



**Department of Textile Engineering
Faculty of Engineering**

**Course Title: Industrial Attachment
Course Code: TE 431**

**A report
on
Zaber & Zubair Fabrics Limited.**

Submitted by
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ID: 113-23-2664

Supervised by
Sumon Mazumder
Assistant Professor
Dept. of TE, DIU

**A report submitted in partial fulfillment of the requirements for the degree of
Bachelor of Science in Textile Engineering**

Summer-2015

Declaration

I hereby declare that, this internship has been done by me under the supervision of **Sumon Mazumder, Assistant Professor**, Department of Textile Engineering, Faculty of Engineering, Daffodil International University. I also declare that, neither this report nor any part of this has been submitted elsewhere for award of any degree or diploma.

Submitted by

Avik Roy

ID: 113 -23-2664

Department of TE

Daffodil International University

Letter of Approval

24 July 2015

To
The Head
Department of Textile Engineering
Faculty of Engineering
Daffodil International University
102 Sukrabad, Mirpur Road, Dhaka 1207

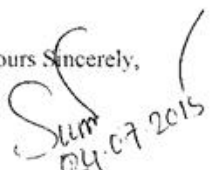
Subject: Approval of Internship Report of B.Sc. in TE program.

Dear Sir

I am just writing to let you know that, this internship report is prepared by **Mr. Avik Roy**, bearing ID-113-23-2664, after accomplishing his two months internship at **Zaber & Zubair Fabrics Ltd.** The report is now completed for final evaluation. The whole report is prepared based on practical information those were collected by the said student during the tenure of internship. The student attentively worked in the industry following the requirements and the report becomes vital to spark off much valuable information for the readers.

Therefore, it will highly be appreciated if you kindly accept this report and consider it for final evaluation.

Yours Sincerely,


Sumon Mazumder
Assistant Professor
Department of Textile Engineering
Faculty of Engineering
Daffodil International University

Acknowledgement

All pleasure goes to the Almighty Allah to give me strength and ability to complete my two months long industrial attachment at **Zaber & Zubair fabrics Limited**. It was a great opportunity for me to complete the industrial attachment with the assistance of persons employed in **Zaber & Zubair fabrics Limited**.

I am grateful to my academic supervisor **Sumon Mazumder**, Assistant Professor, Department of Textile Engineering, Faculty of Engineering, Daffodil international University as well as to **Mr. Kamrul Islam, Sr. Manager (pre-treatment)**, my factory supervisor for their continuously guiding me about the development and preparation of this training report. They have enriched me with sharing necessary theoretical and practical ideas and supervised me to complete this report on time.

I would like to express my thanks to **Prof. Dr. Md. Mahbub ul Haque**, Head, Department of Textile Engineering, Faculty of Engineering, and Daffodil International University for his kind help to finish our training report. I would like to express my thank to **Prof. Dr. Md. Zulhash Uddin**, Dean, BUTex for providing my necessary information to complete the report.

I am also grateful to the supervisors, technicians, operators and all other staffs of **Zaber & Zubair fabrics Limited**, who were most cordial and helpful to me during the tenure of internship.

Finally, I would like to express a sense of gratitude to my beloved parents and friends for their mental support, strength and assistance throughout writing the training report.

*This internship report is dedicated to my loving
Father, Mother and my elder Brother whose affection, love,
encouragement and prays made me able to get such kind of success
and honor*

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CHAPTER-1
EXECUTIVE SUMMARY

Chapter-1

Executive Summary

The purpose of the Industrial Training is to provide me exposure on practical engineering fields. Through this exposure, we will have better understanding of engineering practices and sense of frequent and possible problems. This training is part of the learning process. So, the exposure that uplifts the knowledge and experience needs to be properly documented in the form of a report. Textile Engineering can't be completed without industrial training. Because this industrial training minimizes the gap between theoretical and practical knowledge and make me accustomed to industrial environment.

I got an opportunity to complete **two months (8 Weeks)** long industrial training from **May 02 to June 30** in **Zaber & Zubair Fabrics Limited** which is 100% export oriented composite Home Textile Industry and internationally recognized home textile manufacturing company by meeting day by day's market requirement achieving customer's satisfaction. During this period I saw many types of machinery in dyeing & stitching section. Like in dyeing section Osthoff m/c, Goller bleach m/c, Bab cock stenter m/c, Zimmer m/c etc. & in stitching section Cutter m/c, overlock m/c, eyelet m/c etc. I observed the function of these machineries very carefully. It also provide me sufficient practical knowledge about production management, work study, efficiency, industrial management, purchasing, utility and maintenance of machinery and their operation techniques etc. I worked there in Home Dyeing where including Pre-treatment, Printing, Dyeing, Finishing and supporting Sections.

The above mentioned cannot be achieved successfully by means of theoretical knowledge only. This is why it should be accomplished with practical knowledge in which it is based on Industrial attachment make me reliable to be accustomed with the industrial atmosphere and improve courage and inspiration to take self responsibility.

CHAPTER-2

INFORMATION ABOUT FACTORY

Chapter-2

Information about Factory

Name: Zaber & Zubair Fabrics Limited (An Enterprise of Noman group)

Company Logo:



Nature of Business: 100% export oriented woven home and fashion textile dyeing, printing and finishing.

Chairman: Md. Nurul Islam

Managing Director: A. S. M. Rafiqul Islam Noman

Year of incorporation: 1997

Year of Commercial Production: March 2000

Corporate Office Address: Adamjee Court main Building (5th Floor), 115-120,
Motijheel, Dhaka-1000, Bangladesh.

Factory Address: Pagar, Tongi, Gazipur, Bangladesh

Telephone No: (8802)9802646, 9801146, 9801012

Fax: (8802)9800200

Investing Capital: USD 80 Million

Factory Area: 9, 97, 000 Square feet.

Production Capacity: 1, 00,000 meter per day

Number of Employees: More than 6000

Other Sister Concern of Noman Group

- 1) Artex Fabrics limited
- 2) Sufia Cotton Mills Limited
- 3) Talha Spinning Mills Limited
- 4) Mariom Textile Mills Limited
- 5) Noman Fabrics Limited
- 6) Zaber Spinning Mills Limited
- 7) Noman Textile Mills Limited
- 8) Talha Tex-pro limited
- 9) Zaber&Zubair Accessories Limited
- 10) Zarba Textile Mills Limited
- 11) Yasmin Spinning Mills Limited
- 12) Saad-Saan Textile Mills Limited
- 13) Noman Weaving Mills Limited
- 14) Zubair Spinning Mills Limited
- 15) Talha Fabrics Limited
- 16) Noman Home Textile Mills Limited
- 17) Sufia Fabric limited
- 18) Ismail & Anjuman Fabrics Limited

Shift:

Shift	A	B	C
Duration	6 AM -2 PM	2 PM – 10PM	10 PM – 6 AM

Company Profile

Noman Group has a rich history, starting with Md. Nurul Islam's advent in the textile industry back in 1968. In 1997, Noman Group was incorporated through the inception of Zaber & Zubair Fabrics Ltd. The group has grown to become one of the largest, privately-owned businesses in Bangladesh spanning 33 textile subsidiaries and employing over 50,000 employees. It is presently one of the biggest private sector employers in the country, making significant contribution to the economy. Beside entire value chain in textiles, Noman Group also has diversified business interest in housing and real estate.

Today, Noman Group is a reputed vertically integrated textile group in Bangladesh. The group started its journey with a vision of establishing itself as the largest textile manufacturing in the world. It has consistently been the highest exporter in Bangladesh for the last seven years. With sustained growth over the years and an ever-expanding list of international clientele, Noman Group has solidified its position as a market leader in the textile industry.

Corporate Mission

Growing up as an internationally recognized home textile manufacturing company, by meeting day today's market requirement and achieving customer's satisfaction.

Mission Statement

Noman Group is founded on and committed to a sustainable corporate concept of concomitant prosperity. The mission consists of 3 intertwined parts-

- **Consumer Mission:** To manufacture and supply the finest quality textile products on time with a continued commitment to compliance.
- **Social Mission:** To act responsibly as a global corporate citizen and ensure the well-being and growth of our employees and all other stakeholders.
- **Environmental Mission:** To foster a sustainable future through collaborating with area businesses, community leaders and neighbors with the end of goal of environmental well-being.

Group Vision

Noman Group started its journey with a vision of establishing itself as the largest textile manufacturing in the world. It has consistently been the highest exporter in Bangladesh for the last seven years. With sustained growth over the years and an ever-expanding list of international clientele, Noman Group has solidified its position as a market leader in the textile industry.

Corporate Structure

The highest governing body of Noman Group is the Board of Directors who is responsible for establishing broad policies and objectives that aids in governing the company, setting revenue goals and to overview the performance of the top management. Noman Group is privately owned and operated company with none of the shareholders sitting in any conflicting committees relating to the organization.

Board of Directors

Md. Nurul Islam, [**Chairman**]

A.S.M Rafiqul Islam (Noman). [**Director**]

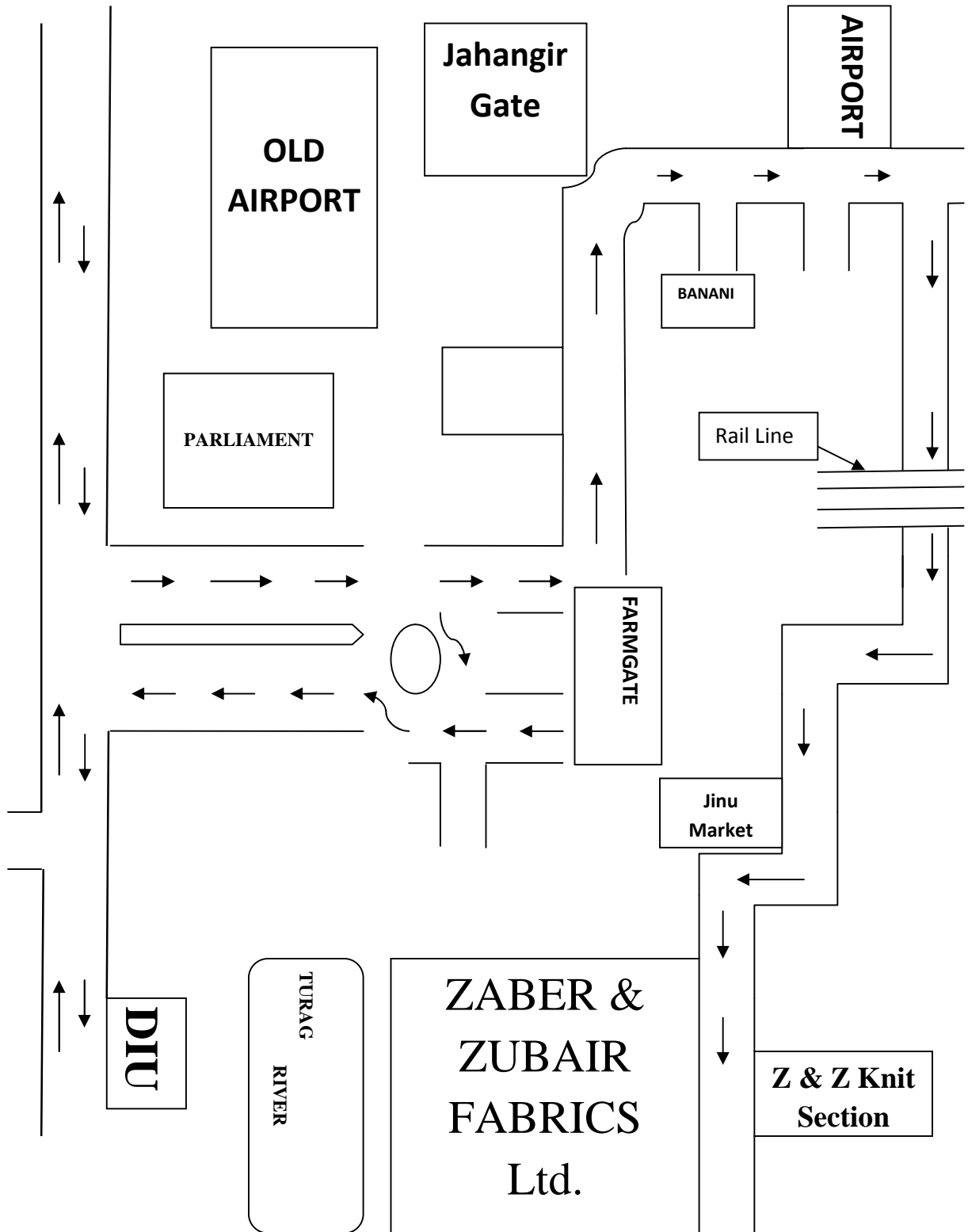
Nur-e-Yasmin Fatima. [**Director (Non-Executive)**]

Abdullah Mohammad Zaber. [**Director**]

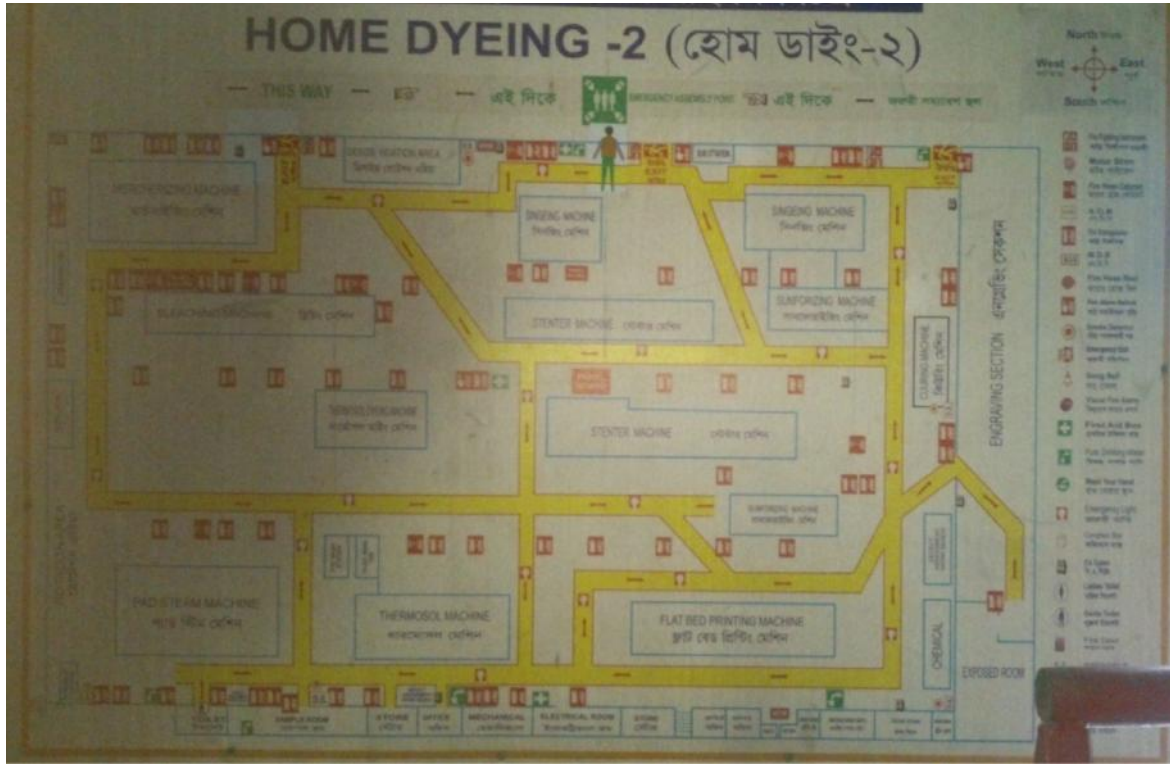
Mohammad Abdullah Zubair. [**Director**]

