NaOH in a test tube
Detergent in a paper

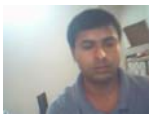
Procedure:

1.For reactive dyeing bleaching and scouring process done in same way that means the chemical of above wt dilute in to the biker and start to heating in gas burner/heater when rise the temperature up to 60^0 C - 80^0 C boiling point then wet the sample fabrics and drop to the biker and moving by the glass rode continuing the heating 1 hr for weaven fabrics and knit fabrics 45 mints to 60 mints depend upon process controller.

2. Adding the water (boiling) unto liquor ratio maintain (water level maintain)
3. After 1 hr boiling the fabrics color will changed and the foreign materials will remove from the fabrics l**ike color mater**, **Protein, pectoris, mineral Matter** etc.
10.And fabrics will be white and bright..
11.Then the fabrics will ready for dyeing in dyeing section.
12.Please go to the dyeing unit of our laboratory. Ok

Reactive dyes:

Step 1:
Take all apparatus like Bleaching and scouring process:
Step 2:
Take chemical like previous process



But
Stock solution making required at here like that

Process of stock solution making like that
1 gm dyestuff mixed with 100 cc water.
In 2% shade
1000(1kg)gm fabrics, dyestuff required = (2 X 1000) / 100 gm = 20 gm
Make stock solution by 20gm dyestuff as below

1 gm dyestuff is required water =100 cc
So 20 gm " " " " =100X20 cc = 2000 cc

Or

So stock solution reqiuired is = (w x p)/c = (100 X 2%)/ 1 = 2000 cc

(W X P)/C
Here
W= weight of fabrics in gm
P = percentage of shade (%)
C = concentration of stock solution

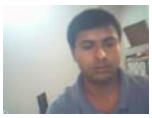
Sample Fabrics. Knit fabrics.

3% shade making practices done at this classes.

19.Fabrics. Wt = 1000 gm (1kg)
20.Water = 1000 x 10 = 10000 cc
21.Common salt = 700 gm [70gm/l]
22.Soda Ash . = 200 gm [20gm/l]
23.Detergent = 29.84 gm
24.Dyes = 513.38 cc(stock solution)

Water adding unto maintain level:

Biker(600cc) = 3 nos
Biker (150 cc) = 2 nos.
Pipet = 1
Borate = 1



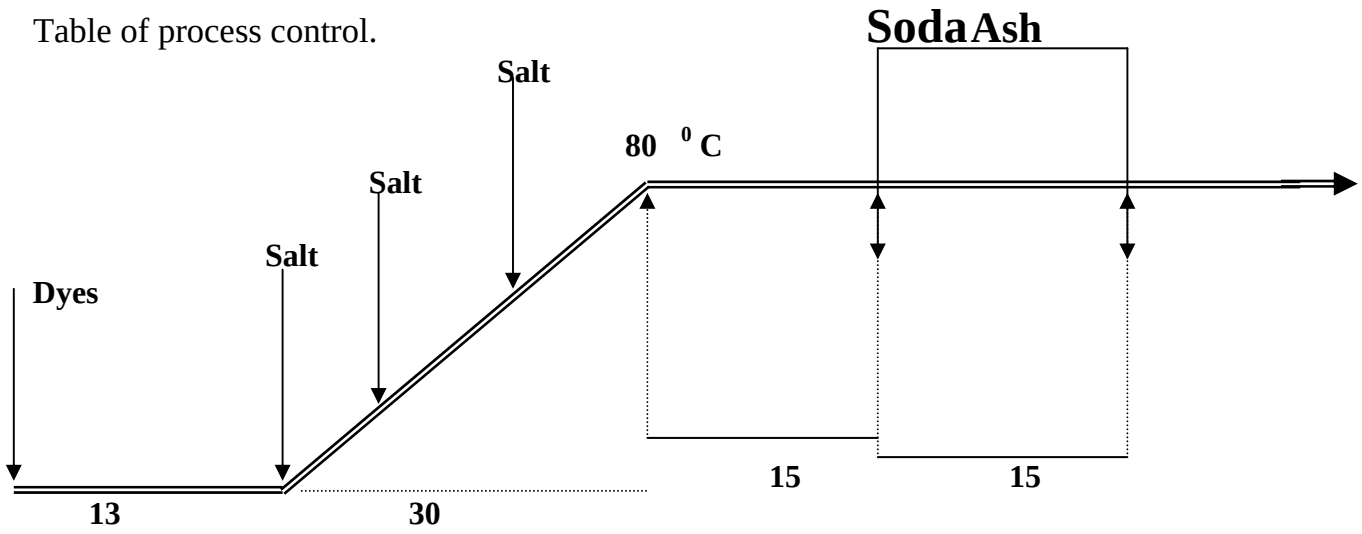
A Practices of dyeing (Reactive & Sulfure dye)

