



*Faculty of Engineering*  
*Department of Textile Engineering*  
**REPORT ON**

**Industrial Attachment**

At

**Unifill Dyeing & Printing Finishing Mills Ltd.**

Tarabo, Rupgonj, Narayanganj

Course Title: Industrial Attachment

Course Code: Tex-442

15B(Mahananda)

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This report we have presented in partial fulfillment of the requirement for the Degree  
of Bachelor of Science in Textile Engineering

Submission Date: February 2022



## DECLARATION

We hereby declare that, this Industrial Attachment on The Civil Engineers Limited, of Standard Group of Bangladesh is done by us under the supervision of Kamrul Hassan Bhuiyan, Coordinator & Lecturer, Department of Textile Engineering, Sonargaon University (SU), Dhaka. We also declare that, this Industrial Attachment report has not been submitted anywhere for award, degree or diploma. We ensure that, any part of this attachment has been presented anywhere .

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### LETTER OF APPROVAL

This is to certify that **Md. Md. Shahidul Islam, TEX1803015020, Ashiqur Rahman, TEX1803015008, Md. Rubel Alom, TEX1702011056, Md. Naem Hasan, TEX1803015059, Anamul Hok Sobuj, TEX1803015062**, BSC Engineering Textile program, 15B Batch have successfully completed their Industrial Internship on Apparel Manufacturing Technology under my supervision. I do hereby approve their report. I also recommend accepting their report for partial fulfillment of Bachelor of Science in Textile Engineering (BSCTE) Degree.

.....  
**Kamrul Hassan Bhuiyan**  
**Coordinator & Lecturer**  
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## Acknowledgement

My first gratefulness goes to Almighty Allah to give me the strength and ability to complete the industrial training and this report Who has made our life more beautiful, glorious and honored.

A number of people have made significant contributions to the preparation of this report. Their insights, advice and suggestions helped us a lot. Firstly, I am very much thankful to Prof. Kamrul Hassan Bhuiyan, Academic Supervisor & Lecturer the Department of textile SU, for his encouragement and valuable suggestions for continual improvement of the report. My Internship Supervisor who offered me to do internship in the number one industry in Bangladesh Named Unifill dyeing printing & finishing mills LTD . I got tremendous support and guidance throughout the internship period. Working with him I have earned not only valuable knowledge but also inspired by innovativeness which helped to enrich my experience to a greater extent. His ideas and way of working is truly remarkable.

I would like to thank the Chairman, Managing Director, General Manager, Deputy General Manager, Manager, Assistant Manager, Senior Production Officer, Production Officer, Assistant Technical Officer, Technical Officer who gave us scope & helped for doing industrial attachment in the factory as well as for giving scope to work in their respective section.

I would also like to express my gratitude to S M abdur Rahaman Islam (General Manager), Unifill dyeing printing & finishing mills LTD. who helped us and give me his valuable time. Being involved with them we have not only earned valuable knowledge but was also inspired by their innovativeness which helped to enrich our experience to a greater extent. I believe this report could not be finished if they did not help us continuously.

I am also very much grateful to Unifill dyeing printing & finishing mills LTD. authority for giving us opportunity to do our internship work in their factory.



## Abstract

The Term "Fabric Manufacturing" is referred to produce the fabric by both of Woven & Knitting also including the other fabric manufacturing process as like as Non-woven & Braid. But in case of the Woven Fabric The Term "Woven Dyeing" is referred to dyeing or coloring of fabrics which are prepared by the process of Weaving. Generally in our country the different types of Woven Fabric is produce & mainly Reactive & Vat dyes and Reactive pigment is used for woven dyeing in continuous, semi-continuous process in various industries. So the techniques can be examined & analyzed for an effective follow-through. For this purpose several dyeing industries have been examined and information's are analyzed for the specific outcome.

On the observation of different industries it is seen that semi-continuous and continuous process of textiles are using for large scale production, though the discontinuous way is done for small amount of production and shading.

Fabrics of different constructions are processed in woven-dyeing industries. Descriptions of different processes with theoretical and practical analysis are arranged as a considerable paper-work.

In this paper, analytical description, draw-backs and their probable solutions are given throughout the total paper for getting a better output in the practical field of woven dyeing as well as gathering knowledge. I have gathered a lot of practical knowledge regarding textile sector which was previously unknown to me and I am optimistic that this report has provided me the opportunity to be a excellent performer as a textile engineer in my coming soon period.



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## Introduction

Without practical training any technical education is incomplete. In these senses industrial attachment is much more necessary for 4 years Textile Engineering course. As a Textile graduate Engineer one should have the adequate knowledge about the Yarn & Fabric Manufacturing Procedure, Wet Processing, Apparel Manufacturing & their machineries as well as manage to capable the different situation during carrier life. That's why to make a report on "Industrial Internship" by adopting the instruction of course teacher is a part and parcel of our Bachelor degree in Textile Engineering. Two months training provide this opportunity to learn some of the difficult task. I have got the opportunity to perform mill attachment 100% export oriented Unifill dyeing printing & finishing mills LTD.

Unifill dyeing printing & finishing Mills Ltd. Covers four basic factors of quality control

1. Quality materials 2. Quality machines 3. quality manpower 4. Quality management that is why it is easier to this organization to achieve their goal. With for basic factors and advanced technology its make an important contribution to the Textile sector.

The ratio behind the existing structure and future expansion of the textile division is to capture valued add each stage of the textile manufacturing process. Despite lacking of Bangladeshis raw material, dyes and auxiliaries the Unifill dyeing printing & finishing mills LTD . having first criteria to exceed the competitiveness in the World market.



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## CHAPTER -01



## PROJECT DESCRIPTION:

1. **Name of the organization** : Unifill dyeing printing & finishing mills LTD.
2. **Type** : Woven Febric Dyeing & Printing Finishing .
3. **Year of Establishment** :2019
4. **Address** : Nassa hight, Gulshan-1, Dhaka
5. **Factory** : Tarabo rupgonj narangonj, Bangladesh
6. **Production Capacity** : **Woven Fabric**
  - i. 28 laks Meters per month
7. **Production Capacity** : **Wet Processing**
  - i. **Dyeing** : 16 lakes Meters per month
  - ii. **Printing** : 7 lakes Meters per month

### 9. Supporting Department

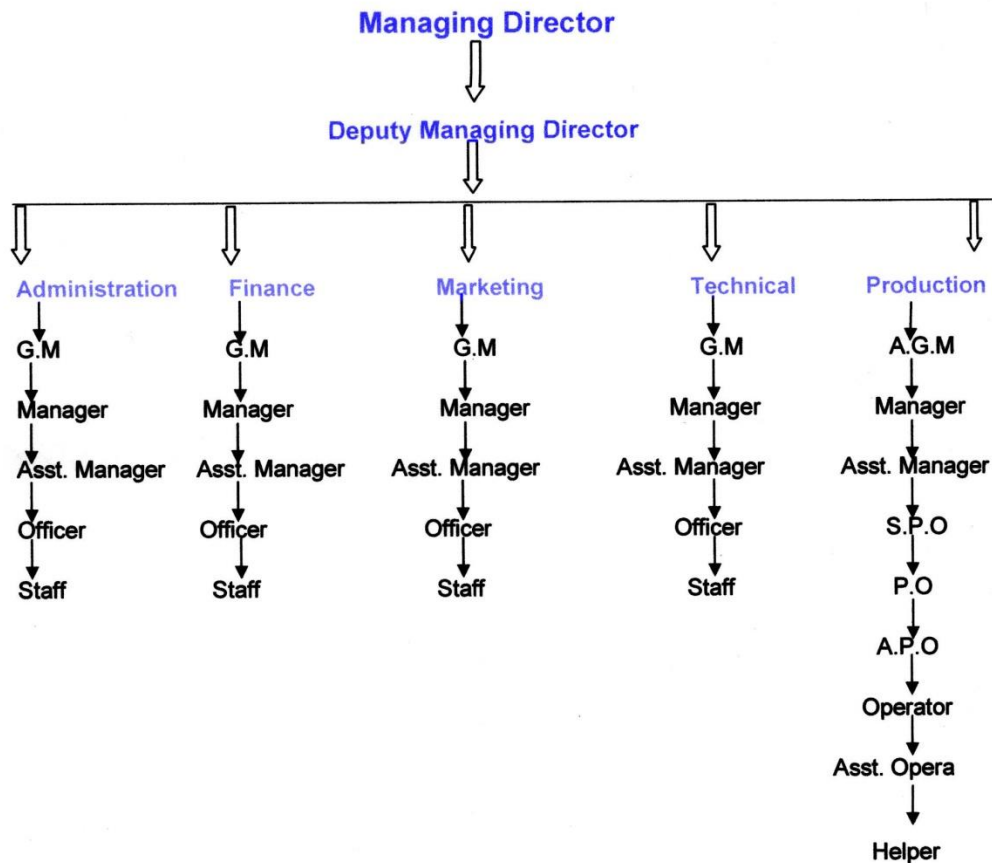
- Marketing Department
- Accounts Department
- Administration Department
- Compliance Department
- Purchasing Department
- Planning
- Etc

## Remarks:

The company 9, 97,000square feet of land property which is situated near by Dhaka-sylhat high way far from 19 kilometers of Dhaka city. The future plan of this Organization is to achieve following parameter:

- 100% quality achieve as per buyer requirements.
- Buyer Satisfaction.
- Time to time delivery of every shipment.
- Project Expansion.
- Well Satisfaction & Motivation of the Employee.

### ➤ Organizational Structure:





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## CHAPTER NO-02

# Manufacture of woven fabric.

## WINDING

---

Transferring of yarn from one package to another is called winding.

Winding provides an opportunity of cleaning and rewinding the package to a suitable package size, shape and build maintaining a sufficient tension to give the package a required density and stability.

### Objects:

To make a soft package for Yarn Dyeing, so that dyes can penetrate easily in the yarn.

To produce a hard package for warping process or weft for yarn dyeing fabric production.

To make a suitable package for specific end use i.e. warping beam.

### Types of Winding:

#### SOFT WINDING:

- Grey yarn is wound on a special Perforated Plastic or suitable Steel Spring Bobbin.
- The package are made soften and bulkier to make it suitable for dye liquor penetration in yarn dyeing.