Abdullah Mohammad Talha. [**Director**]

Location Layout of Zaber & Zubair Fabrics Limited:



Factory Layout plan of Zaber & Zubair Fabrics Limited:



Different sections of the company:

To smooth functioning of the organization activities, some department assist these activities as per given below:

❖ **Dyeing, Printing & Finishing Section:**

- ✓ Preparation
- ✓ Dyeing
- ✓ Printing
- ✓ Finishing
- ✓ Q,C & Lab Section
- ✓ Final inspection & Folding

❖ **Garments Section:**

- ✓ Sample Section
- ✓ Cutting Section
- ✓ Sewing Section
- ✓ Final inspection
- ✓ Packing Section
- ✓ Etc

❖ **Maintenance:**

- ✓ Electrical
- ✓ Mechanical

❖ **Utility Section:**

- ✓ Boiler
- ✓ Generator
- ✓ Compressor
- ✓ Chiller
- ✓ ETP
- ✓ WTP
- ✓ Etc.

- **Accounts & commercial Section.**
- **Administration & Compliance Section.**
- **Chemical & Spare parts Store.**

Supporting Department:

- Marketing Department
- Accounts Department
- Administration Department
- Compliance Department
- Purchasing Department

Name of products company export:

➤ **Home Textile**

- ✦ Comforter
- ✦ Duvet Cover
- ✦ Pillow Cover
- ✦ Bed Linen
- ✦ Bed Spreads
- ✦ Bed Throws
- ✦ Kitchen Cloth
- ✦ Table Cloth
- ✦ Curtain
- ✦ Shower Curtains
- ✦ Chair Pads
- ✦ Cotton Rugs
- ✦ Napkins
- ✦ Table Runners
- ✦ Aprons
- ✦ Mitten
- ✦ Rug/Mat
- ✦ Upholstery
- ✦ Towel (Kitchen Towel, Bath Towel, Robe, Spa Towel, Beach Towel, Tea Towel)

Membership certificates:

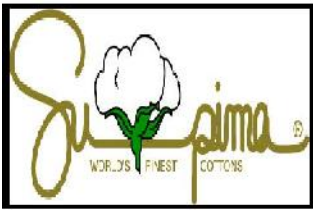
Certification/ Achievements

- 1) ISO 9001:2008
- 2) OEKO-TEX STANDARD 100
- 3) BRC GLOBAL STANDARD
- 4) GOTS-GLOBAL ORGANIC TEXTILE STANDARD
- 5) 9001 : 2000 (audited by URS)
- 6) OEKO - Tex (by Testex)
- 7) BRC Global Standard Consumer Product (by British Retail Consortium)
- 8) BSCI (Business Social Compliance Initiative) (audited by SGS)
- 9) Several audits on ETI (Ethical Trade Initiative) base code by different third party audit companies.
- 10) ISO 14001 (audited by URS)
- 11) SRM (audited by URS)
- 12) IWAY By IKEA
- 13) Wall-Mart
- 14) H & M
- 15) Asda
- 16) Disney

Awards and Achievements

- ❖ HSBC Export Excellence Award 2011
- ❖ Social & Environmental Excellence Award 2012
- ❖ Certified AA Credit Rating by Credit Rating Information & Services Limited Bangladesh
- ❖ “Best Example” 2012 Award by H&M
- ❖ National Export Trophy (Awarded by **Ministry of Commerce and Export Promotion Bureau**)
- ❖ Zaber & Zubair Fabrics: 2001-02, 2002-03, 2003-04, 2006-07, 2007-08, 2008-09, 2009-10, 2010-11 (Gold)
- ❖ Noman Weaving Mills: 2008-09, 2010-11 (Gold)
- ❖ Zaber Spinning Mills: 2008-09 (Gold)
- ❖ Yeasmin Spinning Mills: 2008-09 (Silver), 2010-11 (Bronze)
- ❖ Ismail Textile: 2010-11 (Bronze)

Certifications:



IWAY
Standard

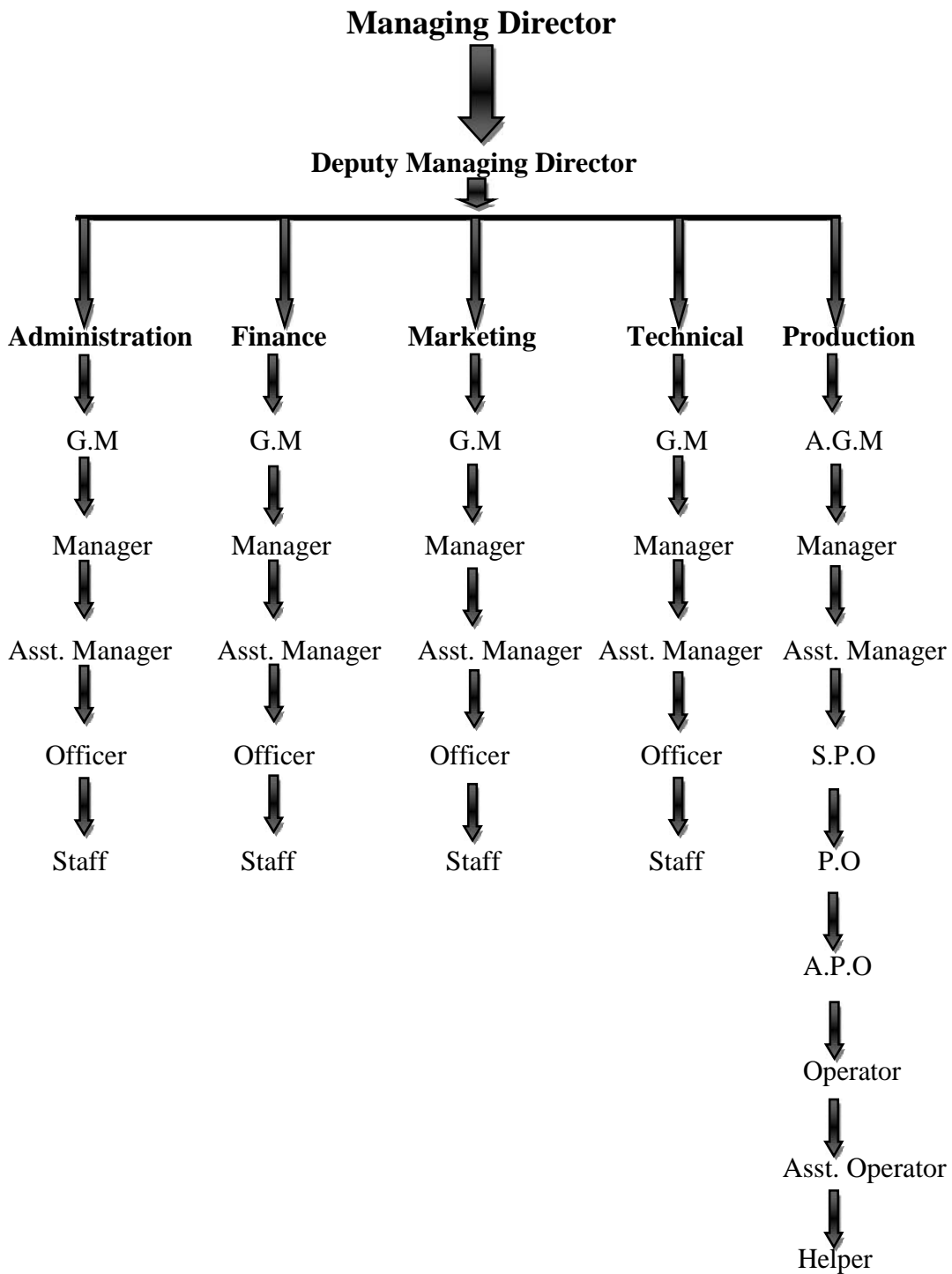
Type of Factory: Vertically Integrated
Website: www.znzfab.com

List of Buyers:

Buyer	Logo
IKEA	
H & M	
Walmart	
TESCO	
UNIQLO	
AMERICAN EAGLE	
ASDA	
ALDI	
C&A	
Abercrombie & Fitch	
GAP	
G-STAR	
ESPRIT	
PVH	
Otto Group	

ZARA	
TARGET	
M&S	
Next	
NIKE	
MANGO	
LA REDOUTE	
Kappa	
Kmart	
KOHL'S	
LEVI'S	
LiDL	
JC Penny	
BIGW	
JYSK	

Organ gram:



CHAPTER-3

DETAILS OF ATTACHMENT

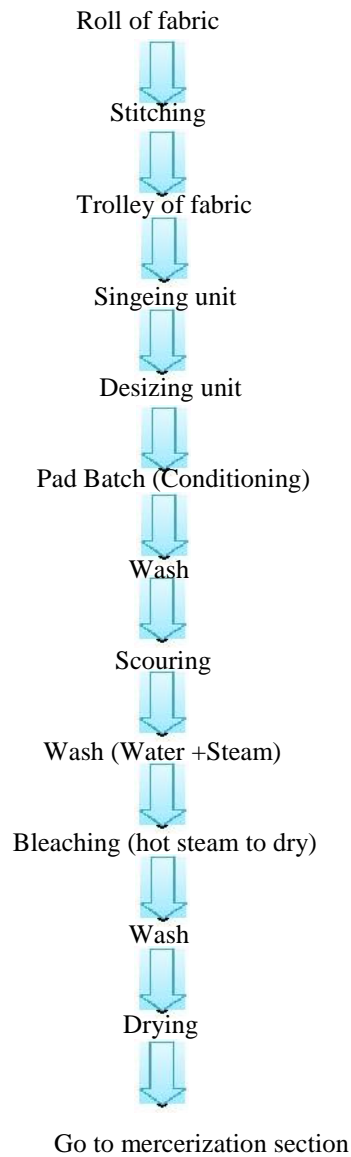
3.1 Pre-treatment Section

Natural fibers and synthetic fibers contain primary impurities that are contained naturally, and secondary impurities that are added during spinning, weaving processes. Textile pretreatment is the series of cleaning operations. All impurities which cause adverse effect during dyeing and printing is removed in pretreatment process.

Pretreatment process includes-

**SINGEING
DESIZING
SCOURING
BLEACHING
MERCERIZATION**

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



3.1.1. SINGEING

Singeing is the process which is carried out for the purpose of removing the loose hairy fibers protruding from the surface of the cloth, thereby giving it a smooth, even and clean looking face. Singeing is an essential process for the goods or textile material which will be subjected to mercerizing, dyeing and printing to obtain best results from these processes.

Generally there are 3 types singeing machine:

Gas singeing machine

Roller singeing machine &

Plate singeing machine

Objects of singeing

1. The risk of pilling, especially with synthetics and their blends, is reduced in case of singed fabrics.
2. Protruding fibers are removed in singeing which could cause diffused reflection of light.
3. To obtain a uniform & smooth fabric surface by removing hairiness.
4. To ensure uniform optical reflectance throughout the fabric surface in subsequent fabric wet process.

In this factory, gas singeing machine is used.



Figure: Singeing Machine

Summary and Solution to Problem in Singeing:

Problem	Possible Cause	Counter measure
In complete singeing	<ol style="list-style-type: none"> 1. Too low flame intensity. 2. Too fast fabric speed. 3. Too far distance between Two burners. 4. In appropriate singeing Position (not severe enough). 5. Too much moisture in the Fabric incoming for singeing. 	<ol style="list-style-type: none"> 1. Optimum flame intensity. 2. Optimum fabric speed. 3. Optimum distance between the fabric and the burner. 4. Optimum singeing position. 5. No excess moisture in the fabric incoming for singeing.
Uneven singeing (Width ways)	<ol style="list-style-type: none"> 1. Non-uniform moisture content across the fabric Width. 2. Non-uniform flame intensity across the fabric Width. 3. Uneven distance between the burner and the fabric. 	<ol style="list-style-type: none"> 1. Uniform moisture content Across the fabric width. 2. Uniform flame intensity Across the fabric width. 3. Uniform distance between the burner and the fabric.
Uneven singeing (Length ways)	<ol style="list-style-type: none"> 1. Non-uniform moisture Content along the fabric length. 2. Non-uniform flame intensity along the fabric Length. 3. Change in fabric speed During singeing. 4. Change in the distance between the fabric and the Burner along the length. 	<ol style="list-style-type: none"> 1. Uniform moisture content Along the fabric length. 2. Uniform flame intensity Along the fabric length. 3. Uniform fabric speed During singeing. 4. Uniform distance between the fabric and the burner along the length.

Required parameters:

- **Steam**-steam is supplied to the steam box of the m/c.
- **Compressed air**- the standard air supply pressure requirement is 4 kg/cm^2
- **Water**- the standard water supply pressure requirement is $1-1.2 \text{ kg/cm}^2$
- **Natural gas**- the standard gas supply pressure requirement is 3 kg/cm^2

3.1.2. DESIZING

After singeing, fabric goes to Desizing unit.