Test tube = 3 nos.
Fresh Paper = 10 pcs.
Chemical balances
Glass rode
Glass pipe
Etc

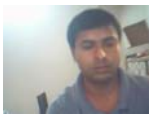
Procedure:

After complete the wt of fabrics and chemicals go to the near of burner and begain to heating the water with dyes (s.s.) , sample fabrics and water
After 10 mints add the common salt with the heat chemicals and continue 15 mints
Next check the temperature up to riseing 60 - 80 o C
Then add Soda ash in the heat chemical please care fully handle that other wise chemical may jump up & damage your eye / mouth / hand. And continuing heating up to 45 mints. And check shade .
[Follow the process control table given below:]

Table of process control.



	Minutes	
		Load m/c's run liquor and/or fabric revolution ensure that s That the pH is below 7.
Raise Temp to 50 ^{0}C		**Adjust with acetic acid if necessary and 1 - 2 g/l, oxidizing agent**
	5 →	**Add pre – dissolved dye**
	10 →	**Continue dyeing**
	2 →	**Add 5 g/l common salt (2.5 g/l for very light shade)**
Raise Temp to 80 ^{0}C	**10** →	**Continue dyeing**
(At approximately	**3** →	**Add 20 g/l common salt**
	→	



1^0C Per minute while the Salt is being Added)	**10**	**(10 g/l for very pale shades) Continue dyeing**
	5	**Add remainder salt**
	15	**Continue at 80^0 C to allow a uniform temp. to be achieved through the m/c. allow 15 min after the last salt addition if slat is still being added when the temp. Reaches 80^0 C.**
	15	**Add alkali at 80^0C slowly. If soda ash alone is used as alkali this should be added over 10 min. if mixture of soda ash and caustic soda in used, the pre-mixture should be added over 15 min.**
	45-75	**Dye at 80^0 C** **Check shade.**

After complete the dyeing process check wash the sample with normal process/ normal water.
Next wash with hot water in normal fabrics
Next wash with detergent 0.05 gm/l with boiling water or wash in detergent + sample fabrics + heating in the burner .
Next wash it normal water
Then dry and check the shade .

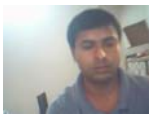
	Sodium Chloride Anhydrous sodium sulfate G/l.		Alkali (g/l)		
Depth of shade (%)	**Unmerc. Cotton**	**Merc. Cotton**	**Soda Ash only**	**Mixed Alkali**	
				Soda Ash	**Caustic Soda**
Up to .10	**10**	**5**	**10**	**5**	**0.2**
0.11 -0.30	**20**	**10**	**10**	**5**	**0.2**
0.31 - 0.50	**30**	**20**	**10**	**5**	**0.2**
0.51 - 1.00	**45**	**30**	**15**	**5**	**0.2**
1.01 - 2.00	**60**	**40**	**15**	**5**	**0.5**
2.01 - 4.00	**70**	**55**	**20**	**5**	**0.5**
Above 4.00	**90**	**65**	**20**	**5**	**0.5**

Soaping After Exhaust dyeing (Knit Fabrics)

For maximum fastness, wash off efficiently after dyeing.

<u>Minutes</u>.