#### HARD WINDING (used in Evinco Textile Ltd.):

- Yarn dyed package are converted to cone/cheese by rewinding on paper or plastic bobbin.
- Yarn package are comparatively hard.

### Requirements of Winding:

The fault level in the yarn must be reduced to an acceptable level.

The yarn must not be damaged in the winding process, so the tension must be kept proper.

The yarn must be wound in such a way so as to permit unwinding in the following process with minimum difficulty and at the required speed.

The package size, shape and build must be the most technologically suitable for particular end use.

The winding operation must be geared to give the best possible economic performed throughout the whole process of the fabric manufacturing.

## WARPING

---

The parallel winding of a set of warp yarns from many yarn packages (cone/cheese) on a flanged bobbin (warping beam) at uniform specific tension and length is called **Warping**.

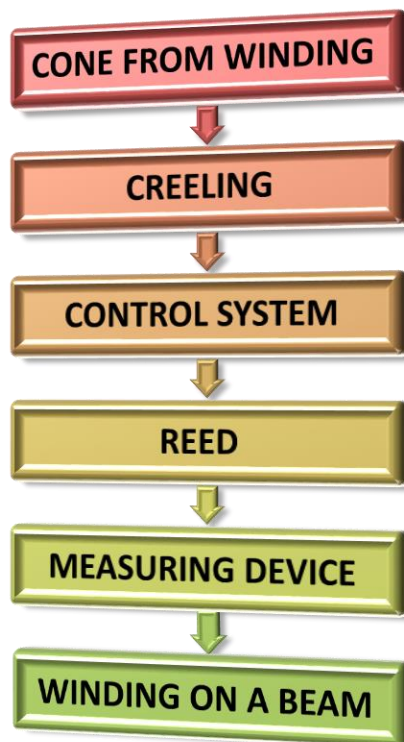
### Objects:

- Wind the warp yarns on the warping beam to make it suitable for sizing.
- In case of designable fabric wind the yarns section wise by sectional warping.

### Requirement of Warping:

- The yarns in the sheet should be in uniform spacing.
- The yarns in the sheet should be in uniform tension.
- The yarns in the sheet should be of a predetermined length.
- The sheet should be containing a predetermined number of ends.
- There should be no broken ends in the beam.

### Warping Process Involves:



## Types of Warping:

### DIRECT OR HIGH SPEED OR BEAM WARPING:

Direct warping is used for single color warping. Yarns are directly wound on the warpers beam so it's called direct warping.

### Raw Material:

Cone (different count yarn) from Winding Section.

### Equipment:

For Warping :KARL MAYER(ZM 2000/800)

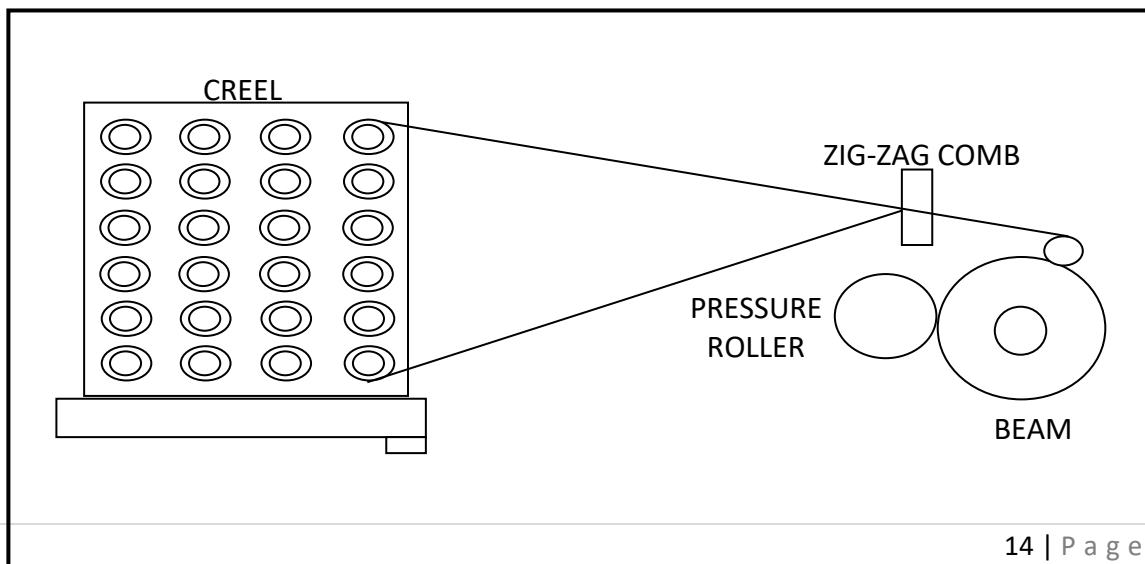
Check List before Production:

With the production before data control operator will call-up the following for recording:

- Warp length shift
- Down time.
- Efficiency.
- No. of thread breaks.
- No. of warp beam doffed.
- Time for thread repair.
- Time for beam change.

Operator must check yarn quality in term of count, material, and color with customer demand. No mixing is allowed.

Operator must check yarn quality in term of strength and record yarn break rate. Standard for good quality yarn 10 breaks/1000000 meter



## Warping Machine

### SIZING

---

Sizing is the process of giving a protective coating on the warp yarn to minimize yarn breakage during weaving.

Sizing is the most important operation in preparing warp yarn for weaving especially with cotton yarn. The smallest error in sizing process may be very harmful. This may increase warp breakage rate on the looms and consequently reduce weaving production and quality. Therefore sizing is termed as the **“Heart of Weaving”**.

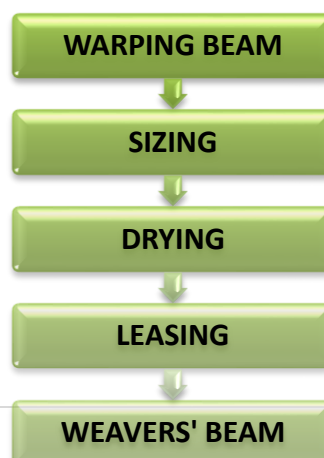
#### Objects:

- ✓ To increase the smoothness of the warp yarn.
- ✓ To reduce hairiness of warp yarn.
- ✓ To increase the strength of warp yarn.
- ✓ In some cases sizing is now done to modify the character of the warp yarn. i.e. to have an effect on fabric weight on fabric weight, stiffness, handle properties etc.

#### Requirement of sizing:

- ✓ Sized warp must be strong and elastic.
- ✓ Yarn strength and loss in elongation should be within admitted limits.
- ✓ The process must ensure the applications of required amount of size on the yarn.
- ✓ The tension of warp yarn must be constant all the time.
- ✓ The weavers beam must have a cylindrical shape, necessary winding density and the yarn length.
- ✓ The sizing process must be efficient, economical and must ensure the production of high quality size warps.

#### Sizing Process Involves:



### **Types of sizing:**

Sizing may be classified into **Four** types on the basis of size% on the yarn.

1. **Light Sizing** :10% to 15%.
2. **Pure Sizing** :16% to 25%.
3. **Medium Sizing** :26% to 50%.
4. **Heavy Sizing** :50% to 100%.

### **Equipment:**

- ✓ BENINGER ZELL SIZING M/C (SINGLE SIZE BOX).
- ✓ BEN SIZEMIX (COOKER).

These sizing machines are equipped with BEN SIZEMIX size cooking & storage apparatus. A total of 12 (max<sup>m</sup>) direct warped beams can be combined & sized to make weaver's beam. Moreover an additional unwinding frame provides the facilities to size sectional warped beam.

### **Key Accessories:**

- ✓ REFRACTOMETER.
- ✓ VISCOSITY CUP.

### **Material/Chemical:**

- ✓ Adhesive.
- ✓ Chemical.
- ✓ Acrylic sizing agent.
- ✓ Lubricant softener.

### **Operation Staff:**

- ✓ PRODUCTION MANAGER.
- ✓ SUPERVISOR OFFICER.
- ✓ SIZER.
- ✓ ASSISTANT SIZER.
- ✓ HELPER.





FIG: SIZING M/C

## **Drawing, Denting & Knotting**

---

Drawing is the process of passing the warp yarn into the heald eye according to the warp plan or design is known as **Drawing**.

Denting is the process of passing the warp yarn into the reed dent according to the denting plan is known as **Denting**.

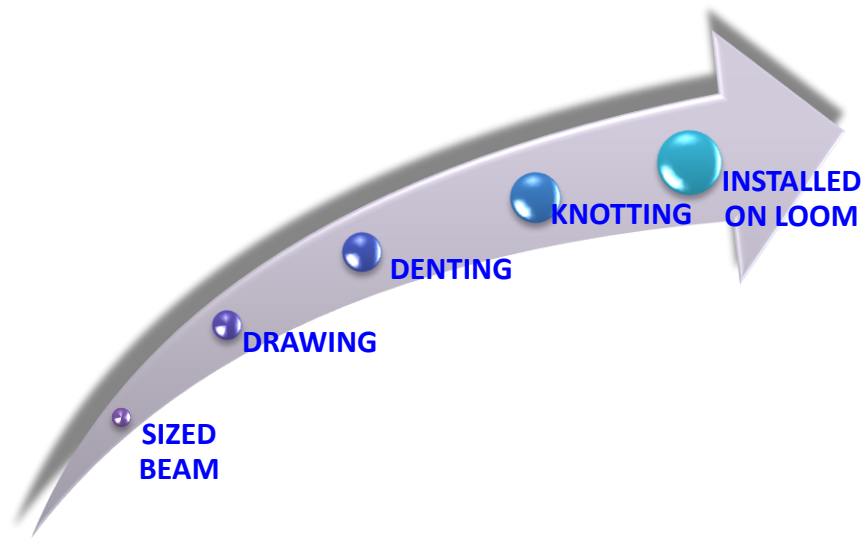
### **Objects:**

- To draw the warp yarn into the heald eye.
- To ensure the production of proper design in the loom.
- To maintain the proper warp yarn spacing in the fabric.