Desizing is the process of removing size materials from the fabric, which is applied in order to increase the strength of the yarn which can withstand with the friction of loom. Fabric which has not been desized is very stiff and causes difficulty in its treatment with different solution in subsequent processes.

In de-sizing, the hydrolysis reaction is carried out up to the stage of **soluble dextrin** only & no further to alpha-glucose.

Object of de-sizing:

- Remove starch from the fabric
- To increase the absorbency of the fabric
- To reduce the stiffness & make the fabric soft
- To make fabric ready for the subsequent process.

Desizing chemicals are given below-

- **Wetting Agent**
- **Sequestering Agent**
- **Enzyme (Oxidative Desizing)**

Factors that influence de-sizing:

Size removal depends essentially on the following factors:

- Viscosity of the size in solution.
- Ease of dissolution of the size film on the fiber
- Amount of size applied.
- Nature and amount of the plasticizers.
- Fabric construction.
- Method and nature of washing-off.
- Temperature of washing-off.

Summary and Solutions to Problems in De-sizing:

Problem	Causes	Counter measure
In complete de-sizing	<ol style="list-style-type: none"> 1. Inappropriate de-sizing bath pH 2. Inappropriate de-sizing bath Temperature. 3. Insufficient fabric pick up. 4. Insufficient digestion time. 5. Poor enzyme activity. 6. Deactivation of enzyme due to presence of metals or other Contaminants. 7. Ineffective wetting agent. 8. Incompatible wetting agent. 	<ol style="list-style-type: none"> 1. Optimum pH. 2. Optimum temperature. 3. Optimum squeeze pressure. 4. Use of wetting agent. 5. Optimum digestion time. 6. Use of good enzymes. 7. Use of soft water. 8. Use of appropriate Sequestering agents. 9. Use of good and effective Wetting agents. 10. Use of compatible wetting Agent.
Uneven de-sizing (Width ways)	<ol style="list-style-type: none"> 1. Uneven pad pressure. (across the width) 2. Non-uniform pad temperature 3. Non uniform chemical Concentration in the bath. 	<ol style="list-style-type: none"> 1. Uniform squeeze pressure. 2. Uniform bath temperature. 3. Uniform chemical Concentration.
Uneven de-sizing (Length ways)	<ol style="list-style-type: none"> 1. Uneven pick-up. (along the length) 2. Preferential drying of outer Layers of the batch. 3. Temperature variation During digestion. 	<ol style="list-style-type: none"> 1. Uniform pick-up along the fabric length. 2. Covering the batch with polythene or other suitable sheet. 3. Keep the batch rolling.
Uneven de-sizing (Random)	<ol style="list-style-type: none"> 1. Poor wetting agent. 2. Use of effective and Compatible wetting agent. 2. Optimum bath temperature. 3. Use of appropriate Deformers. 4. Uniform liquor distribution during padding. 5. Thorough and uniform washing after 	<ol style="list-style-type: none"> 1. Use of effective and compatible wetting agent. 2. Optimum bath temperature. 3. Use of appropriate Deformers. 4. Uniform liquor distribution during padding. 5. Thorough and uniform washing after de-sizing.

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

1. Osthoff singe.
2. Poong-Kwang singe.

Specification of this m/c:

<u>M/C Name</u>	<u>M/C Quantity</u>	<u>Company</u>	<u>Country</u>
OSTHOFF Singe	03	OSTHOFF	Germany
Poong-Kwang Singe	01	Poong-Kwang	Korea

Singeing & Desizing process used in this factory:

- **Singeing:**

All most Gas singeing process is used in this factory.

- **Desizing:**

Enzyme based desizing is used in this factory.

M/C parameters:

- ⇒ No. of burner-----02
- ⇒ Flame height----- 2-3 inch
- ⇒ Burner Width-----128 inch
- ⇒ Burner Flame Intensity-----16-18 m/bar
- ⇒ P^H of bath -----5.5-6.5
- ⇒ Temperature of desizing box---60⁰-90⁰C
- ⇒ Machine speed-----50-100 m/min
- ⇒ Padder Pressure-----2.5 m/bar
- ⇒ Pick Up %-----80%

Recipe for every process

For desizing:

⇒ Recipe for Enzyme based desizing:

<u>Chemical Name</u>	<u>Quantity</u>	<u>Brand</u>
ULTRA DESIZER	1-2g/l	Chung Jung /CHT
HOSTAPAL XTRA LIQUID	1-2g/l	Archroma
SIRRIX 2UD	1-2g/l	Archroma

#Function of different chemical agent:

- ⇒ **HOSTAPAL XTRA:** It is a wetting agent. Its function is to remove surface tension of the water & minimize interfacial tension.
- ⇒ **ULTRA DESIZER:** It is a desizing agent. Its function is to remove the size materials from the fabric.
- ⇒ **SIRRIX 2UD:** It is a sequestering agent. Its function is to remove the water hardness & Deactivate metal ions.

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

- ⇒ Flame intensity
- ⇒ Fabric speed
- ⇒ Singeing position
- ⇒ Distance between flame burner and fabric
- ⇒ Flame width
- ⇒ Temperature
- ⇒ Time & P^H
- ⇒ Padder pressure for desizing.

After desizing process, the fabric is batched in roll form and the batch is wrapped with polyethene and conditioned with continuous rotation for about 8 to 16 hours. Polyethene wrapping prevent evaporation of chemicals from the fabric surface and continuous rotation prevents percolation of the desizing chemicals. After completion of the rotation period, it goes for the next process.

FIGURE:

Singeing & Desizing M/C

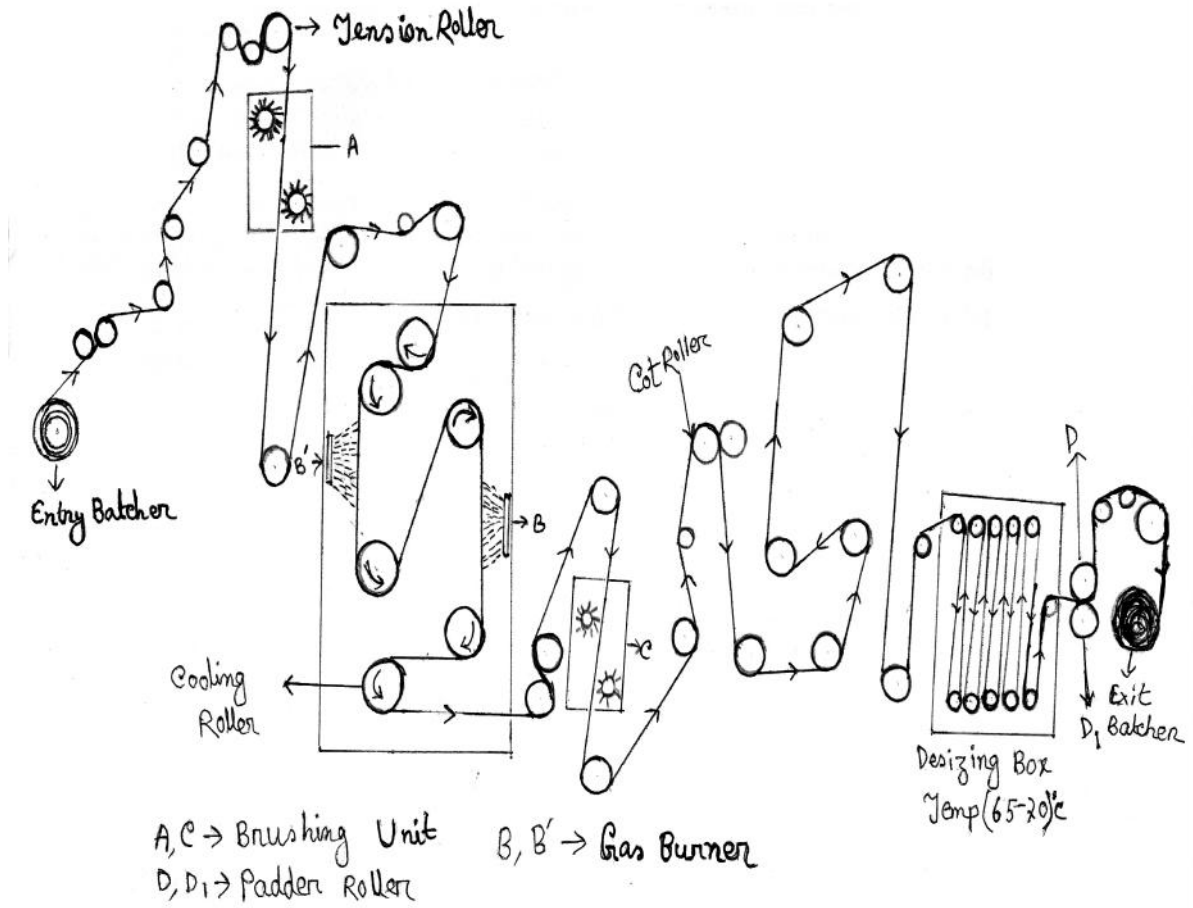


Fig: Line diagram of singeing & desizing m/c

Flow Chart of SINGE & DESIZE:

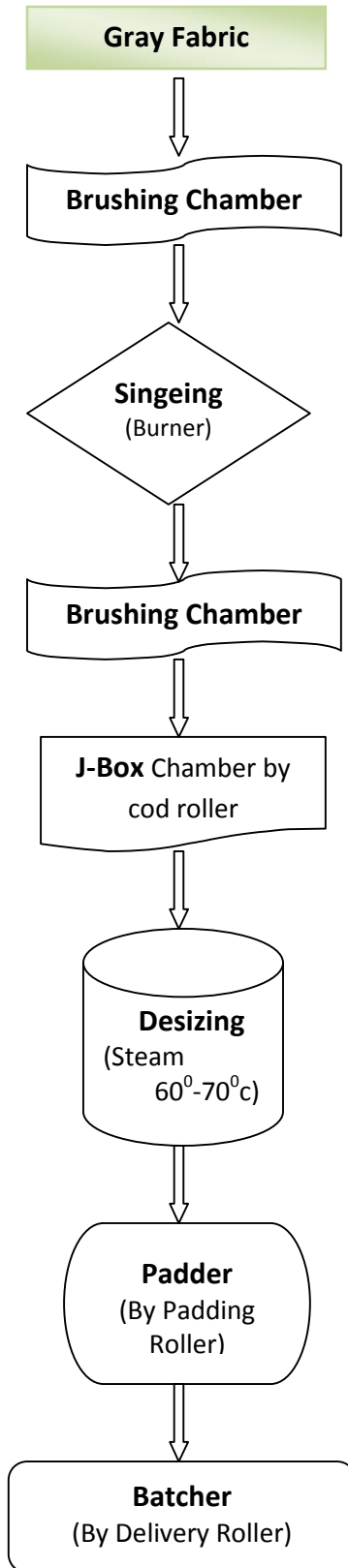




Fig: Singeing and Desizing M/C [OSTHOFF-03]



Fig: Singeing and Desizing M/C [OSTHOFF-04]

3.1.3. SCOURING AND BLEACHING

Scouring is the process by which natural (oil, wax, gum, fat etc.) as well as added (during fabrication process) impurities of essentially hydrophobic character are removed as completely as possible and leave the fabric in a highly absorptive condition without undergoing chemical or physical damage of the fabric significantly.

Objectives of scouring

1. The main purpose of scouring is to remove the impurities from the textile materials.
2. The textile materials are leave in a highly absorptive condition without undergoing any chemical or physical damage significantly.
3. To produce hydrolytic characteristics.
4. To increase absorbency of fabric.
5. To remove natural nitrogenous coloring materials, dirt, dust, husk, broken seed, protein, leaf, etc by oxidizing on chemical treatment.
6. After scouring process, material becomes suitable for the next process bleaching.

Bleaching process can be defined as the destruction of natural coloring matters from the textile materials in order to achieve a clean white end product. Different types of bleaching agent are used during bleaching.

Objectives of bleaching

1. The main objective of bleaching is to get a sufficiently high and uniform degree of whiteness in the textile materials.
2. To produce a clean material by adding alkali.
3. To obtain pure & permanent white color.
4. To get a high and uniform absorptive in the textile materials.
5. To prepare the fabric for the next process mercerizing or dyeing.

In Zaber and Zubair Fabrics Limited, scouring and bleaching is done in the same machine one after another. Otherwise it can say that, scouring & bleaching unit are consecutively interconnected.

Scouring & bleaching process used in this factory

- **Scouring:** Continuous scouring process with NaOH used in this factory.
- **Bleaching:** Continuous peroxide bleaching process is used in this factory.