Drop dye bath



10 - 20	**Rinse hot (70^0C)**
15 - 30	**'Soap' at the boil. For very heavy shades two 15 min. 'Soap' are preferred**
10	**Rinse hot (70^oC) (0.05 g/l Detergent)** **Rinse cold until clear and soften as required** **(Use softening agent as necessary)** **Drop dye baths immediately after softening agent treatment and unloads.**
Softening	**1% - 2% Softening agent** **Time: 10 - 20 min.** **Temp: 40 ^{o}C**

-:The end:-

Name of the experiments ----------
Date -----/----/----- Time----------AM/PM

Experiment: R-04,

Teacher / instructor:----------

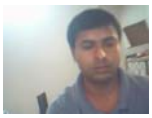
Method:

General Scouring and Bleaching:

- H_2O_2 = 52 gm/l [that means 52 grams H_2O_2 will add in one liter liquor]
- Stabilizing Agents = 14gm/l [14 "]
- NaOH = 16gm/l [16 "]
- Detergent = 3 gm/l [03 "]
- Time = 1 hrs
- Temp. = Boiling(Knit fabrics)
- L:R = 1: 10

Sample Fabrics. Knit fabrics.

25.Fabrics. Wt = 5000 gm(5kgs)
26.Water = 5000 x 10 = 50000 cc
27.H_2O_2 = 24213.91 cc (36 o Be)
28.Prestogen) stb. = 699.60 gm
29.NaOH = 799.40 gm



30.Detergent = 149.20 gm

Water adding unto maintain level:

Step 1:
Select apparatus:

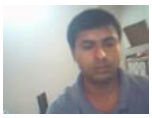
Biker(60000cc) = 3 nos
Biker (15000 cc) = 2 nos.
Pipet = 1
Borate = 1
Test tube = 3 nos.
Fresh Paper = 10 pcs.
Chemical balances
Glass rode
Glass pipe
Etc

Step2: chemical weighting

At first weight the sample fabrics
Next take biker for 60000 cc
Next take distill water about 50000 cc
Next take 100cc water in biker
Next weight the chemical according to the ratio
Next H_2O_2 in a test tube
Next take stabilizer agent (prestogen pl)
Next take NaOH in a test tube
Detergent in a paper

Procedure:

1.For reactive dyeing bleaching and scouring process done in same way that means the chemical of above wt dilute in to the biker and start to heating in gas burner/heater when rise the temperature up to 60^0 C - 80^0 C boiling point then wet the sample fabrics and drop to the biker and moving by the glass rode continuing


the heating 1 hr for weaven fabrics and knit fabrics 45 mints to 60 mints depend upon process controller.

2. Adding the water (boiling) unto liquor ratio maintain (water level maintain)
3. After 1 hr boiling the fabrics color will changed and the foreign materials will remove from the fabrics l**ike color mater**, **Protein, pectoris, mineral Matter** etc.
13. And fabrics will be white and bright..
14. Then the fabrics will ready for dyeing in dyeing section.
15. Please go to the dyeing unit of our laboratory. Ok

Reactive dyes:

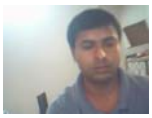
Step 1:
Take all apparatus like Bleaching and scouring process:
Step 2:
Take chemical like previous process
But
Stock solution making required at here like that

Process of stock solution making like that
1 gm dyestuff mixed with 100 cc water.
In 2% shade
50000gm(5kgs) fabrics, dyestuff required = (2 X 50000) / 100 gm = 1000 gm
Make stock solution by 1000 gm dyestuff as below

1 gm dyestuff is required water =100 cc
So 1000 gm " " " " =100X1000 cc = 1,00,000 cc =100 liter
Or

So stock solution reqiuired is = (w x p)/c = (5000 X 2%)/ 1 =1,00,000 cc =100 liter

(W X P)/C
Here
W= weight of fabrics in gm
P = percentage of shade (%)
C = concentration of stock solution



Sample Fabrics. Knit fabrics.

2% shade making practices done at this classes.