### **Requirement of Drawing & Denting:**

- Proper warp plan in case of yarn dyed fabric.
- As much possible accurate warping in case of sectional warping.
- Keep some extra warp yarn during warping from the required quantity.
- Must use accurate reed.

### **Process Involves in Drawing, Denting & Knotting:**



For Drawing-in the following key accessories are used-  
 Drawer's hook,  
 Heald wire,  
 Drop wire,  
 Reed.

For Warp tying the following key accessories are used-  
 Brush.  
 Leasing band.

Method Used to Prepare Weaver's Beam:

1. Warp tying or Knotting (quick style change).
2. Reaching-in/Drawing-in & Beam getting.

#### WARP TYING:

This method is limited to use where an exactly same article or quality of fabric is to be made that is already running on the loom. The following points are considered-

- The total number of warp ends should be same as that of running.
- The count of yarn & weave design should be same.

Before running a new beam with an older one, the new beam is to undergo a process called leasing, where the adjacent yarns are kept separately by placing a yarn in between them. This is very essential in case of tying a yarn dyed beam; otherwise the warp yarn scheme will be disturbed & lost. Leasing is done manually. For more color beam (solid dyed beam) tying is performed without leasing.

## DRAWING-IN/RACHING-IN:

This method of mounting weavers beam on to loom is adopted in such case which have separate style of working of adjacent warp yarn is called yarn interlacement, compared to that of running in loom.

In this method, warp yarn are separated individually, as per count or color patterns from the adjacent yarn & hooked to the access of drawer's hook called Reaching-in.

The yarn as it comes to reach of drawer's hook is then drawn through the dropper & then through the eye of heald wire. All the warp yarns thus drawn in one by one, is then passed through the split of reed called reed.

## WEAVING

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Weaving is the process of manufacturing woven fabric by interlacing at two sets of yarns (warp & weft) at right angle (90°) according to design.

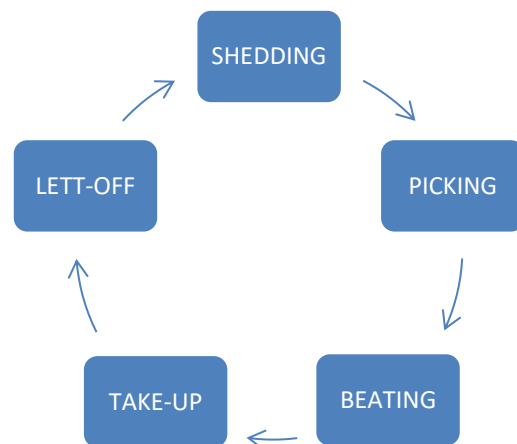
### Objects:

- ✦ To produce woven fabric.
- ✦ To give the final product.

### Requirement of Weaving:

- ✦ Proper sized warp yarn.
- ✦ Required length of warp yarns.
- ✦ Accurate drawing & denting.
- ✦ Machine setting must be accurate

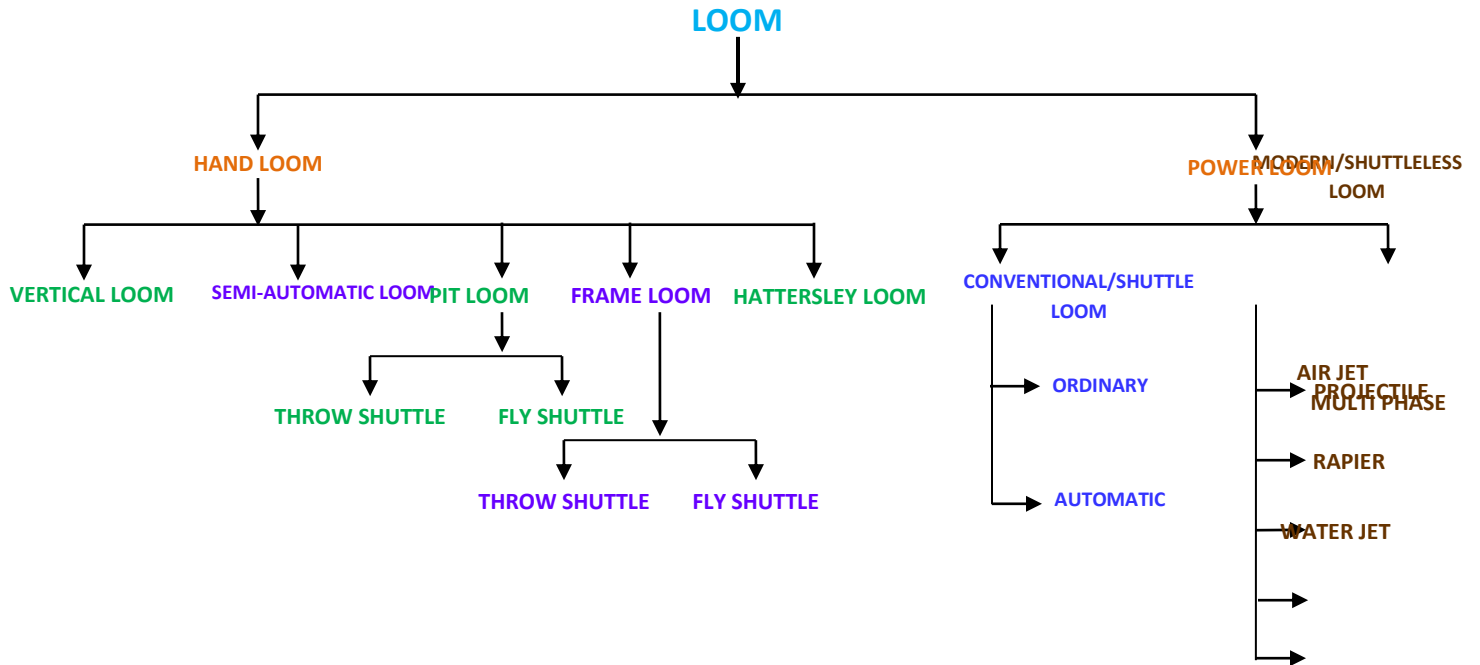
### Weaving Process:



## Key Accessories:

WEAVERS HOOK.  
PICK COUNTING GLASS.  
MEASURING TAPE

## Classification of Loom:



## Weaving Mechanism:

Weaving is the process of interlacement between the warp and weft in fabric according to a design of fabric.

Basic principal or weaving mechanisms are:

- ✦ The yarn from the weavers beam passes round the back rest and comes forward through the drop wire of the warp stop motion to the heald eye of heald shaft which is responsible for the purpose of shade formation.

It then pass through the dent of reed which holds the thread at uniform spacing and it is also performed the beating up the weft thread that has been left in the triangle warp sheet form by the two warp sheet and reed.

- ✦ In this way, weft yarn is meshes with last pick of fabric or cloth. Temple holds the cloth firm at the feed position and assist in the formation of a uniform fabric width. Then the fabric passes over the rest, take up roller, pressure roller and finally wind on to the cloth roller.



**FIG: AIR JET LOOM**



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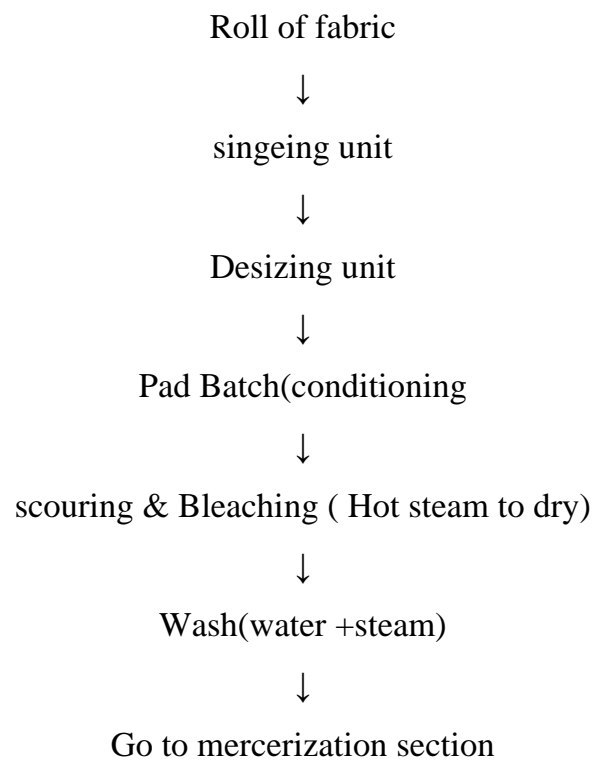
## CHAPTER-03

# Description Of Pretreatment

## Description Of Pretreatment

- ❖ Singeing
- ❖ Desizing
- ❖ Scouring
- ❖ Bleaching
- ❖ Mercerization

**A process flow-chart of pre-treatment section is given below-**



## SINGEING

Gas singeing machine is a modern & mostly used in the factory. It is so popular because proper singeing is done by the used this machine. To remove projected fiber, hairy fiber, yarn etc from the fabric surface and then to increase smoothness & high luster of fabric surface with the help of gas burner in gas singeing process and ready for the next process. Gas singeing machine is a modern & mostly used in the factory. Generally, these are two types:

1. Brush singeing
2. Gas singeing

Gas singeing is more effective than the brush singeing due to chance of fabric damage and inferior quality. Some features with figures are given below-

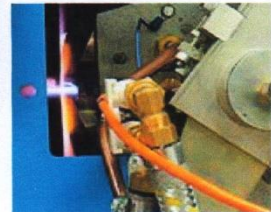
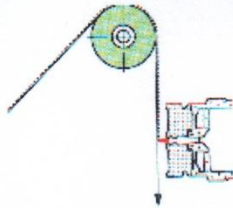


Fig: Modern machine of singeing

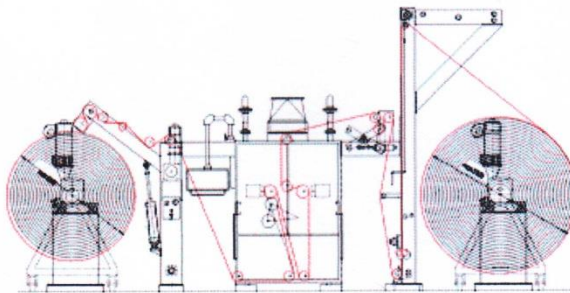


Fig: Process of singeing.