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

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

#Specification of this m/c:

<u>M/C Name</u>	<u>M/C Quantity</u>	<u>Company</u>	<u>Country</u>
Scouring & Bleaching m/c	02	Goller	Germany
Bleaching m/c	01	Brugman	Holland

M/C parameters:

- ⇒ pH for printing:
 - a) Pigment printing-6-7
 - b) Reactive Printing-7-7.5
- ⇒ pH for dyeing:
 - a) Pigment dyeing 5.5-6
 - b) Reactive dyeing-7-7.5
 - c) 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-65⁰-95⁰C
 - b) For Steaming chamber-95⁰-115⁰C
 - c) For Chemical bath-40⁰-60⁰C
 - d) For Cylinder dryer-150⁰-200⁰C
- ⇒ pH of bath-----10-11

Critical to Quality (CTQ) Machine Parameter List:

➤ M/C Goller-01

Pre-Bleaching Wash		Post-Bleaching Wash				
Chamber-1	Chamber-2	Chamber-3	Chamber-4	Chamber-5	Chamber-6	Chamber-7
20°c-80°c	60°c-90°c	75°c-90°c	75°c-90°c	75°c-90°c	75°c-90°c	40°c-60°c
Steamer Temp.		Steamer Bed Time	M/C Speed	Pick Up%	pH Post Bleaching	
98°c-102°c		16-20 min	50-70 m/min	80%	5.5-6.5	

➤ M/C Goller-02

Pre-Scouring Wash			Post-Scouring Wash		
Chamber-1	Chamber-2	Chamber-3	Chamber-4	Chamber-5	Chamber-6
70°c-90°c	70°c-90°c	60°c-80°c	70°c-95°c	70°c-95°c	60°c-80°c
Post-Bleaching Wash					
Chamber-7	Chamber-8	Chamber-9	Chamber-10		
70°c-95°c	70°c-95°c	70°c-95°c	60°c-80°c		
Steamer Temp.		Steamer Bed Time	M/C Speed	Pick Up%	pH Post Bleaching
98°c-102°c		18-20 min	60-80 m/min	70-90%	5.5-6.5

➤ M/C Brugman

Pre-Bleaching Wash					
Chamber-1	Chamber-2	Chamber-3	Chamber-4	Chamber-5	
65°c-90°c	65°c-90°c	65°c-90°c	65°c-90°c	65°c-90°c	
Post-Bleaching Wash					
Chamber-6	Chamber-7	Chamber-8			
65°c-90°c	65°c-90°c	65°c-90°c			
Steamer Temp.		Steamer Bed Time	M/C Speed	Pick Up%	pH Post Bleaching
98°c-102°c		18-20 min	50-70 m/min	70-90%	5.5-6.5

Recipe for every process:

Recipe for scouring process:

<u>Chemical Name</u>	<u>Quantity</u>	<u>Brand</u>
CAUSTIC (NaOH)	45 ml/kg	Arabial Alkali
HOSTAPAL XTRA LIQUID	2-3 ml/kg	Archrom
SIRRIX 2UD	2-3 ml/kg	Archroma

Recipe for bleaching process:

<u>Chemical Name</u>	<u>Quantity</u>	<u>Brand</u>
HYDROGEN PEROXIDE (H ₂ O ₂)	35 ml/kg	Samuda
CAUSTIC (NaOH)	20 ml/kg	Arabial Alkali
HOSTAPAL XTRA LIQUID	2-3 ml/kg	Archrom
SIRRIX 2UD	2-3 ml/kg	Archrom
STABILIZER Fcb/ Contavan GD-T	4-5 ml/kg	Archroma/CHT

#Function of different chemical agent:

- ⇒ **HOSTAPAL XTRA:** It is a wetting agent. Its function is to remove surface tension of the water & minimize interfacial tension.
- ⇒ **SIRRIX 2UD:** It is a sequestering agent. Its function is to remove the water hardness. Deactivate metal ions.
- ⇒ **NaOH(alkali):** To neutralize acidic materials. Swell the fiber & saponify glycerides & to remove the oil, fats, wax & additive impurities from the fabric.
- ⇒ **H₂O₂:** It's a universal bleaching agent. H₂O₂ 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^H, temperature, liquor ratio & water hardness. It's function to maintain the proper power of H₂O₂ at high temperature.

Controlling point of the scouring & bleaching m/c:

- pH
- Temperature
- Speed & time
- Concentration of hydrogen per oxide(H₂O₂) & Caustic (NaOH)
- Liquor ratio
- Water hardness

#Figure:

New Goller Bleaching M/C

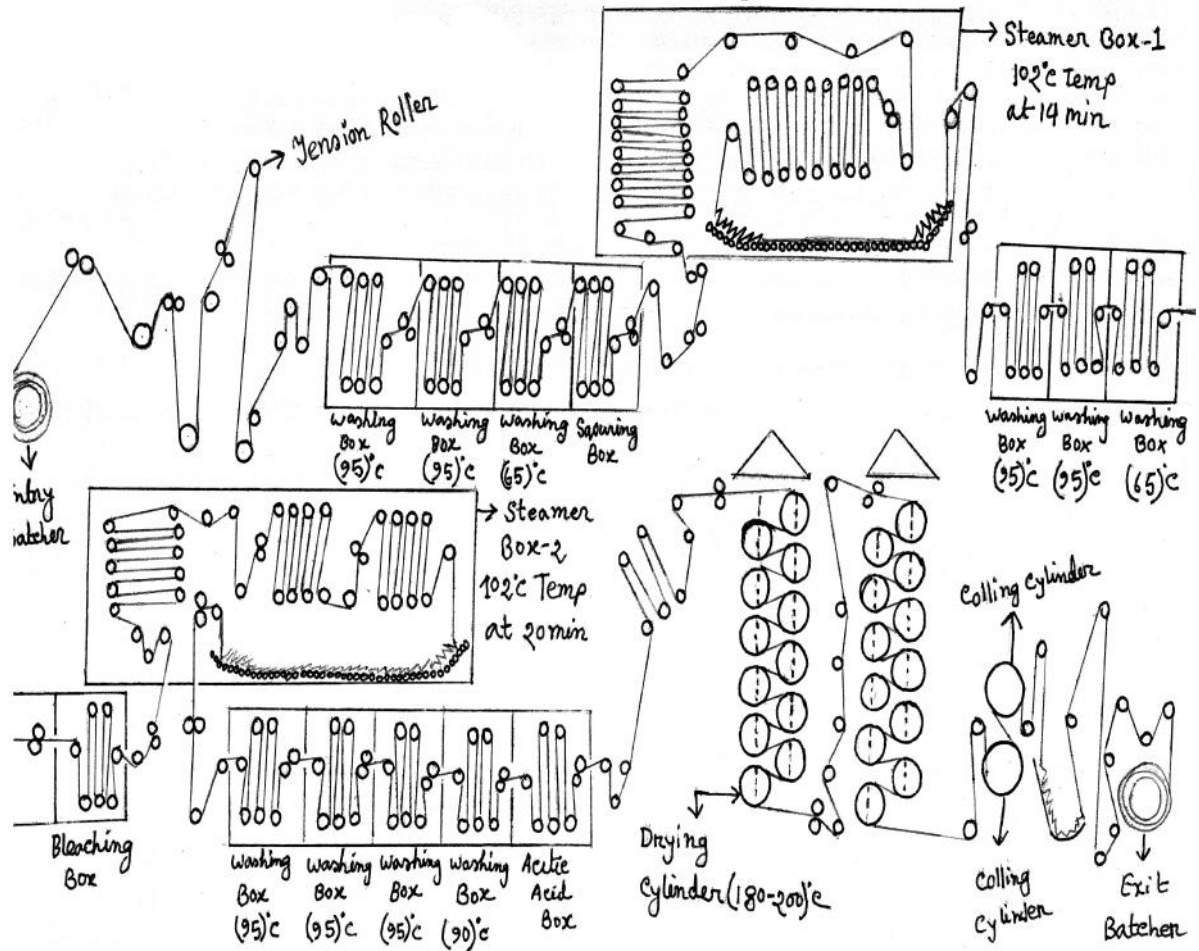
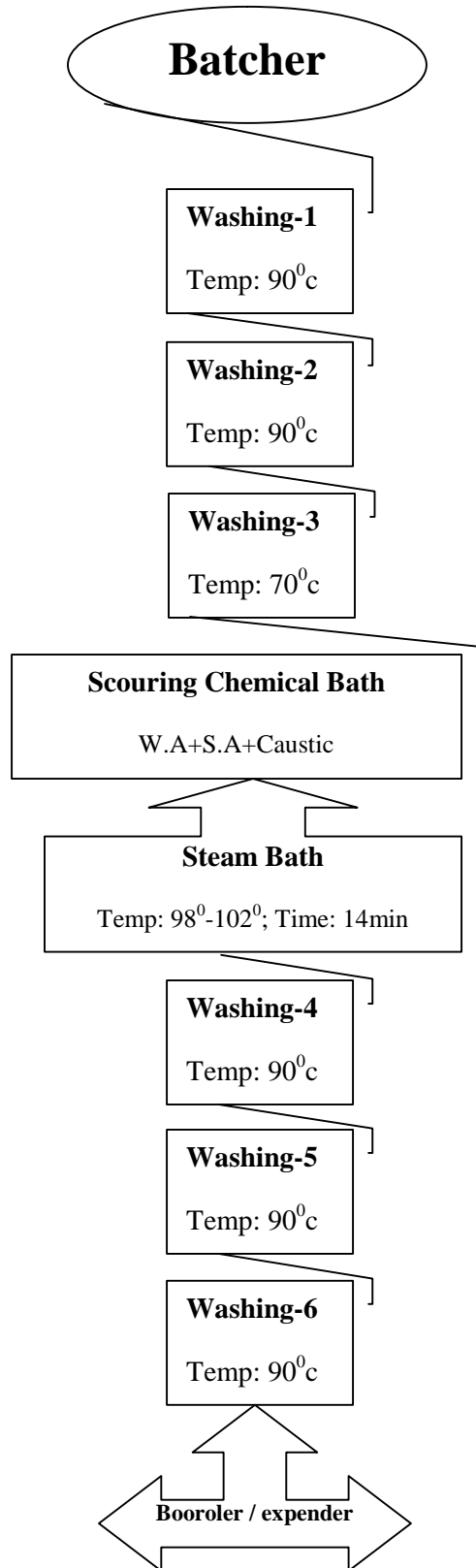
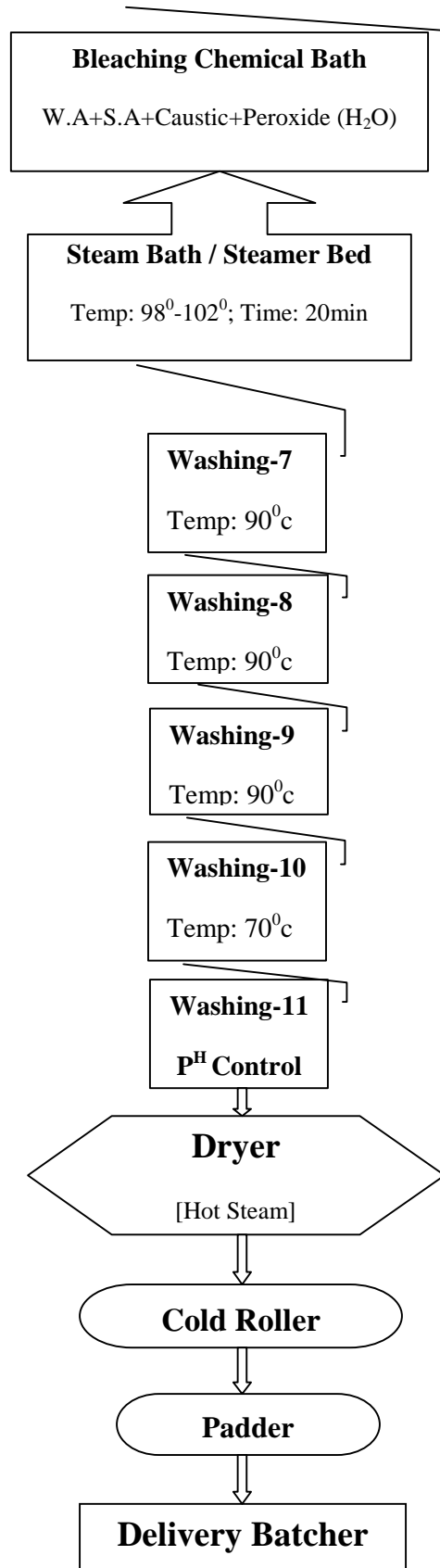


Fig: Line diagram of scouring & bleaching m/c.

Flow chart of Scouring & Bleaching in Zaber & Zubair Fabrics Limited:





➤ Bleach Fabrics Faults:

- ⇒ Whiteness
- ⇒ Absorbency
- ⇒ pH
- ⇒ Size Chemical
- ⇒ Optical Brightness
- ⇒ Holes
- ⇒ Distortion
- ⇒ Black Spot
- ⇒ Iron Spot
- ⇒ Others Spot
- ⇒ Crease Mark

Controlling point of the scouring & bleaching machine:

- ⇒ pH
- ⇒ Temperature
- ⇒ Speed & Time
- ⇒ Concentration of hydrogen peroxide (H_2O_2) & caustic soda (NaOH)
- ⇒ Water hardness etc.

After scouring and bleaching, following tests are done in the 'Online QC' booth:

- ✓ Concentration of H_2O_2 (gm/Lt) in Bleaching bath
- ✓ pH test (Drop test method)
- ✓ Tegwa rating (Drop test method)
- ✓ Concentration of NaOH (gm/Lt) in scouring /Bleaching bath
- ✓ Whiteness
- ✓ After bleach width (Optional)
- ✓ Absorbency test (Capillary test method)



Fig: Scouring and Bleaching M/C

3.1.4. MERCERIZATION

Mercerization is one of the most important processes of back process or pretreatment section. Mercerizing is the treatment of cotton with concentrated caustic soda under fabric tension. It imparts gloss to the fiber, increases its hygroscopicity, strength and improves its dye affinity.

Objects of mercerization

1. Length wise shrinkage and swelling axially.
2. Untwisting of fiber.
3. Changes of cross section of the fiber due to swelling.
4. Increase tensile strength.
5. Decrease the extension at break.
6. Increase luster.
7. Increase smoothness of fiber.
8. Increase affinity to dyestuffs and chemicals.

Mercerization is done for some several purposes-

- To increase luster
- To increase affinity to dyes
- To control fabric width and for dimensional stability
- To increase tensile strength and save dye.

Features:

- Auto dozing of NaOH solution.
- Bo's indicator.
- Auto acid dozing & P^H controller.
- Auto stop motion
- Width & moisture controller.

Mercerization process:

Mercerization (for luster) can be carried out in two ways:

1. By unrestricted swelling (by treating the cotton with sodium hydroxide solution, allowing it to Shrink to the maximum extent), following by stretching to the original width or length.
2. By restricted swelling (by treating the cotton under tension, with strong sodium hydroxide Solution without allowing it to shrink and then washing while still in the stretched condition).

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

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

List of mercerizing machines: Total 3 machines.

Machine name	Company	Origin
Mercerizing Machine	Goller	Germany
Mercerizing Machine	Benninger	Germany
Mercerizing Machine	Kusters	Germany

#Mercerization process used in this factory:

Mercerization process is done in this factory by using Caustic (NaOH).