31. Fabrics. Wt = 5000 gm (5 kgs)
32. Water = 5000 x 10 = 50,000 cc
33. Common salt = 3500gm [70gm/l]
34. Soda Ash . = 1000 gm [20gm/l]
35. Detergent = 149 gm
36. Dyes = 2569.13 cc(stock solution)

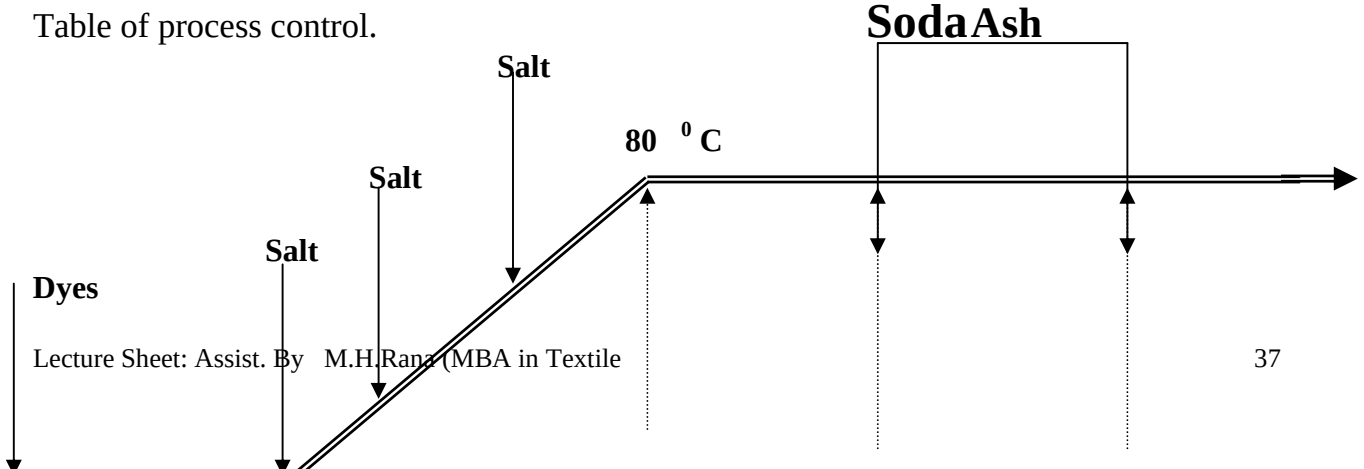
Water adding unto maintain level:

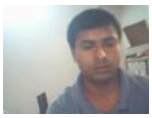
Biker(600cc) = 3 nos
Biker (150 cc) = 2 nos.
Pipet = 1
Borate = 1
Test tube = 3 nos.
Fresh Paper = 10 pcs.
Chemical balances
Glass rode
Glass pipe
Etc

Procedure:

After complete the wt of fabrics and chemicals go to the near of burner and begain to heating the water with dyes (s.s.) , sample fabrics and water
After 10 mints add the common salt with the heat chemicals and continue 15 mints
Next check the temperature up to riseing 60 - 80 o C
Then add Soda ash in the heat chemical please care fully handle that other wise chemical may jump up & damage your eye / mouth / hand. And continuing heating up to 45 mints. And check shade .
[Follow the process control table given below:]

Table of process control.





15 **15**

14 **30**

	Minutes	
		Load m/c's run liquor and/or fabric revolution ensure that s That the pH is below 7.
Raise Temp to 50 ^{0}C		**Adjust with acetic acid if necessary and 1 - 2 g/l, oxidizing agent**
	5 →	**Add pre - dissolved dye**
	10 →	**Continue dyeing**
	2 →	**Add 5 g/l common salt (2.5 g/l for very light shade)**
Raise Temp to 80 ^{0}C	**10** →	**Continue dyeing**
(At approximately 1^{0}C Per minute while the Salt is being Added)	**3** →	**Add 20 g/l common salt (10 g/l for very pale shades)**
	10 →	**Continue dyeing**
	5 →	**Add remainder salt**
	15 →	**Continue at 80^0 C to allow a uniform temp. to be achieved through the m/c. allow 15 min after the last salt addition if slat is still being added when the temp. Reaches 80^0 C.**
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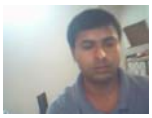
Depth of shade (%)	**Unmerc.**	**Merc.**	**Soda Ash**	**Mixed Alkali**



	Cotton	Cotton	only	Soda Ash	Caustic Soda
Up to .10	10	5	10	5	0.2
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0.31 - 0.50	30	20	10	5	0.2
0.51 - 1.00	45	30	15	5	0.2
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-: The end: -