Fig: Modern machine of singeing



## DESIZING

Then the fabric is given to desizing section for removal of sizing material. Now a days enzyme desizing is more popular than the ordinary way. But conventional process is more effective and cheap. Before desizing the roll of fabric is keep for a certain time for batching.

Stainless steel compartment, single-threaded with 10,15, or 20m fabric content

- Jockey-roller on request,
- Driven upper roller on request
- Bath filter on request
- Squeezer, pressure according to need, with conventional or stabilized rolls

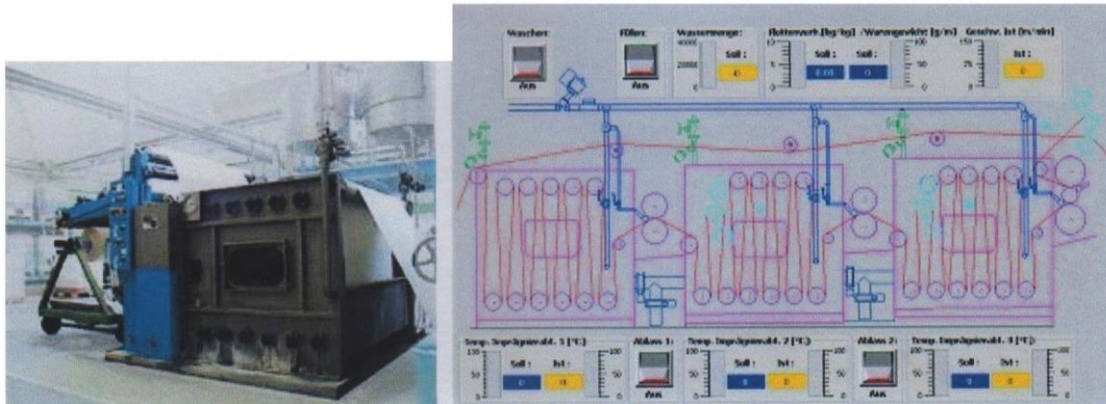


Fig: Desizing process

Desizing chemicals are given below-

BEISOL AFG: enzyme (amylase)

Rucogen WBL

Glacial acetic acid

## ➤ Industrial data:

In this factory singeing & desizing both processes is done at the same time & same parameters with the help of the following machine:

- Osthoff singe.
- Poong-Kwang singe.

### # Specification of this m/c:

<u>M/C Name</u>	<u>M/C Quantity</u>	<u>Company</u>	<u>Country</u>
1. Osthoff Singe	03	Osthoff	Germany
2. Poong-Kwang Singe	01	Osthoff	Korea

### Singeing & Desizing process used in this factory;

- Singeing:

All most Gas singeing process is used in this factory.

- Desizing:

Peroxide desizing, Enzyme based & Acid desizing is used in this factory.

### MIC parameters:

- No. of burner-----02
- Burner height----- 16 inch
- P<sup>H</sup> of bath----- -6.5-7.0
- Temperature of desizing box—65-70°C
- Fabric speed-----50-100 m/min

**Recipe for every process:**

• **For Singeing:**

➤ **Recipe for PC fabric:**

SANDOZIN MRN-----1.05kg

ENGYME-D----- -1.5kg

WATER.....1000 Liter

➤ **Recipe for cotton fabric:**

SANDOZIN-MRN----3kg

ENGYME-D.....3kg

SIRRIX-2D.....3kg

WATER-----1000 Liter

• **For desizing:**

➤ **Recipe for peroxide desizing:**

Caustic soda.....40 g/l

Sandozol HS.....0.3 g/l

Stabilizer.....0.3 g/l

P<sup>H</sup> of bath.....10-10.5

P<sup>H</sup> of fabric.....8.5

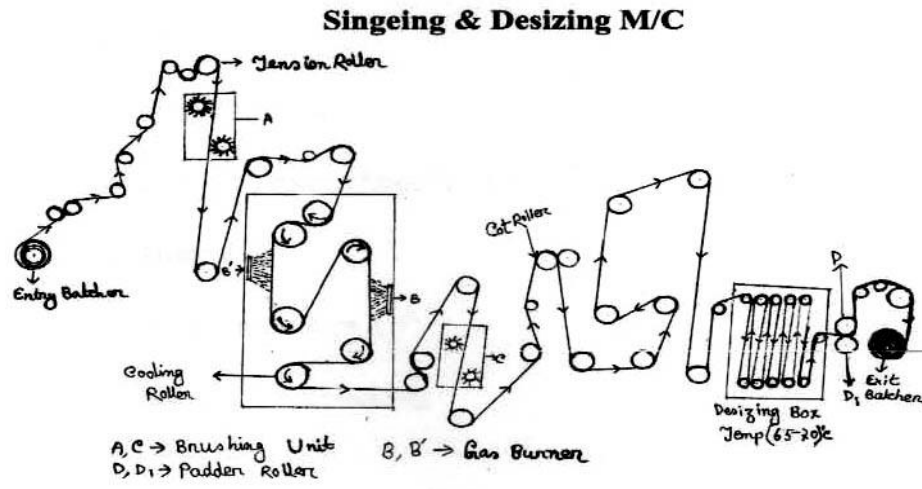
➤ Recipe for Enzyme based & Acid desizing:

Texsize (Enzyme).....1 g/l  
Common salt-----10 g/l  
Deternon.....5 g/l  
Oxalic acid.....0.5 g/l  
Acetic acid.....1 g/l  
P<sup>H</sup> of bath.....5.5-6.5  
P<sup>H</sup> of fabric.....5-6

# Function of different chemical agent:

- Sandoz in-MRIM: It is a wetting agent. It's function is to remove surface tension of the water & minimize interfacial tension.
- Enzyme-D: It is a desizing agent. It's function is to remove the size material's from the fabric.
- Sirrix-2D: It is a sequestering agent. It's function is to remove the water hardness & Deactivate metal ions.
- Caustic soda: To neutralize acidic materials. Swell the fiber.
- Sandozol HS: It is a wetting agent. It's function is to remove surface tension of the water & minimize interfacial tension.
- Stabilizerf To maintain the proper power of H<sub>2</sub>O<sub>2</sub> at high temperature.
- Texsize: It's a Enzyme. It's function is to remove the size material from the fabric.

Figure



*Fig: Line diagram of singeing & desizing m/c*



*Fig: Singeing and Desizing M/C*

## Controlling point of the singeing & desizing m/c:

- Flame intensity
- Fabric speed
- Singeing position
- Distance between flame burner and fabric
- Flame width
- Time Temperature & P<sup>H</sup>
- Nip pressure for desizing

## SCOURING

Scouring, is a chemical washing process carried out on cotton fabric to remove natural wax and non-fibrous impurities (eg the remains of seed fragments) from the fibres and any added soiling or dirt. Scouring is usually carried in iron vessels called kiers. The fabric is boiled in an alkali, which forms a soap with free fatty acids. (Saponification).

A kier is usually enclosed, so the solution of sodium hydroxide can be boiled under pressure, excluding oxygen which would degrade the cellulose in the fibre. If the appropriate reagents are used, scouring will also remove size from the fabric although desizing often precedes scouring and is considered to be a separate process known as fabric preparation.

Preparation and scouring are prerequisites to most of the other finishing processes. At this stage even the most naturally white cotton fibres are yellowish, and bleaching, the next process, is required. A typical recipe for scouring is given below-

- NaOH99% : 60g/l
- Ultravon-sx : 5g/l
- Soda Ash : 1g/l
- Invatex-c-s : 13g/l
- Salt : 0.75g/l

## BLEACHING

**Bleaching** is one of the stages in the manufacture of textiles. All raw textile materials, when they are in natural form, are known as 'greige' material. Not only the natural impurities will remain on the greige material but also the add-ons that were made during its cultivation, growth and manufacture in the form of pesticides, fungicides, worm killers, sizes, lubricants.

The next process of decolorization of greige material in to a suitable material for next processing is called bleaching. Bleaching of textiles can be classified in to oxidative bleaching and reductive bleaching. A typical recipe for bleaching is given below-

- H<sub>2</sub>O<sub>2</sub>(50%) : 2g/l
- Prestogen FPBL : 0.75g/l
- Invator : 1g/l
- NaOH : 4g/l

➤ **Industrial data:**

In this factory scouring& bleaching both process is done at the same time & same parameters with the help of the following machine:

1. Bleaching m/c.
2. Bleaching m/c.

**# Specification of this m/c:**

<u>M/C Name</u>	<u>M/C Quantity</u>	<u>Company</u>	<u>Country</u>
1. Bleaching m/c.-1	02	Goller-1	Germany
2. Bleaching m/c.-2	01	Brugmum	Holland

## Scouring & bleaching process used in this factory;

- **Scouring:**

All most continuous scouring process with NaOH used in this factory.

- **Bleaching:**

All most peroxide bleaching process is used in this facto

### **MIC Parameters:**

➤ **P<sup>H</sup> for printing:**

- a. Pigment printing-6-7
- b. Reactive Printing-7-7.5

➤ **P<sup>H</sup> for dyeing:**

- i. Pigment dyeing 5.5-6
- ii. Reactive dyeing-7-7.5
- iii. Disperse dyeing-3-7.5

➤ **Speed:**

- a. For cotton-70-80 m/min
- b. For PC-70-100 m/min

➤ **Temperature:**

- a. For washing bath-70-95°C
- b. For steaming chember-95-115°C
- c. For chemical bath-45-60°C d.For cylinder dryer-150-200°C



**Recipe for every process:**

• **Recipe for scouring process:**

- NaOH(alkali)- -30g/l
- Sandozmg MKN---19 g/l
- Sirrix-2ud-----03g/l

**Recipe for bleaching process:**

- H<sub>2</sub>O<sub>2</sub>-----16 g/l
- Stabilizer-----06g/l
- NaOH-----08g/l
- SandozingMRN—03g/l
- Sirrix-Zud-----05g/l

**# Function of different chemical agent:**

- Sandozin-MRN: It is a wetting agent. It's function is to remove surface tension of the water & minimize interfacial tension.
- Sirrix-2D: It is a sequestering agent. It's function is to remove the water hardness. Deactivate metal ions.
- NaOH(alkali): To neutralize acidic materials. Swell the fibre & saponify glycerides & to remove the oil, fats, wax & additive impurities from the fabric.
- H<sub>2</sub>O<sub>2</sub> It's a universal bleaching agent. H<sub>2</sub>O<sub>2</sub> is virtually the only bleaching agent available for protein fibers & is extensively used for cellulose fibers. It's function to break the cellulose particles & remove the natural coloring matter & produce permanent whiteness to the fabric.
- Stabilizer: Stabilizer effects at various condition of P<sup>H</sup>, temperature, liquor ratio & water hardness. It's function to maintain the proper power of H<sub>2</sub>O<sub>2</sub> at high temperature.