M/C parameters:

- ⇒ Feed to delivery fabrics-----160 m
- ⇒ Temperature of stabilizer-----80⁰C
- ⇒ Number of washing bath-----5
- ⇒ Temperature of washing bath -----70-95⁰C
- ⇒ Number of acetic bath-----01
- ⇒ Maximum m/c speed-----60m/min
- ⇒ Normally speed -----25-50m/min
- ⇒ Number of drying cylinder-----10
- ⇒ Temperature of drying cylinder----180-200⁰C
- ⇒ Number of cooling cylinder-----02
- ⇒ Caustic of Bo:
 - a.For printing-----22-24 Be
 - b.For dyeing-----28 Be
 - ⇒ Cotton- 28 baume
 - ⇒ P.C-26 baume
 - ⇒ Twill-28-30 baume
 - ⇒ Cotton Sateen- 28 baume
 - ⇒ Sheeting- 28 baume

Recipe for mercerization process:

- ⇒ NaOH (28⁰) Bo
- ⇒ Mercerize oil
- ⇒ Acetic acid

Function of different chemical agent:

- ⇒ **NaOH(28⁰ Bo)**: To neutralize acidic materials. Swell the fiber & saponify glycerides & to remove the oil, fats wax & additive Impurities form the fabric.
- ⇒ **Mercerize oil**: It is a wetting agent. Its function is to remove surface tension of the water & minimize interfacial tension.
- ⇒ **Acetic acid**: To maintain proper value of P^H.

#Controlling point of the mercerizing m/c:

- ⇒ pH
- ⇒ Temperature
- ⇒ Fabric speed
- ⇒ Time
- ⇒ Concentration of NaOH
- ⇒ Etc.

#Figure:

Mercerizing M/C

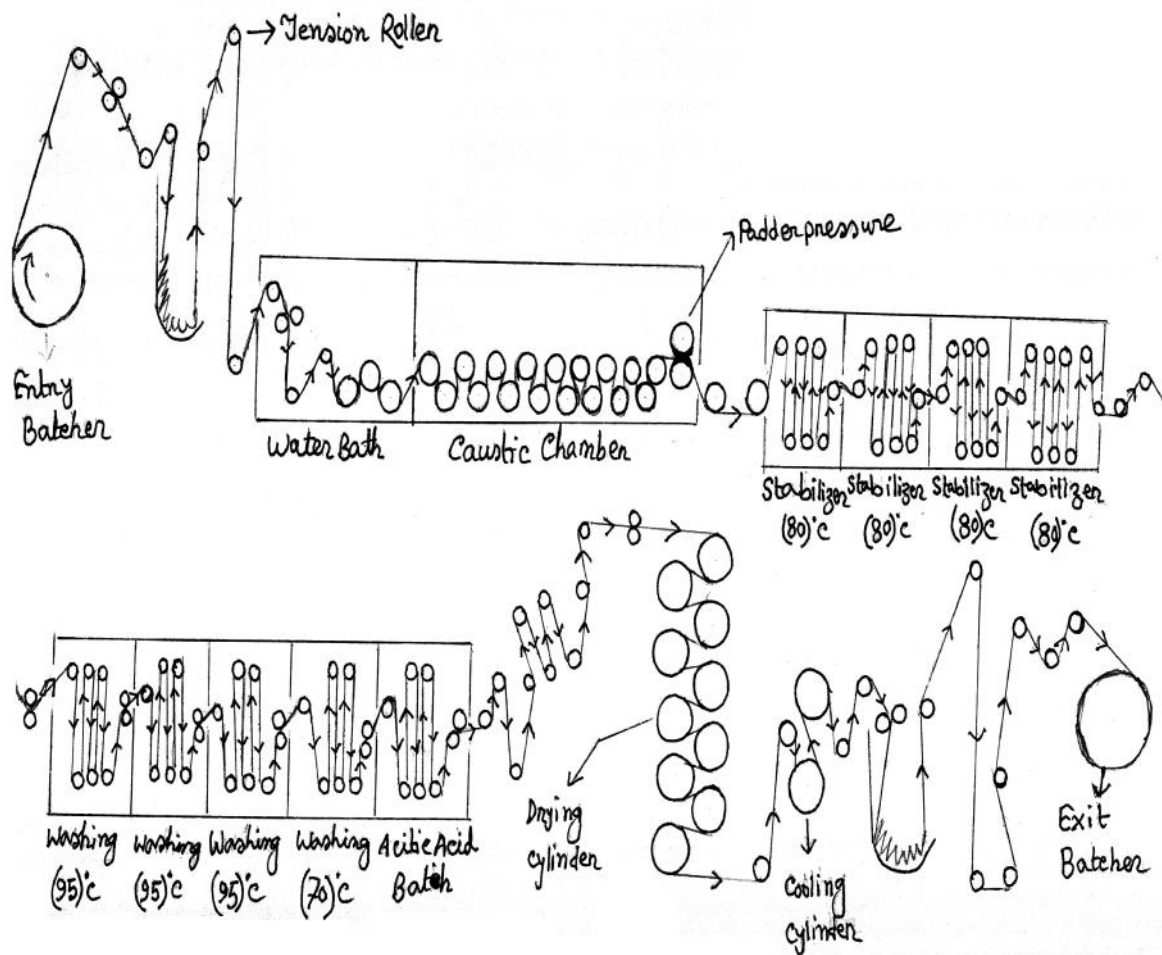


Fig: Line diagram of mercerizing m/c.

Flow Chart of Mercerizing:

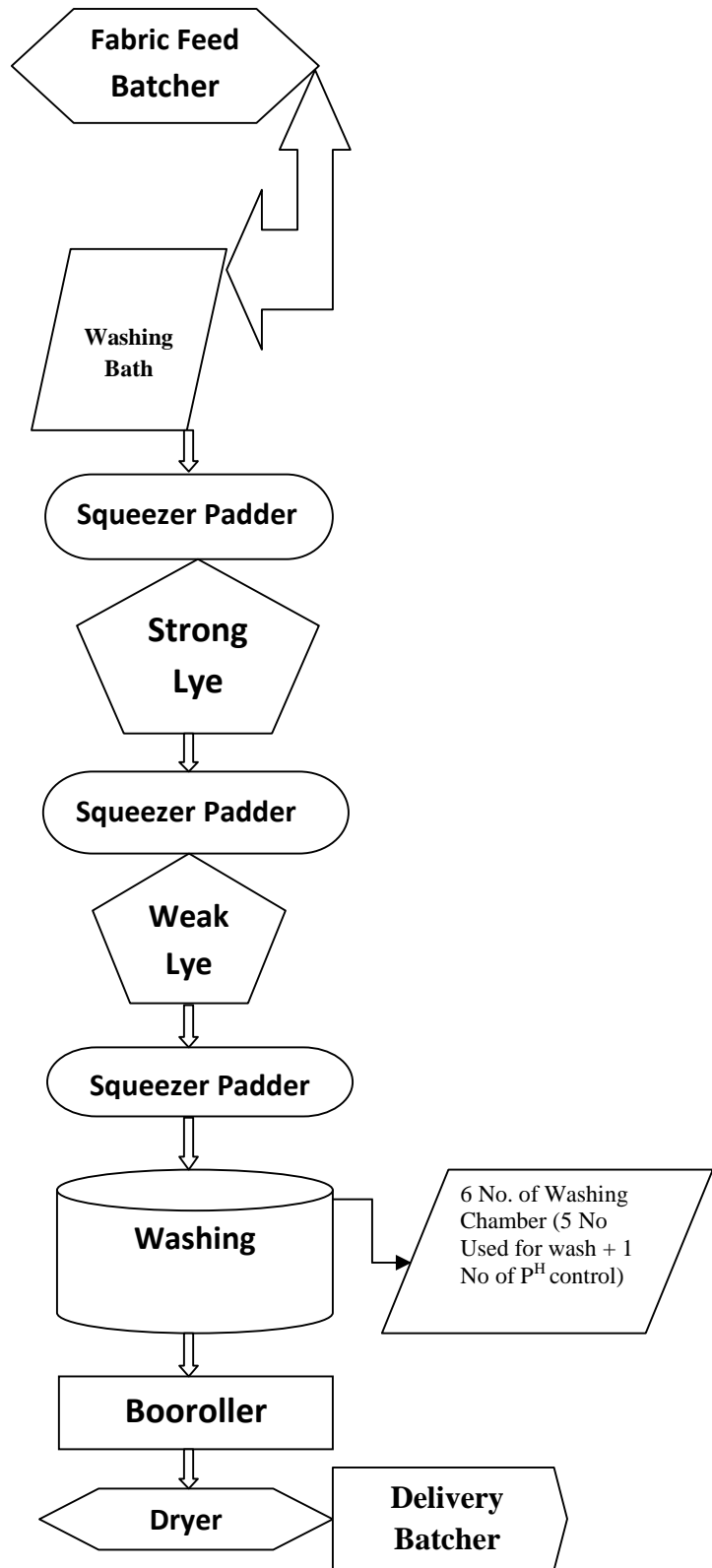




Fig: Mercerizing M/C

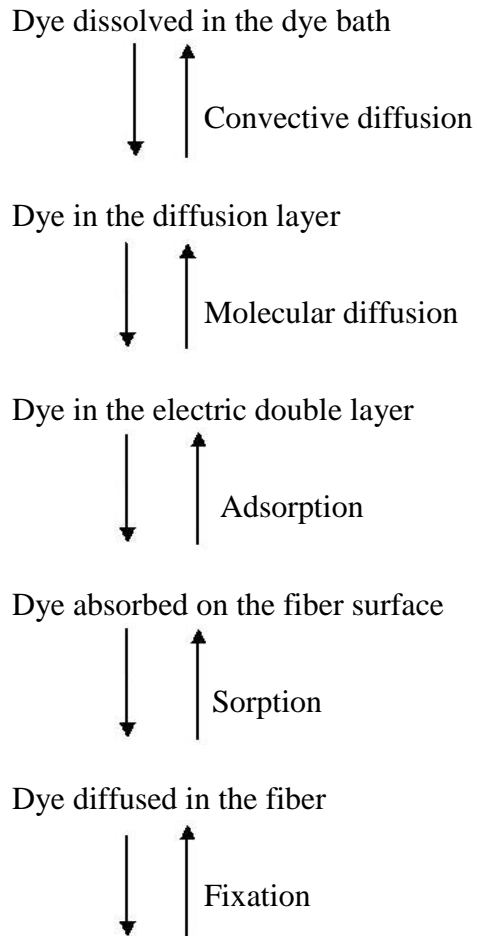
Mercerizing process fault:

- pH variation
- Crease
- Water drop mark
- Spot
- Problem from sigar
- Holes
- Distortion of dimensional stability

3.2 Dyeing Section

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

Dyeing Process sequence



Dye physically/ chemically bonded with the fiber

In Zaber & Zubair Fabrics Limited, **Continuous Dyeing Process** is used. Under dyeing department machines are used. They are-

- ✓ **THERMOSOL M/C**
- ✓ **PAD STEAM M/C**
- ✓ **COLD PAD BATCH (CPB) M/C**
- ✓ **JIGGER M/C**

3.2.1. List of Machineries

In Zaber & Zubair fabrics Limited, Home Dyeing machineries are –

<u>Machine Name</u>	<u>Machine Quantity</u>	<u>Capacity</u>	<u>Company</u>	<u>Origin</u>
THERMOSO L	02	40000	Monforts	Germany
PAD STEAM	03	25000	Goller/ Beninger/Bab cock	Germany
JIGGER	01	1000		China

3.2.2. Description of dyeing machines:

THERMOSOL MACHINE

Thermosol dyeing process proffers the mainly economical and expedient technique of dyeing cotton fabric with reactive and vat dyes, as is a continuous dyeing method which is applied mainly for the polyester/cotton blended materials. The water and energy consumptions are very low and addition of salt is reduced, thus depicting it extra eco-friendly and the dye fixation rate is at an elevated rate as well. The Thermosol dyeing is a trouble - free procedure as simple step concerned is the channel of textile fabric from side to side of the dye – bath.

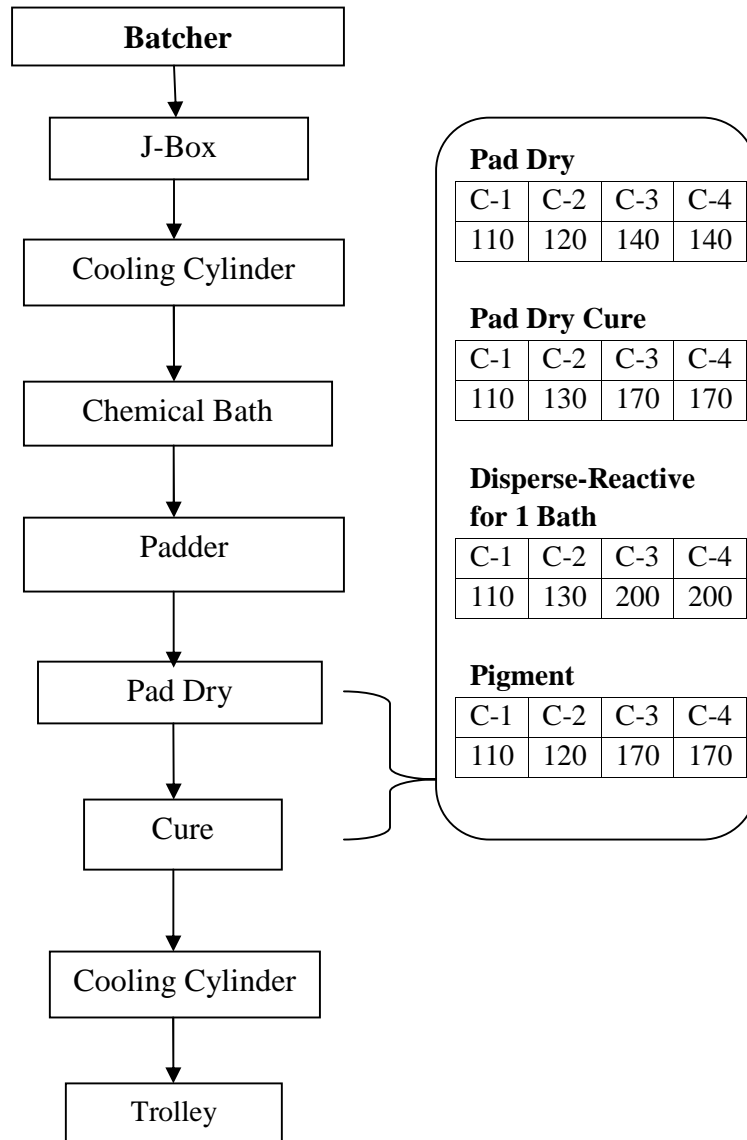


Figure: Thermosol Machine

M/C Specification:

- 01. Speed Meter
- 02. Padder Pressure
- 03. Infra Red (IR)1,2
- 04. Color Level Control
- 05. Chamber Temperature 1,2,3,4(Burners)
- 06. Circulation Fans
- 07. Cooling Cylinder

Thermosol Process Flowchart:



Recipes:

➤ Recipe for PDC(Pad Dry Cure) Process:

Dyes	As per Lab dip
Urea	200g/l
Soda Bi Carbonate(Na_2CO_3)	20g/l
Primasol V/Flolux AM(Anti Migrant)	20g/l
Primasol NF (Wetting Agent)	2g/l

➤ Recipe for PD(Pad Dry) Process:

Dyes	As per Lab Dip
Urea (If Required)	200g/l
Primasol V / Flolux AM (Anti Migrant)	20g/l
Primasol NF (Wetting Agent)	2g/l

Color Making Procedure for PAD DRY CURE (S.O.P) [Standard Optimization Procedure]:

- ✓ Take Water 50%
- ✓ Add Urea
- ✓ Add Primasol-V(Anti Migrant)
- ✓ Add Primasol- NF (W.Agent)
- ✓ Add Dyes
- ✓ Add Soda Bi Carbonate
- ✓ Add water to required level
- ✓ Stirrer for 10 minutes

Color Making Procedure for PAD DRY (S.O.P) [Standard Optimization Procedure]:

- ✓ Take Water 50%
- ✓ Add Urea [If Required]
- ✓ Add Primasol-V(Anti Migrant)
- ✓ Add Primasol- NF (W. Agent)
- ✓ Add Dyes
- ✓ Add water to required level
- ✓ Stirrer for 10 minutes

Test required during Thermosol operation

1. Pick up testing
2. Shade listing identification

Pick up testing: Before going to Thermosol machine, pick up of the fabric should be calculated and based on their result, liquor is prepared.