Figure:

### New Roller Bleaching M/C

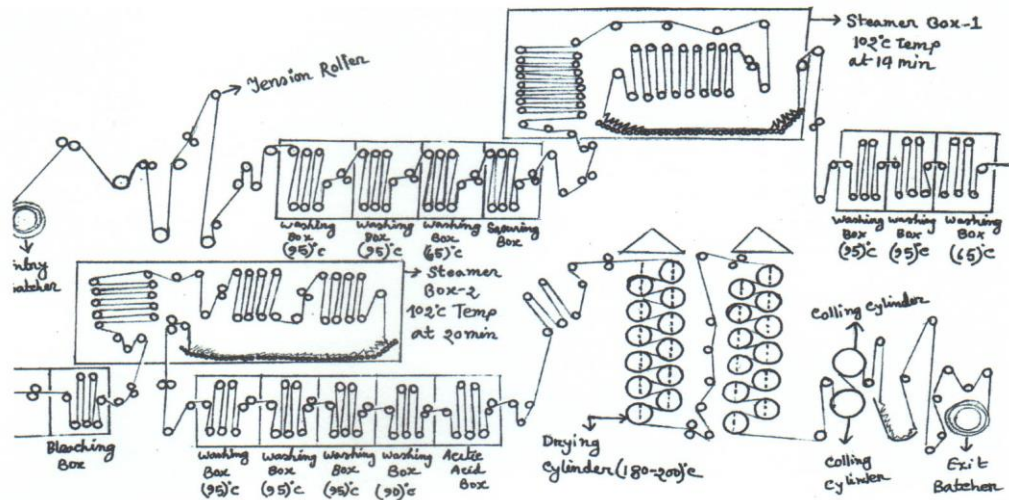


Figure: line diagram of scouring & bleaching m/c

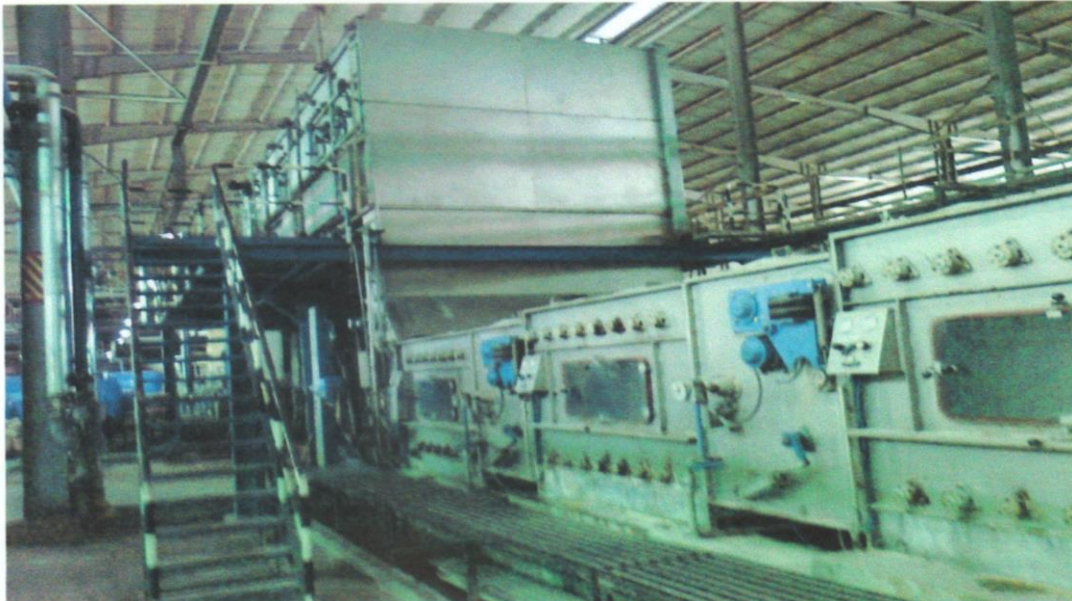


Figure: Scouring and Bleaching m/c

## # Controlling point of the scouring & bleaching m/c:

- P<sup>H</sup> Temperature
- Speed & Time
- Concentration of hydrogen per oxide & NaOH
- Liquor ratio
- Water hardness
- Etc

## MERCERIZATION

**Mercerization** is done for some several purposes-

- To increase texture
- To increase affinity to dyes
- To control fabric width and for dimensional stability
- To increase tensile strength and save dye.
- Here machine specification with figure is given below-

### ➤ Industrial data:

*In this factory mercerization process is done with the help of the following machine:*

1. Mercerize m/c-1
2. Mercerize m/c-2

## # Specification of this m/c:

<u>M/C Name</u>	<u>M/C Quantity</u>	<u>Company</u>	<u>Country</u>
1. Mercerize m/c-1	01	Brugmum	Holland
2. Mercerize m/c-2	01	Goller	Germany

*# Mercerization process used in this factory:*

Mercerization process is done in this factory by using NaOH

*MIC parameters:*

- P<sup>H</sup>for:
  - a. Pigment-----5.5-6.5
  - b. Reactive-----7-8
- Feet to delivery fabrics----- —160 m
- Temperature of stabilizer-----80°C
- Number of washing bath-----5
- Temperature of washing bath-----70-95°C
- Number of acetic bath-----01
- Maximum m/c speed-----60m/min
- Number of drying cylinder-----10 (Temp—180-200°C)
- Number of cooling cylinder-----02
- Caustic of Bo:
  - 1. For printing— —22°-24° Bo
  - 2. For dyeing-----28<sup>a</sup> Bo

*Recipe for mercerization process:*

- NaOH (28°) Bo
- Ivttercerize oil
- Acetic acid

**# Function of different chemical agent:**

- NaOH(28° Bo): To neutralize acidic materials. Swell the fibre & saponify glycerides & to remove the oil, fats wax & additive Impurities form the fabric.
- Mercerize oil: It is a wetting agent. It's function is to remove surface tension of the water & minimize interfacial tension.
- Acetic acid: To maintain proper value of P<sup>H</sup>. *nControllintj point of the mercerizing mlc:*
- P<sup>H</sup>
- Temperature
- Fabric speed
- Time
- Concentration of NaOH
- Etc.

# Figure:

### Mercerizing M/C

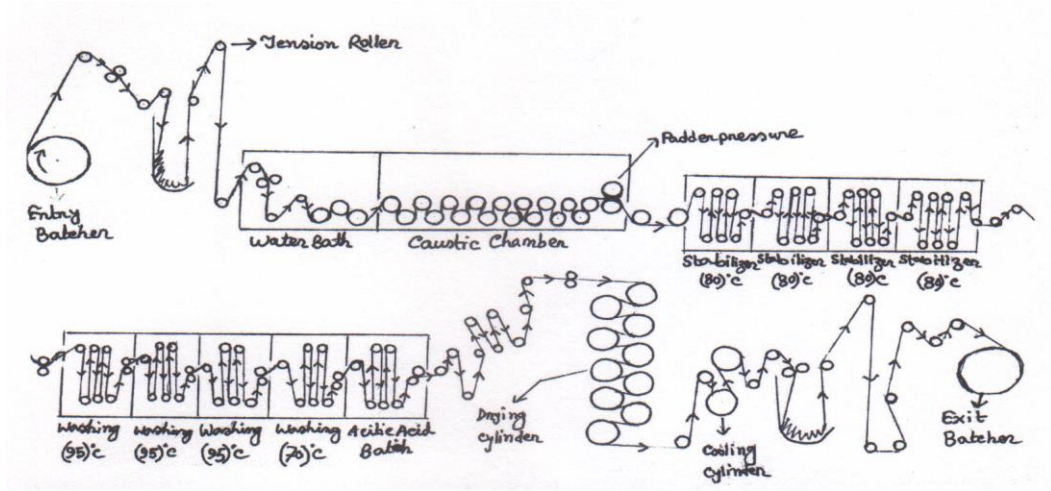


Fig: Line diagram of mercerizing m/c



Fig: Mercerizing M/C



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## CHAPTER-04

# DESCRIPTION OF DYEING:

- ❖ CONTINUOUS DYEING PROCESS.
- ❖ SEMI-CONTINUOUS DYEING PROCESS.
- ❖ DIS- CONTINUOUS DYEING PROCESS.

## Dyeing

- ❖ **Dyeing:** Dyeing is the process of coloring textile materials by immersing them in an aqueous solution of dyes called dye liquor.

### DYEING PROCESS

Dye dissolved in the dye bath  
↓ ↑  
Convective diffusion

Dye in the diffusion layer  
↓ ↑  
Molecular diffusion

Dye in the electric double layer  
↓ ↑  
Adsorption

Dye absorbed on the fiber surface  
↓ ↑  
Sorption Dye diffused in the fiber  
↓ ↑  
Fixation

Dye physically/chemically bonded with the fiber



### Precise Description:

Basicattly in our country there are three ways to describe woven dyeing techniques. These have been briefed before. Before vast description we have to know the ways in short details in below-

### Semi-continuous Process:

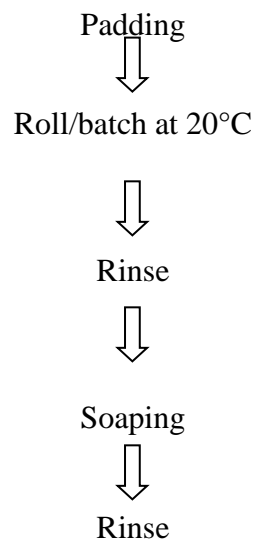
In this process the cellulose fiber fabric is padded with a reactive dye solution in the presence of alfcail. Depending upon the temperature during storing two sequences is emplbyed-

- a. Pad (alkali) - Batch (cold) process.
- b. Pad (alkali) - Batch (warm or hot) process.