Shade listing identification: After each 1000 meter shade is tested in light box. Here listing problem is visualized and can be solved by increasing or decreasing padder pressure.

Test required after dyeing

- ✓ Shade Check / Design Check
- ✓ Rubbing Fastness
- ✓ Washing Fastness
- ✓ Water Fastness
- ✓ Perspiration
- ✓ pH Test

Thermosol Fault:

- Insects Spot
- Oil Spot
- Color Spot
- Drop Mark
- Crease Mark
- Foam Spot
- Fabric Hole
- Line Mark

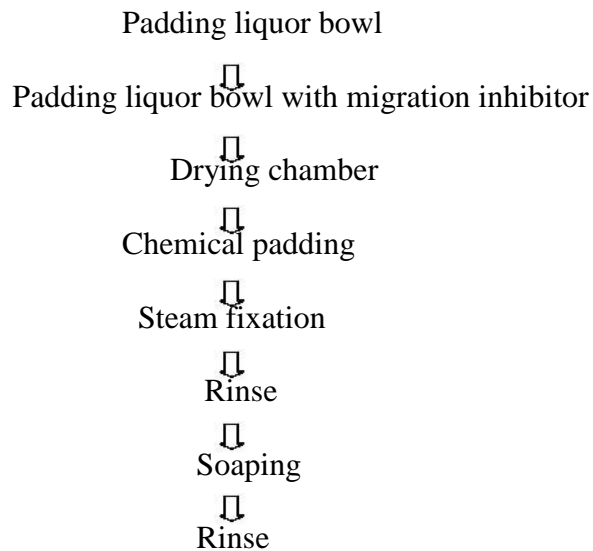
PAD STEAM MACHINE

Pad steam is the essential machine for developing color after thermosoling in CPS process. Generally the color which is applied on the fabric surface is fixed in this stage and provides required color shade. Here not only chemical padding is done but also application of color is also possible if required shade is not achieved. Stripping process is also done in this machine.



Figure: Pad Steam Machine

Pad Steam Process Sequence



Recipes:

- Recipe for CPS (Chemical Pad steam) Process

Glauber Salt (Na₂SO₄)	250 g/l
Soda Ash (Na₂CO₃)	20 g/l
Caustic Soda (NaOH)	6–8 g/l

- Recipe for R.C (Reduction Cleaning) Process

Sodium Hydro Sulfate / Hydrosulfite (Na₂S₂O₄)	40-50 g/l
Caustic Soda (NaOH)	30-40 g/l

N.B: It is used for P.C Fabric after Polyester dyeing with disperse

- Recipe for CPB (Chemical Pad Batch) Process

Glauber Salt (Na₂SO₄)	125 g/l
Soda Ash (Na₂CO₃)	10 g/l
Caustic Soda (NaOH)	6–8 g/l

N.B: It is used for conditioning dyeing

- Recipe for Stripping Process

Hydrosulfite (Na₂S₂O₄)	50 g/l
Caustic Soda (NaOH)	50g/l

3.2.3. Dyes List of Home Dyeing used in Zaber & Zubair Fabrics Ltd.

DYES
Bezaktive Navy SLF
Drim. Black CLS
Drim. Red HF-3B
Drim. Turquoise CL-B
Drimarine Deep Red HF-4B
Levafix Yellow CA
Levafix Red CA
Remazol Blue RGB
Remazol Navy RG-B
Remazol Turquoise Blue G.133
Remazol ULTRA Carmine RGB
Remazol ULTRA Orange RGB

3.2.4. Production Calculation:

From Running Production get

Fabric Cons.: 30 X 30 / 76 X 68

Fabric Quantity: 5000m

Fabric width: 117"

$$\begin{aligned} \text{Pick Up \%} &= \frac{\text{Wet Weight after Padding} - \text{Air Dry Weight}}{\text{Air Dry Weight}} \times 100 \\ &= \frac{198 - 120}{120} \times 100 \\ &= 65\% \end{aligned}$$

GSM = 120g

$$\begin{aligned} \text{GLM} &= \frac{\text{GSM} \times \text{Fabric width}}{39.37} \\ &= \frac{120 \times 117''}{39.37} \\ &= 356 \end{aligned}$$

$$\begin{aligned} \text{Liquor Required} &= \frac{\text{GLM} \times \text{Fabric Quantity} \times \text{Pick Up \%}}{1000} \\ &= \frac{356 \times 5000 \times 60\%}{1000} \\ &= 1068 \text{ Ltr.} \end{aligned}$$

3.2.5. Production Parameters:

THERMOSOL

FOR ALL DVALA SHADES (PAD DRY CURE)

Const.	GSM	Dyes	Speed m/m	Padder Pressure N/mm	IR-1 OR IR-2	Color Level	Chamber-1		Chamber-2		Chamber-3		Chamber-4		Cooling Cylinder
							Temp C°	Circulation	Temp C°	Circulation	Temp C°	Circulation	Temp C°	Circulation	
SET POINT	120gm	REACTIVE	40 m/m	25 36 30	750	350	110	35%	130	45%	170	65%	170	75%	ON
30x30/76x68 Cotton	120gm	REACTIVE	35-50 m/m	25 33 29 TO 25 36 39	650 TO 850	300 MM	100 -120	35%-45%	120 -140	40%-55%	160 -180	55%-75%	160 -180	55%-75%	ON

FOR ALL DVALA SHADES (PAD DRY)

Const.	GSM	Dyes	Speed m/m	Padder Pressure	IR-1 OR IR-2	Color Level	Chamber-1		Chamber-2		Chamber-3		Chamber-4		Cooling Cylinder
							Temp C°	Circulation	Temp C°	Circulation	Temp C°	Circulation	Temp C°	Circulation	
SET POINT	120gm	REACTIVE	40 m/m	25 36 30	750	350	110	35%	120	40%	140	55%	150	50%	ON
30x30/76x68 Cotton	120gm	REACTIVE	35-50 m/m	25 36 25 TO 25 36 35	650 TO 800	300 MM	100 -120	35%-45%	115 -125	40%-55%	130 -145	45%-65%	130 -145	45%-65%	ON

- ⇒ CHECK FRONT & BACK CONTINUOUSLY
- ⇒ CHECK LISTING AFTER EVERY 500 METER
- ⇒ CONTINUE CHECK COLOR LEVEL
- ⇒ MAINTAIN TEMPARATURE AS PER REQUIRMENT
- ⇒ SHADE SHOULD BE CHECK AFTER EVERY 1000 METER

PAD STEAM

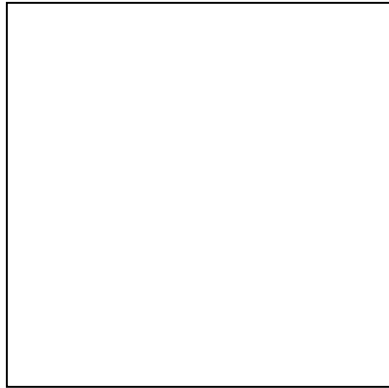
CHEMICAL PAD STEAM

Const.	GSM	Speed m/m	Padder Pressure N/mm	Color Level	Steaming Temp.	Chamber-1 Temp.	Chamber-2 Temp.	Chamber-3 Temp.	Chamber-4 Temp.	Chamber-5 Temp.	Chamber-6 Temp.	Chamber-7 Temp.	Chamber-8 Temp.	Chamber-9 Temp.	pH	Cylinder Dryer	
SET POINT		40	35 - 30 - 35	300	102	40	95	95	95	95	95	95	95	40	4		
20x20/104x5 2 doby	198gm	30 - 50	30 - 25 - 30 to 40 - 35 - 40	280 - 320	95 - 105° C	30 - 50° c	85 - 99° c	85 - 99° C	85 - 99° C	85 - 99° C	85 - 99° C	85 - 99° C	85 - 99° C	85 - 99° C	40-60° C	3.5 - 4.5	FULL DRY

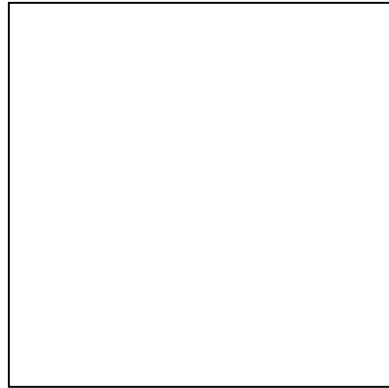
CHEMICAL PAD BATCH

Const.	GSM	Speed m/mm	Padder Pressure	Trough Level	Winder	Rotation Time
SET POINT	120gm	40	3.5 - 3.0 - 3.5	300	UP SIDE	10 hrs
30x30/76x68 COTTON	120gm	30-50	3.5 - 3.0 - 3.5	300 MM	UP SIDE	8-12 hrs

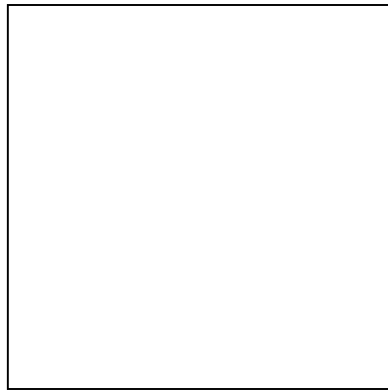
3.2.6. Dyed Samples:



100% Cotton Poplin
30x30/76x68



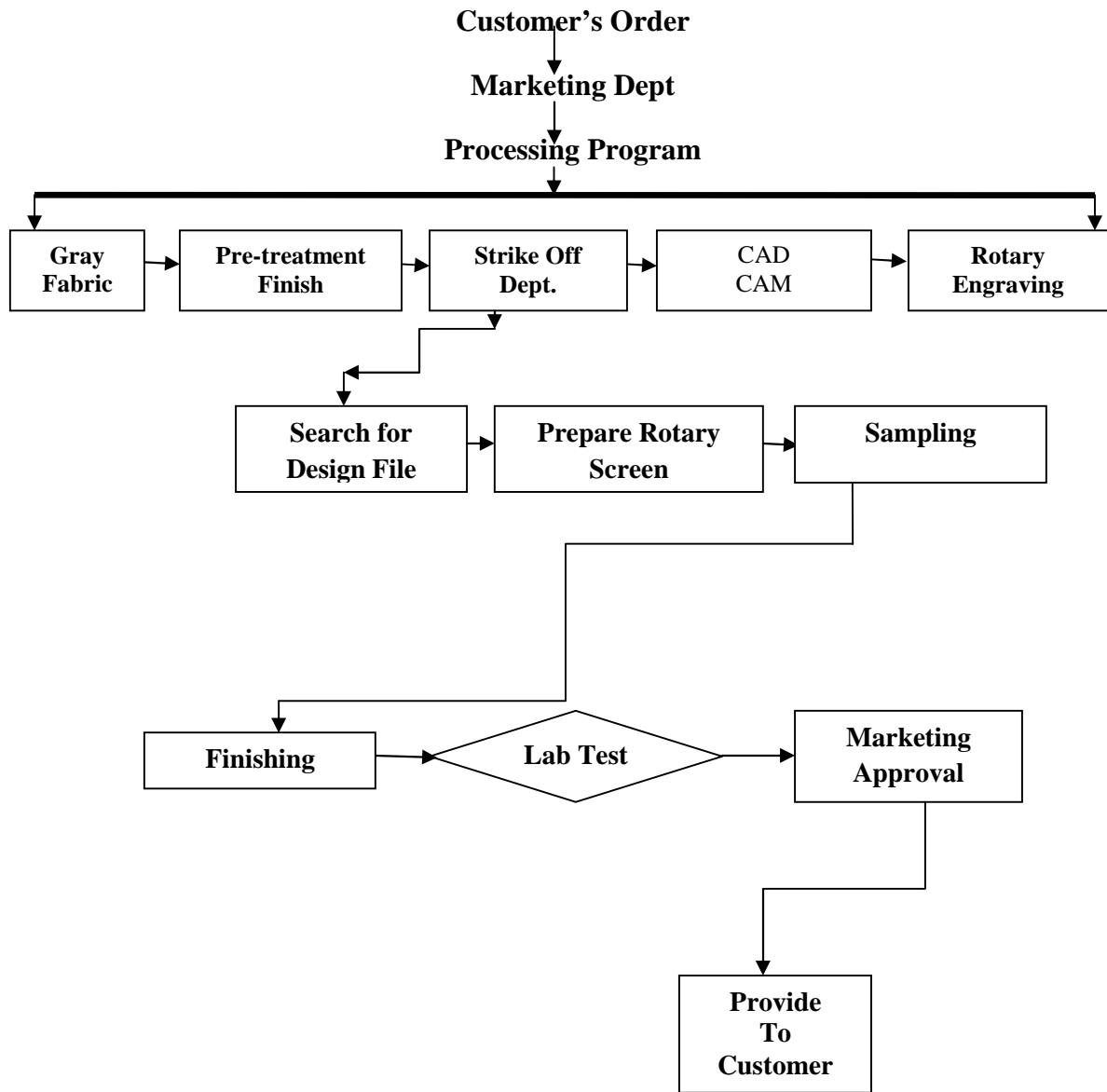
100% Cotton Poplin
30x30/76x56



100% Cotton Poplin
30x30/131x65

3.3 Printing Section

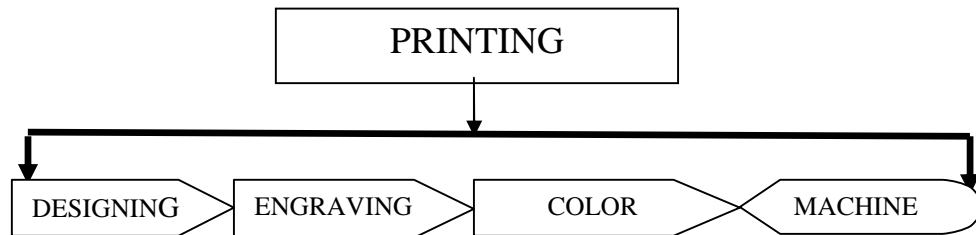
3.3.1. Follow –Up Chart



Textile printing is the process of applying color to fabric in definite patterns or designs. Sometimes it is called localized dyeing.