At first the padded cloth is covered with polyethylene sheet & stored 4 hours and finally washed.

### Industrial data:

#### # Process sequence of pad-batch process:



### # Function of different steps:

- **Padding (Dyes + Alkali + NaCL + Urea + Na-aleinatel):** The fabric is padded with dye, urea, & Na-againate at a temperature of 20-25°C.
- **Roll/batch at 20°C;** The padded fabric in roll form is transferred to a chamber where the temperature at 20°C and relative humidity is 100% for 10-12 hour's.
- **Rinse, soaping, rinse:** The fabric is rinse, soaped,& again rinsed.

### # Necessary chemical & auxiliaries used in different steps:

- DrimRed-CL5B
- Drim YeJtow-Ct 2R
- Caustic (38° Bo)
- Soda ash
- Urea

#### ➤ **PAD-PAD-STREAM PROCESS:**

This process is only for specific heavy fabric qualities. A special pad liquor applicator is required. This is a "wet-on-wet" process without intermediate drying.

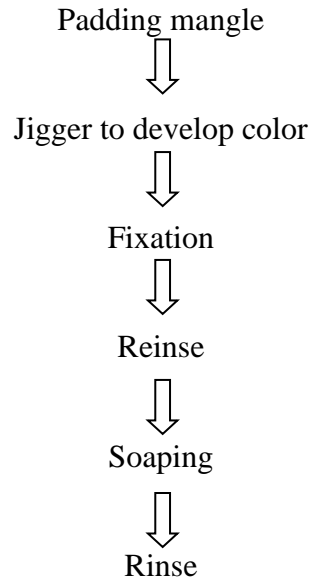
### **Dis-continuous process;**

#### ➤ **JIGGER DYEING PROCESS:**

This is most commonly used piece dyeing process for dyeing almost all kinds of cotton fabrics. The fabric moves while the liquor stands still, except for the very latest machines, which are also equipped with a circulation pump.

❖ Industrial data:

# Process sequence of jigger dyeing process:



# Function of different steps:

- **Padding mangle (Dyes):** The fabric is padded with dye liquor in a padding mangle. No alkali & salt is used in this stages.
- **Jigger to develop color (NaOH + NaCl):** The fabric is transferred to jigger dyeing machine to developed the color with the addition of salt & alkali, dye is fixed-up in this stages.
- **Rinse. soaping, rinse:** After fixation the fabric is rinsed, soaped, & again rinsed thoroughly.

# Necessary chemical & auxiliaries used in different steps:

- ⇒ Drim Yellow CL-2R
- ⇒ Drim Red CL5B
- ⇒ Nova Black G
- ⇒ NaCW&NaCl
- ⇒ Pirmasol N

## Comparative Discussion:

In industries continuous and semi-continuous dyeing process is more popular than the discontinuous process of dyeing. Here the discussion on the process with figure, flow chart, technical data, typical recipe and manufactured fabric can be given. The draw-backs with probable solutions are given for further paper work.

Before discussing on dyeing process the preview of pretreatment is given for understanding the whole process. At first the fabric is taken for singeing. Singeing can be done in two ways-

### ➤ PAD-DRY-PAD-STEAM PROCESS:

The dyeing process can be applied on open-width pieces, on fabrics that are particularly sensitively to creases and crush marks. Pad dyeing differentiates from exhaust dyeing in the dye bath application and fixation process. Very reduced water quantities are required, resulting in lower energy consumption.

A greater measure of continuity is achieved in the pad-dry-pad-steam process in which the cloth is first dye-solution padded, dried, padded with sodium hydroxide, passed through a steam chamber to fix the dye molecule into the fiber finally finished off in a soaping and rinsing range. A typical recipe is given below-

Mifcentren Grey MS/F U/C	: 18.5g/l
Mifcentren Blue RSN	: 6g/l
Indentren Red FBB	: 5.1g/l
Sodium hydrosulphite	: 60g/l
Glubar salt	: 50g/l
NaoH	: 25g/l

Booster chamber are some times used instead of the steam chamber. The liquor is maintained at 75°C to 100°C and the reduction and fixation of the pigment of the dye is very rapid in the aqueous phase because temperatures are used which are very much higher than would be employed when

dyeing with the leuco compounds by conventional methods. Industrial pad-thermosol process is given below-

One reason is that the adsorption of leuco compounds is very rapid at high temperatures and the associated tendency for unevenness can be overcome by pigment padding.

These continuous methods, however, are used with reactive dye. There are a few vat dyes which are not stable at high temperatures. Thus leuco derivatives of vat dyes containing benzoylamino groups tend to hydrolyze under high-temperature reduction conditions.

➤ **COLD PAD BATCH PROCESS:**

In this process, a cold pad dyeing cycle is carried out using auxiliaries and dyestuffs. The fabric is then wound up in rolls and covered with a plastic sheet to prevent the drying and oxidation of the outer layers. It is then rotated slowly for 8 to 24 hours to avoid percolation due to the gravitational effect on the liquid, which could distort the roll and create dyeing defects. The fabric is then finally washed with auxiliaries.

A typical recipe is given below-

⇒ Remtzo Red RB	:36.5
⇒ Everzol Yellow 3RS	: 22.0
⇒ Remazol Blue BB	: 0.04
⇒ Sodium silicate	: 30.0
⇒ Caustic soda 99%	: 9.0
⇒ Soda ash	: 6.0
⇒ PrimasoINF	: 3.0
⇒ Batching for 12 hours washing	

Soda ash, sodium met silicate and caustic soda may be used depending on the depth of shade dyed. Because of the high reactivity of cold brand reactive dyes with these alkalis, a short fixation time is enough. However, the pad liquor (containing the dye and alkali) is stable only for a short

time. Hence the dye and alkali solutions should be prepared separately and mixed immediately before use.

In actual practice, properly prepared fabric is padded with the liquor containing the cold brand dye and the suitable alkali at 20 to 30C (the lower temperate is preferred on the grounds of bath stability). The temperature should be kept constant to avoid variation in shade, especiaffy when mixtures of dyes of different reactivity are dyed. High padding speed with adequate wetting-out of the fabric is preferred.

➤ **PAD-STEAM PROCESS:**

In this process at first the fabric is padded and then passes through a steam chamber. This steam chamber is working affixation chamber. The use of this continuous process is given below-

- A wide range of shades can be found
- The control of shade is maintained accurately and fastness property is great.

The padder pressure, and padder type is responsible for dye pick-up%. One of the figures is given below-

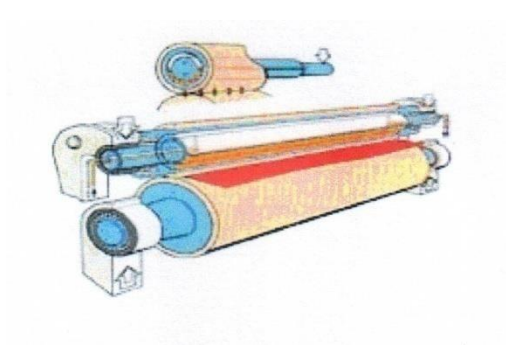


Fig: padding mangle

In the continuous process of dyeing the dryer make an effective roll to go to the fabric at last stage for finishing. Two type of dryer is used-

- Infrared dryer
- Drum dryer

➤ **JIGGER DYKING PROCESS:**

The fabric pieces are sewn together tail to head, forming a sort of ribbon. At the head and at the tail of the ribbon two cloths are added (4.5m long) to allow the regular dyeing of the whole pieces, also leaving the machine drawn-in once the dyeing process has come to an end. The assembled pieces are taken down from a roll, pass through the liquor. The fabric is then wound on a take up roll until the dyeing process has ended.

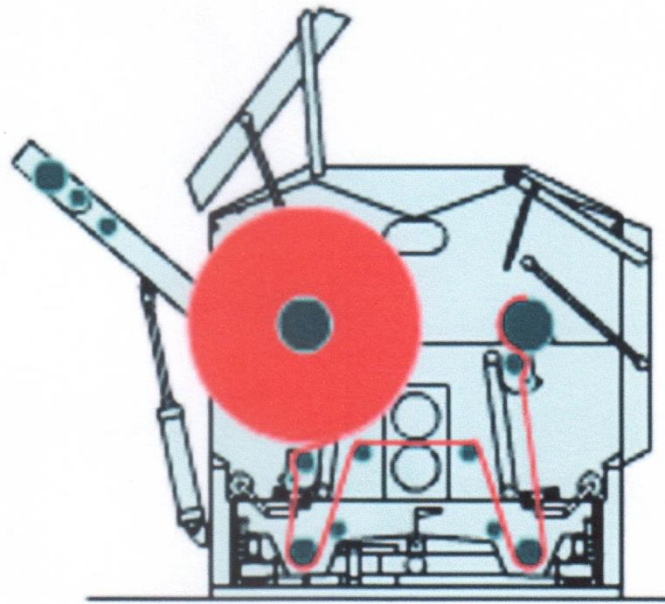


Fig : Jigger dyeing machine

The piece through speed and tension are adjusted by special devices to avoid any change in dimensional stability, above all when treating light-weight fabrics or delicate fibers, the maximum diameters of the roller can be 1450 mm with a width of the cloth ranging between 1400 and 3600 mm. The piece through speed is adjusted between 30 to 150m/min, and kept constant during the whole operation.

Also the tension must be constant and it can be adjusted between 60kg. The composition of the liquor absorbed must be uniform as possible on the whole width and length of the fabric piece; for big lots, many additions may be necessary to avoid the so called head-tail defects. Lightweight fabrics (viscose, nylon) that are stretched excessively during the take up step can show shading defects. Jiggers work with a quite low liquor ratio (from 1:1 to 1:6). Together with standard atmospheric systems, builders also offer HT jiggers inside autoclaves working at high pressure. Jiggers are suitable for dyeing a type of fibers.

There are some certain drawbacks of the techniques used in woven dyeing. They are-

- Long time batching may cause faulty fabric.
- Chance of crease mark
- In batching improper rotation of batches

So some measures should be taken for an effective follow-through. As batching is less effective than pad-thermosol, so pad-thermosol is the most effective & popular technique in woven dyeing.

**Suggestions** are using skilled labors and proper observation can minimize production cost and makes profit higher.



**Figure:**



**Fig: Thermo sol M/C**



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## CHAPTER NO-05

## DESCRIPTION OF PRINTING:

### ❖ Printings

The printing is described as localized dyeing i.e dyes or pigments are applied locally or discontinuously to produce the various design. The main objective in textile printing is the production of attractive designs with well defined boundaries made by the artistic arrangement of a motif or motifs in one or more colors.

### # Specification of this m/c:

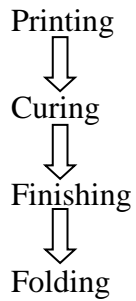
<u>M/C Name</u>	<u>M/C Quantity</u>	<u>Company</u>	<u>Country</u>
Printing m/c(rotary)	04	Zimmer	Austria
Printing m/c(flat bed)	01	Zimmer	Austria

### # STEPS IN TEXTILE PRINTING:

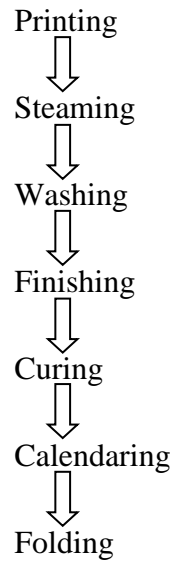
- ⇒ Preparation of fabric to be printed.
- ⇒ Preparation of the print paste (by using printing ingredients).
- ⇒ Making an impression of the print paste on the fabric.
- ⇒ Drying of the fabric
- ⇒ Steaming of the printed fabric.
- ⇒ After treatments (Neutralization/ Soaping etc).s

## # Sequence of pigment and reactive printing;

### PIGMENT PRINTING



### REACTIVE PRINTING



### # MAIN UNIT OF PRINTING MACHINE:

- ⇒ Tension roller
- ⇒ Guider
- ⇒ Pressure roller
- ⇒ Blanket
- ⇒ GJuetray
- ⇒ Washer
- ⇒ Brush
- ⇒ Screen unit
- ⇒ Conveyor
- ⇒ Curing unit

### # FUNCTION OF MAIN UNIT OF PRINTING M/C:

- **Tension roller:** Control tension of the fabric.
- **Gutcter:** Controf fabric direction.
- **Pressure roller:** Fabric pressing on the blanket surface as i4 is not displaced.
- **Blanket:** Glue is added on the blanket surface as a result fabric is firmly attached with the blanket & carrying the fabric forward under the screen.
- **Glue tray:** Gtue sotution is supptiect from the glue tray.
- **Washer:** Residual paste orv the blanket is removed by water spray.
- **Brush:** Brush assist to remove residual color paste.
- **Screen unit:** Rotary screen is setting this unit (capacity 12 screens).
- **Conveyor:** Fabric conveyed to the curing unit by conveyor.
- **Curing unit:** After printing fabric is cured for fixation of color.
- **Plaiter:** Printing fabric is delivered on the trolley by plaiter.

**Figure :**



**Fig: Flat bed M/C**



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## CHAPTER-06

## DECRIPSTION OF FINISHING

### STENTER MACHINE



#### Industrial data:

#### # Specification of this m/c:

<u>M/C Name</u>	<u>M/C Quantity</u>	<u>Company</u>	<u>Country</u>
Stenter	02	Babcock	Germany
Stenter	01	Muzzi	Italy
Stenter	06	Monforts	Germany
Stenter	01	Artos	Germany
Stenter	01	Sunsuper	Korea

To remove shrinkage that occurs due to different wet processing (e.g.

Desizing, scouring, bleaching, dyeing etc) In this process to include the anti shrinkage on the fabric and come back of the fabric of its original position and to dry the fabric.

In this process the fabric brings a uniform width form & to straight the weft yarn in a 90° angle with the warp yarn. A stenter has clip chain in both side of the machine which drive by the mechanical device.

To required stentering after wet dyeing, printing or wet finishing to treatment the fabric by using drying unit at 200°C-220°C for 30-50 seconds.

**# Machine parameter:**

⇒ No, of chamber & gas burner-----8

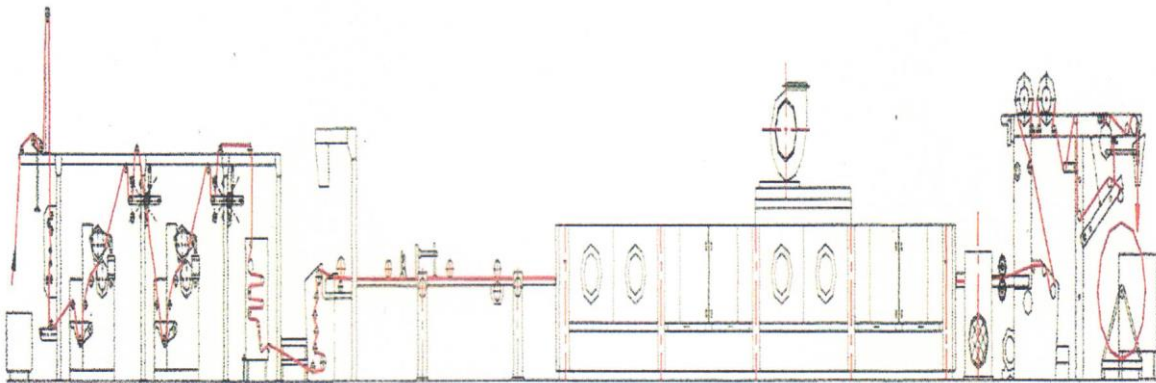
⇒ Temperature of each chamber :-c.

c. 1<sup>st</sup> & 2<sup>nd</sup> chamber-----165°C

d. 3<sup>rd</sup> to 7<sup>th</sup> chamber—170°C

e. 8<sup>th</sup> chamber-----165<sup>D</sup>C

**Figure:**



**Fig: Line Diagram of Stenter M/C**





**Fig: Stenter M/C**

## **CURING MACHINE**

### **❖ Purpose of curing:**

Curing is a process in which fabric passes over a chamber which maintains temperature range 140-160c for dwelling 5-8 mints. For pigment printing curing is necessary due to fixation of color.

### **❖ Objective of loop steaming:**

After printing and drying, the dye is not transferred into the fabric in fact. During steaming the printed & dried fabric is exposed to the action of moist, saturated or super heated steam at atmosphere or higher pressure over a range of temperature 100-1 (Bcfor 6-7 mints. As a result high concentration of the dye ,is rapidly transferred into the fabric from the thickener film.

**# Specification of this m/c:**

<b>M/C Name</b>	<b>M/C Quantity</b>	<b>Company</b>	<b>Country</b>
Curing	05	The sitara eng.	Pakistan
Loop steamer	02	Ariolly	Italy



**Fig: Curing M/C**

## CALENDERING MACHINE

❖ *Industrial data:*

➤ DESCRIPTION:

TO treat the fabric in the vertically heavy roller / bowl with the help of heat & pressure to produce some properties of fabric e.g. luster, smoothness, brightness, closeness of thread, lining effect, water mark etc.

It is a mechanical finishing process. In this process to use 3-11 rollers. 3, 5 or 7 rollers of machine is mostly used in industry. 3 or 5 rollers are used for cotton, silk & 7 rollers are used for jute.

Calendar rollers are two types as follows:

- a. Metallic roller
- b. Compressed material roller

To set the metallic roller in the compressed roller & to heat them by the use of steam or gas burner. And then the pressure is applied on the fabric as follows:

- a. Compound fiber & weight
- b. Hydraulic pressure.

To complete calendaring when the fabric is passing between this roller by the maximum hydraulic pressure.

### # Specification of this m/c:

<u>M/C Name</u>	<u>M/C Quantity</u>	<u>Company</u>	<u>Country</u>
Calender	02	Ramesh	Italy

# Machine parameter:

⇒ No of roller-----03

a. Steam roller b. Nylon roller c. Cot roller

⇒ Roller pressure-----12-15

⇒ Roller temperature—70-75°C

**# FIGURE:**

*Callendering Machine*

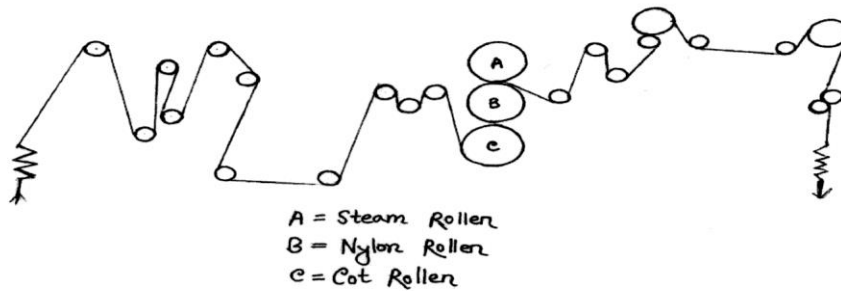


Fig: Line Diagram Of Calendar M/C



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## CHAPTER NO-07

# LAB & QC DEPARTMENT

**# Quality:** By quality we mean an attribute of the product that determines its fitness for use. It also means level or STD which depends on four basic factors for the product.

- Material
- Machine
- Management
- Manpower

**# Quality Control:** Quality control is a powerful productivity technique for effective diagnosis of lack of quality from desired std in any of the material, process, machine or products.

The end product should process the qualities that the consumers expect from them. Quality control ensure this by insisting on quality specifications all along the production proceed from the arrival of raw matl. To the final delivery of goods. There four quality control converse broadly-

- Quality of material.
- Quality of machines.
- Quality of manpower.
- Quality of management.

**# Important function of lab & Q.C:**

- Judicious selection of raw material.
- Important in process QC at all strategic points in processing.
- Accurate evaluation of the end product for conforms to laid stds. ^ Plant research and development program.
- Development of auxiliary products for in house consumption.



**Fig: Tensile Test M/C, Tear Test M/C, Pilling Test M/C, Rubbing Test M/C**



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## CHAPTER NO-08



## **EFFLUENT TREATMENT PLANT (ETP):**

The effluent generated from the different section of a textile industry must be treated before they are discharged to environment. Various chemicals & physical means are introduced for this purpose.

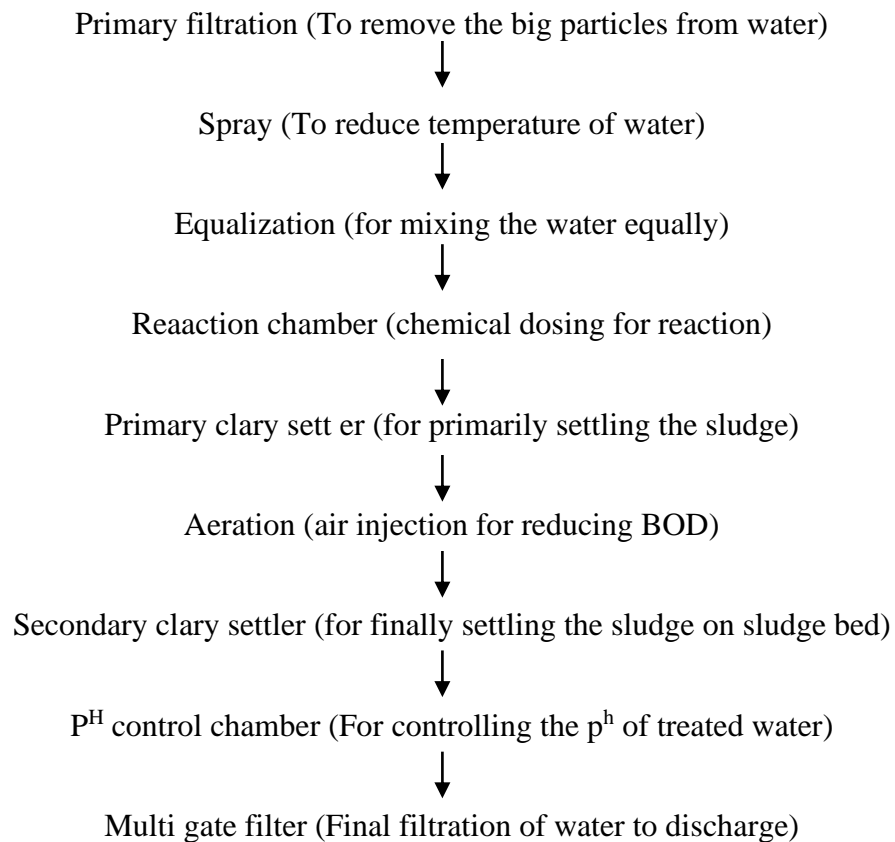
The main objective of effluent treatment plant is to reduce the chemical contamination to an environment heating level, so that the effluent doesn't have the bad effect on the environment.

**Capacity of ETP: 332 M<sup>3</sup>**

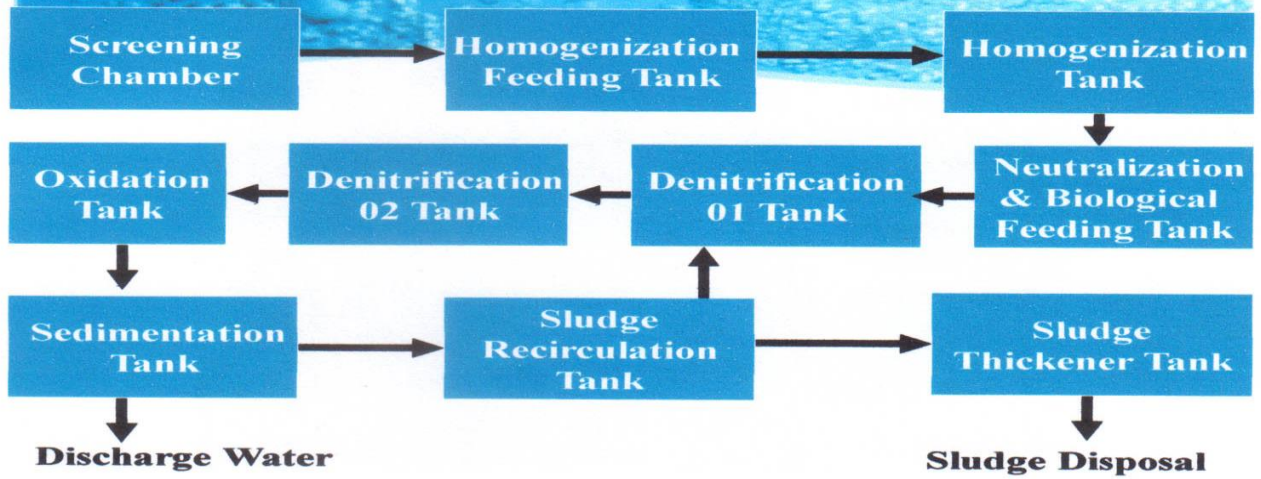
### **CHARACTERISTICS OF WASTE WATER**

- Scouring = NaOH, wax, grease, fragment of fabric; strong alkaline, high BOD
- Bleaching = H<sub>2</sub>O<sub>2</sub>, NaOH, Acid; Alkaline (5% BOD)
- Dyeing = Dye, salt, alkali, acid and auxiliaries; Strongly colored (fairly BOD)
- Finishing = Softener, finishing chemicals; Low BOD (2-4% of total)

## “Process Sequence of Effluent Treatment Plant”



## Flow Diagram of ETP



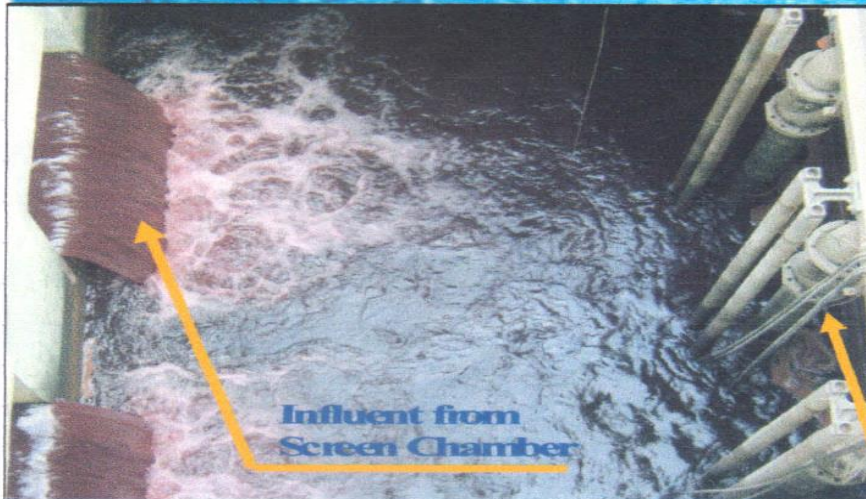
## Screening Chamber



- Removal of “Coarse Solids” (Size > 2mm) by Rotary Screener

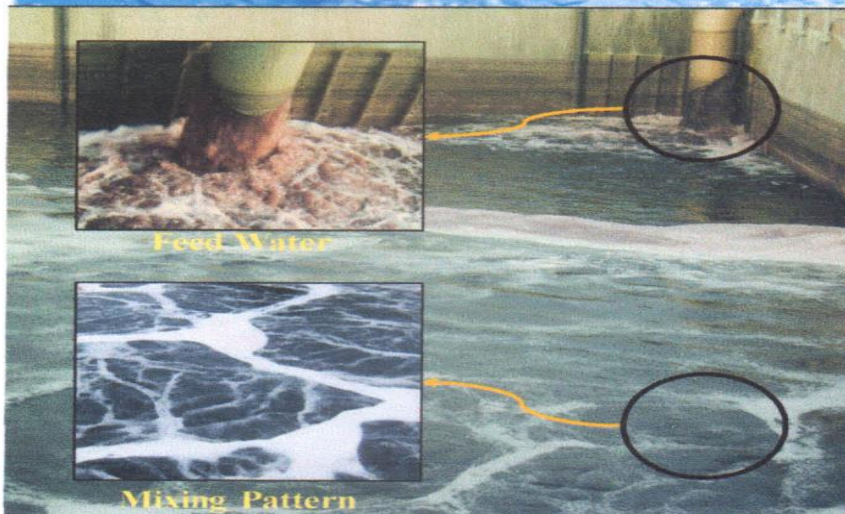
Rotary Screener

## Homogenization Feeding Tank



- Accumulation for feeding to homogenization
- Homogenization feeding by 3 submersible pumps, controlled automatically by level switch

## Homogenization Tank



- Accumulation of wastewater
- Homogenous mixing of wastewater
- Reduction of COD by pre-oxidation (Cavitation Pump)



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## CHAPTER NO-09

## ❖ Conclusion:

The Unifill dyeing printing & finishing mills LTD is one of the well reputed 100% export oriented quality based textile mill. The management body of this textile is well organized and always follows the chain of command. Their objectives are to achieve 100% quality and meet the demand as per buyer requirements.

Besides above characteristics, organization having following intention which could be mentioning as follows-

- Reduction of wastage at 2%.
- Reduce the stoppage time of machine at 5% within 2012.
- Fulfill the demand of customer by time to time shipment
- Organic productivity increase as soon as possible.
- Reduce the re-process and save cost of the company.
- Ensure all kind of facilities of the employee of the organization.
- Atom eliminate environmental adverse effect by using effluent plant.

If the company meet up those criteria all the time. I am sure the organization progressed will be up ward day by day. I am very lucky Daffodil International University has given me the opportunity to perform the industrial attachment in this type of organization.

Undoubtedly, this attachment experienced me the textile technology as well as gaining adequate knowledge for the management and production process. I believe that, this experience will much more help in my future life for carrier growth.