To produce various designs on the fabric with a motif or motives in one or more colors one kind of localized dyeing that is pigments or a dye are applied locally or discontinuously is known as textile printing.

Simply we can say that applying color on fabric by a process for produce a design is terms as textile printing. Only fabric is printed by **Textile Printing**. It is a value added process to the end product.



3.3.2. Designing:

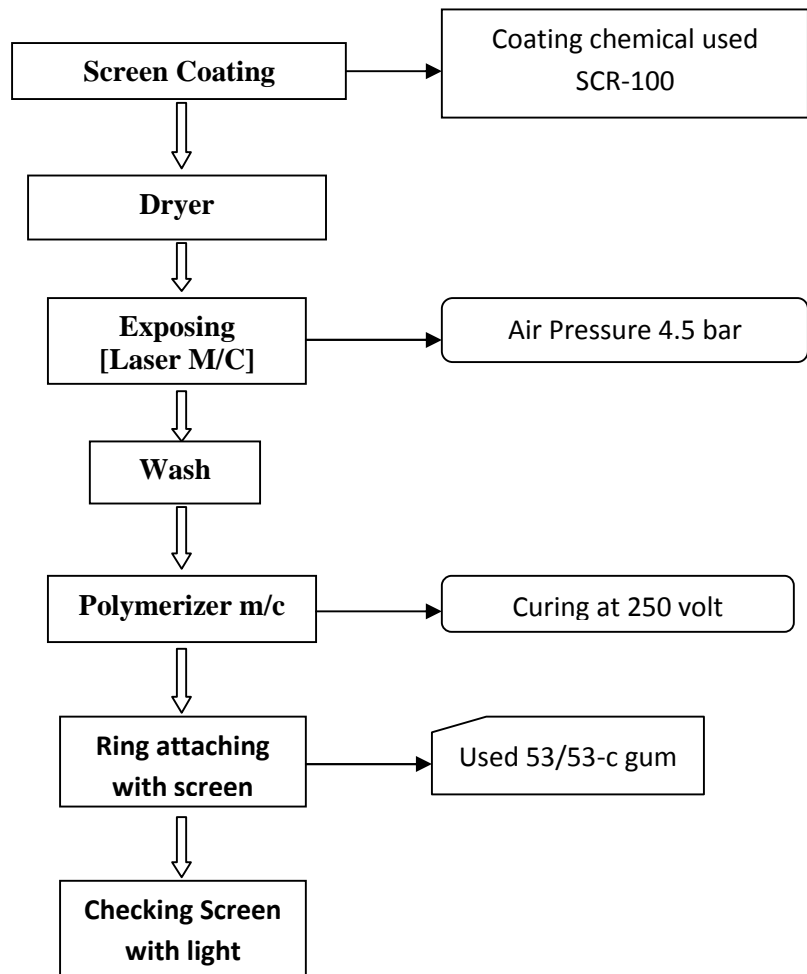
This Company used Ramsete-III (Version 9.05) Software for designing. Design created by measuring repeat.

Here three types repeat of screen used

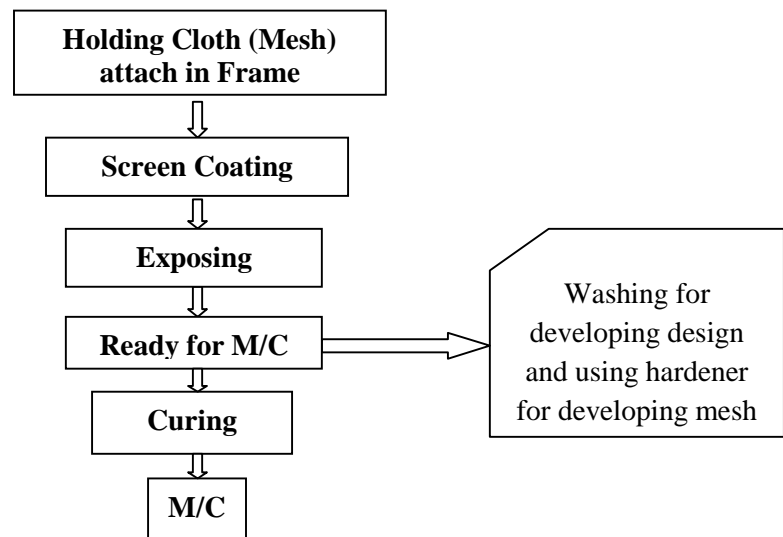
- i. 64cm / 640mm
 - ii. 91cm / 910mm
 - iii. 82cm / 820mm
- } Screen Dia Size

3.3.3. Engraving:

➤ Rotary Engraving:



➤ Flat Bed Engraving:



3.3.4. Color:

In this factory 2 types of printing runs-

- PIGMENT PRINT
- REACTIVE PRINT

Print paste need to make before creating color

For Pigment paste recipe:

1. L. AMONIA	=> 1%	= 10 kg
2. BAINDER 707 / BAINDER 77	=> 10%	= 100 kg
3. ENTISHUMAR	=> 0.1%	= 1 kg
4. DYMATHIC DM	=> 2%	= 20 kg
5. UREA	=> 3%	= 30 kg
6. WATER		= 839 kg

Total = 1000 kg

For Reactive paste recipe:

⇒ Reactive Paste With Algenate

1. ALGENATE GUM	=> 30%
2. UREA	=> 15%
3. SODIUM BI CARBONATE	=> 5%
4. REVATOL SP	=> 3%

⇒ Reactive Paste With RTBC

1. LUTXEL (RTBC)	=> 10%
2. UREA	=> 15%
3. SODIUM BI CARBONATE	=> 5%
4. REVATOL SP	=> 3%

Printing Procedure Sequence- (Rotary)

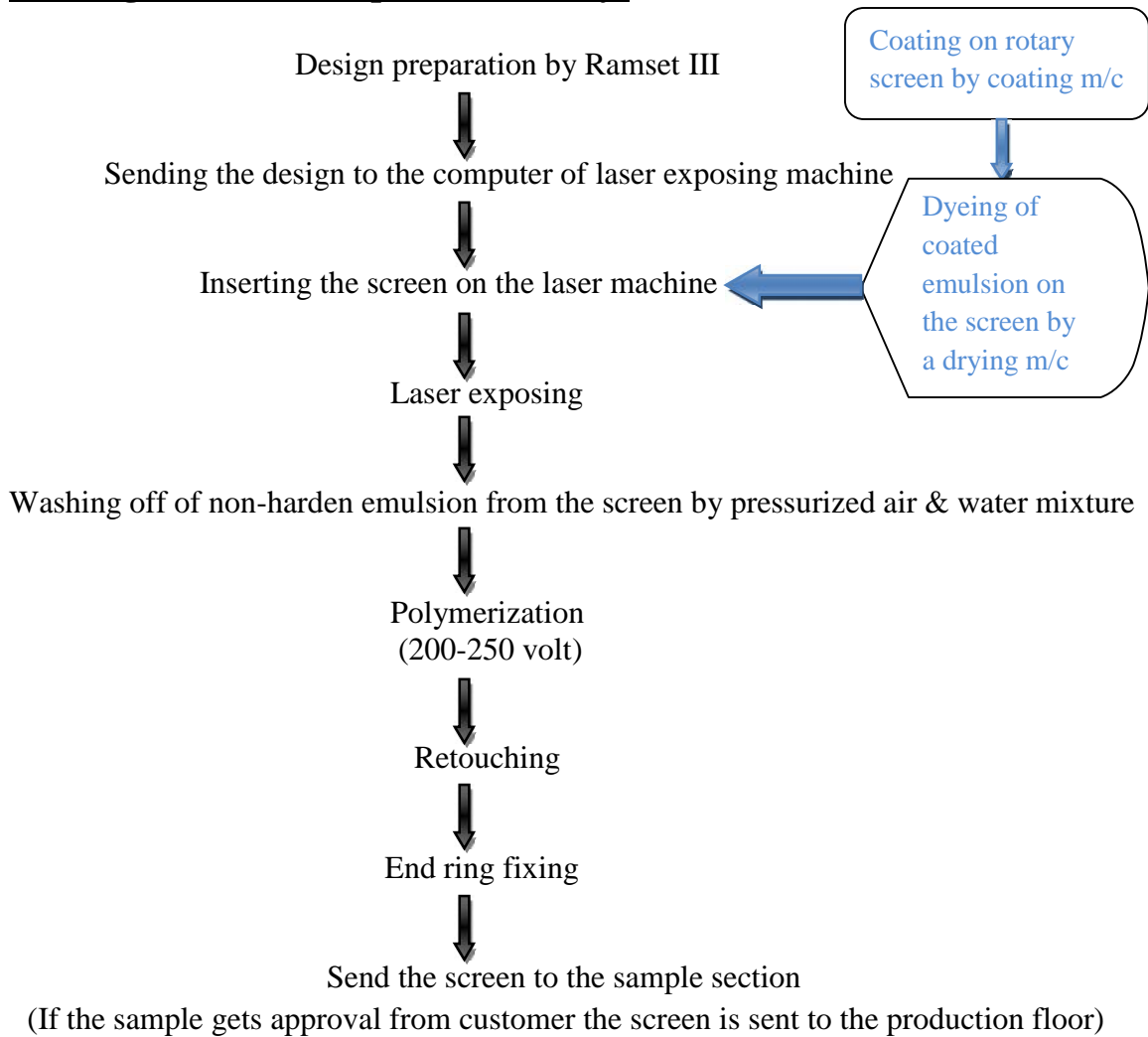


Fig: Rotary Screen Printing M/C

Printing Procedure Sequence- (Flatbed)

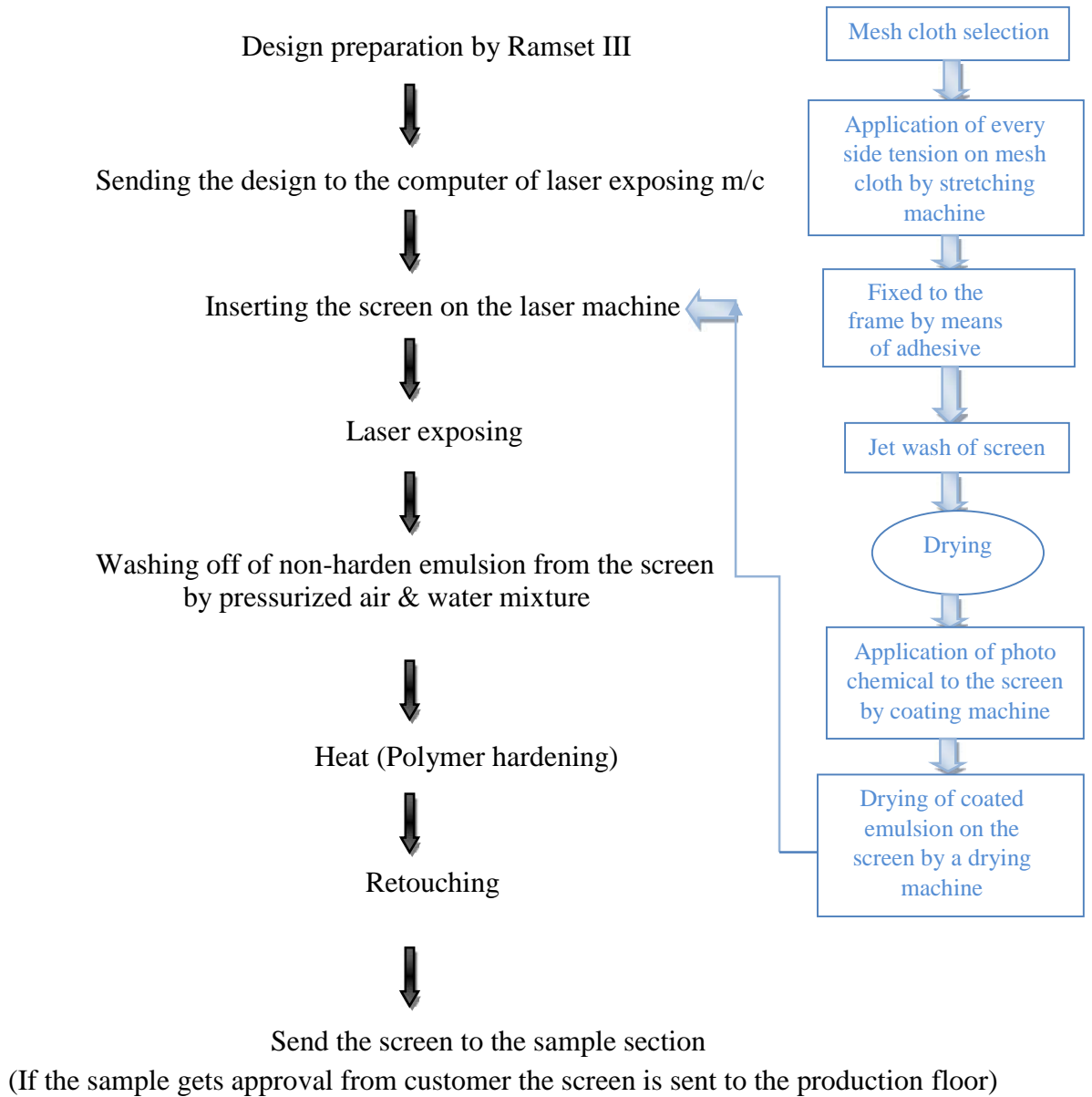


Figure: Flat bed Machine

Sequence of pigment and reactive printing:

PIGMENT PRINTING

Printing



Curing



Finishing



Folding

REACTIVE PRINTING

Printing



Steaming



Washing



Finishing



Curing



Calendaring



Folding

3.3.5. Machine

#Specification of this m/c:

In Zaber & Zubair Fabrics Ltd, there are 2 types of printing machines. They are –

- Rotary printing machine
- Flatbed printing machine

List of printing machineries: Total 5 machines

<u>M/C Name</u>	<u>No. of M/C</u>	<u>Company</u>	<u>Country</u>	<u>Daily Production</u>	<u>Highest number of Screen</u>
Printing Machine (Rotary)	01	Zimmer	Austria	45,000m	12
Printing Machine (Rotary)	02	Zimmer	Austria	45,000m	16
Printing Machine (Rotary)	03	Zimmer	Austria	45,000m	12
Printing Machine (Rotary)	04	Zimmer	Austria	45,000m	09
Printing Machine (Flat Bed)	05	Zimmer	Austria	15,000m	09

Main unit of printing machine:

- ⇒ Tension roller
- ⇒ Guider
- ⇒ Pressure roller
- ⇒ Blanket
- ⇒ Glue tray
- ⇒ Washer
- ⇒ Brush
- ⇒ Screen unit
- ⇒ Rod
- ⇒ Magnet
- ⇒ Conveyor
- ⇒ Curing unit
- ⇒ Plaiter

Function of main unit of printing m/c:

- **Tension roller:** Control tension of the fabric.
- **Guider:** Control fabric direction.
- **Pressure roller:** Fabric pressing on the blanket surface as it 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:** Glue solution is supplied from the glue tray.
- **Washer:** Residual paste on 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).
- **Rod:** Rod size used 8, 10, 12, 14, 16 mm.
- **Magnet:** Magnet pressure follows at 85-100 bar.
- **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.

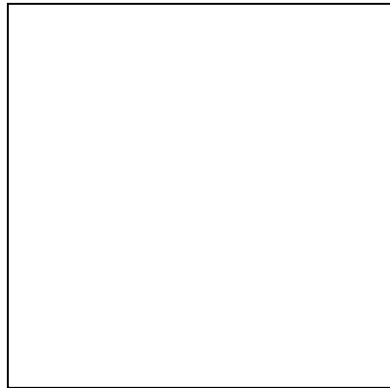
❖ **Printing Fault:**

- ⇒ PRINT OUT
- ⇒ COLOR SPOT
- ⇒ SCREEN PROBLEM
- ⇒ LINE MARK
- ⇒ REFIT SPOT
- ⇒ FABRICS HOLL

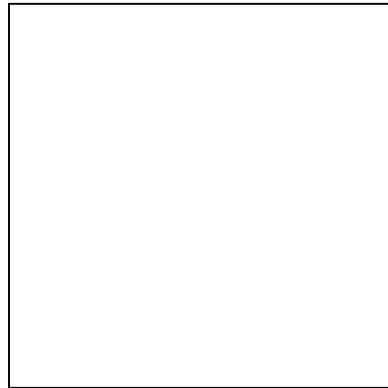
❖ **Critical To Quality List (C.T.Q):**

- ✓ Temp : If increase or decrease can damage the fabric / shade
- ✓ Pressure : Change of Pressure can change the shade
- ✓ Speed : Change of speed can change the shade
- ✓ Rods : Change of Rods can change the shade

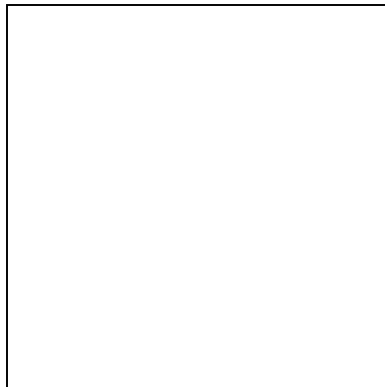
3.3.6. Printed Sample:



Reactive Printing
40/76x68



Pigment Printing
40/130x70



Pigment Printing
30/76x68

3.4 Finishing Section

Textile finishing is the term used for a series of processes to which all bleached, dyed, printed and certain grey fabrics are subjected before they put on the market. The object of textile finishing is to render textile goods fit for their purpose or end-use and/or improve serviceability of the fabric.

Finishing of fabric is carried out for both aesthetic and functional purposes to improve the quality and look of a fabric. Fabric may receive considerable added value by applying one or more finishing processes.

The finishing process may be classified into two main classes:

Physical finish.

Chemical finish.

The physical or mechanical processes range from simple drying over steam- heated cylinders, or on a stenter which both dries stretches the cloth, to a complicated series of calendaring.

Chemical finishes indicate the application or deposition of chemical compounds on fabrics to improve the appearance the chemical finishing is performed by treatment with starch, dextrin, glue, gums, china clay, Epsom-salt, glycerol, soaps, & soluble oils, for stiffening, weighting, & softening, as required.

The compounds used in finishing may be classified as follows:

Long-chain fatty compounds

Synthetic resins

Cellulose derivatives

Quaternary ammonium compounds.

The finishing can also be divided into temporary & permanent. A finish can only be considered permanent if it remains unaffected through all the conditions of wear& treatment to which a fabric may be subjected during its life.

Finishing section of **Zaber and Zubair Fabrics Ltd** contains the following machineries-

Curing Machine

Stenter Machine

Sanforize Machine

Calendar Machine

3.4.1. 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 100-130°c for 6-7 mints. As a result high concentration of the dye is rapidly transferred into the fabric from the thickener film.



Fig: Curing Machine

In Zaber & Zubair fabrics Limited, Curing machineries are –

Machine Name	Machine Quantity	Company Name	Origin / Made By
Curing M/C	03	Arioli	Germany
Curing M/C	02	Noor	Pakistan
Curing M/C	01	Stork	Germany

3.4.1. STENTER MACHINE

Stenter machine is the most versatile machine in the finishing section of processing department. Several operations can be carried out in this machine, such as -

- 1) Application of finishing chemicals
- 2) Control of shrinkage
- 3) Fabric width control
- 4) Drying
- 5) Application of dyes
- 6) To control bowing of fabric
- 7) To control skewness of fabric
- 8) Curing etc.



Fig: Stenter Machine

In Zaber & Zubair fabrics Limited, Stenter machineries are –

Machine Name	Machine Quantity	Company Name	Origin / Made By
Stenter M/C	04	Babcock	Germany
Stenter M/C	02	Sunsuper	South Korea
Stenter M/C	06	Monforts	Germany

➤ **Machine Parameter:**

EQUALIZING FOR MERCERIZE & DYEING

Const.	GSM	Speed m/m	Padder Pressure	Over Feed	Chamber-1 Temp.	Chamber- 2 Temp.	Chamber- 3 Temp.	Chamber- 4 Temp.	Chamber-5 Temp.	Chamber-6 Temp.	Chamber-7 Temp.	Chamber-8 Temp.	Cool Air
SET POINT	120 gm	65 m/m	2.5 bar	1.50%	190	190	190	190	190	190	190	190	ON
30x30/76x6 8 COTTON	120gm	50-80 m/m	2.5-4 bar	1-1.5%	180 TO 210	180 TO 210	180 TO 210	180 TO 210	180 TO 210	180 TO 210	180 TO 210	180 TO 210	ON

FINISHING

QUALITY	GSM	FINISH TYPE	SPEED m/m	PADDER PRESSURE	OVER FEED	CHAMB ER-1 TEMP	CHAMB ER-2 TEMP	CHAMB ER-3 TEMP	CHAMB ER-4 TEMP	CHAMB ER-5 TEMP	CHAMB ER-6 TEMP	CHAMB ER-7 TEMP	CHAMB ER-8 TEMP	EXHAUST
SET POINT	120	RESIN	45 m/m	3 Bar	MAXIMUM	170	175	175	175	175	175	175	175	70%
30x30/76 x68 COTTON	120	RESIN	35-55 m/m	2.5-4 Bar	MAXIMUM	160- 190°C Circulation n 80%- 90%	170- 190°C Circulation n 80%- 90%	170- 190°C Circulation n 80%- 90%	170- 190°C Circulation n 80%- 90%	170- 190°C Circulation n 80%- 90%	170- 190°C Circulation n 80%- 90%	170- 190°C Circulation n 80%- 90%	170- 190°C Circulation 80%-90%	60-70%

❖ SKEW / BOW MUST BE UNDER 3%

➤ **Controlling point:**

- Over feeding
- Temperature for each chamber
- Speed of fabric
- Chemical used for finishing
- P^H of chemical liquor.

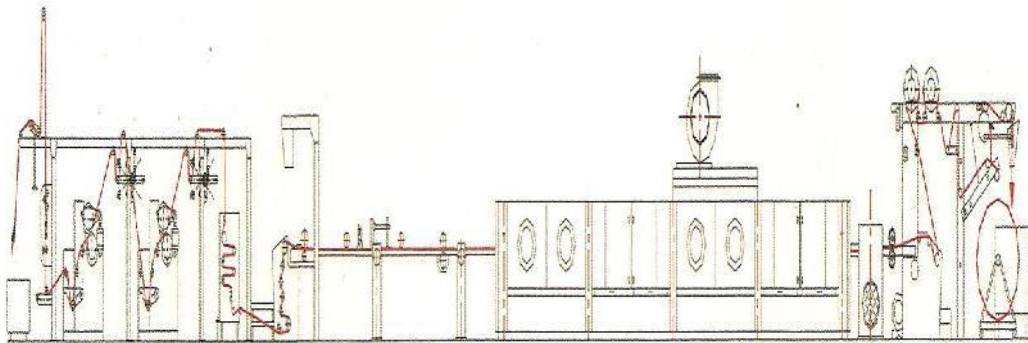


Figure: Line diagram of Stenter machine

Recipe for finishing (pigment print)

Arco fix NETLF	= 40g/l
Catalyst (MgCl ₂)	= 10g/l
Solo soft UP	= 15g/l
MRN	= 01g/l
Acetic acid	= 0.3g/l
Temperature	= 180°c
Speed	= 60m/min

Recipe for finishing (Rective print)

<input type="checkbox"/> Arco fix NZK	= 70g/l
<input type="checkbox"/> Ceranine	= 20g/l
<input type="checkbox"/> Siligen SIS	=10g/l
<input type="checkbox"/> Ceralob PHD	=20g/l
<input type="checkbox"/> Urea	= 10g/l
<input type="checkbox"/> Acetic acid	=0.8g/l
<input type="checkbox"/> Temperature	= 180°c
<input type="checkbox"/> Speed	= 50m/min

➤ **Chemical used in Stenter machine**

Chemicals	Function
ALBAFIX R	Fixer
ACETIC ACID	pH controller
ALBATEX ECO	-
ALBAFLOW PAD	Wetting agent
CERALUBE PHD LIQ C	-
SOLUSOFT NWA	Softening agent
SOLUSOFT TOW	Softening agent
TURPEX ACN NEW	Soft + Tear improver
ULTRATEX FMI	Softening agent
SILIGEN SOFTENER FFUK	Silicone finish
SAPAMINE CSN	Softening agent
SAPAMINE SFC	Softening agent
UREA	-
BINDER 707	Rubbing fastness improver
V A A	Paper Touch
SIRRIX NE PK	-
TEXBOND FA	-

➤ **Main units of stenter machine**

- Feed roller
- J-Box
- Guide roller
- Padder
- Mahlo
- Over feed roller
- Under feed roller
- Heating chamber (burner)
- Width control device (width sensor)
- Selvedge control device
- Exhaust fan
- Blower
- Delivery roller (tension roller)

➤ **Critical to Quality (CTQ) list of stenter machine**

- 1) Speed meter
- 2) Mahlo
- 3) Tough level control
- 4) Padder pressure
- 5) PIV roller (over feed)
- 6) Chamber temperature
- 7) Exhaust fan

3.4.2. CALENDARING MACHINE

Calendaring is a mechanical finishing process. Calendaring is an operation to improve fabric aesthetics. In this process fabric passes between vertically heavily loaded rollers and with the help of heat & pressure; some properties of fabric e.g. luster, smoothness, brightness etc. are generated on the fabric surface.

Objects of calendaring

1. To upgrade the fabric hand and to impart a smooth, silky touch to the fabric.
2. To compress the fabric and reduce its thickness.
3. To improve the opacity of the fabric.
4. To reduce the air permeability of the fabric by changing its porosity.
5. To impart different degree of luster to the fabric.
6. To reduce the yarn slippage.



Figure: Calendaring Machine

In Zaber & Zubair fabrics Limited, Calendar machineries are –

Machine Name	Machine Quantity	Company Name	Origin / Made By
Calendar M/C	01	Ramisch	Italy
Calendar M/C	02	Kuster	Germany

➤ **Machine parameter**

No of roller-	03
a. Steel roller	
b. Rubber roller	
c. Cotton roller	
Roller pressure-	25-30 mbar
Roller temperature-	90°C
	85-90
Speed-	m/min

➤ **Controlling point**

Roller pressure
Steam pressure
Roller temperature
Fabric speed
No. of roller

3.4.3. SANFORIZING MACHINE

This machine has a larger size cylinder or drum. In this process the fabric is treated with a tight condition on the contact of larger cylinder with the help of a hot shoe and an endless woolen blanket and thus giving the fabric an anti-shrinkage treatment by a proper sanforizing range.

It is a mechanical finishing process which removes the tendency of shrink from the fabric. Sanforizing process is used to create shrinkage on the fabric by a rotating elastic felt blanket which is curved tightly around a small diameter shaft. When a thick blanket is passed on this shaft, the outer surface of this blanket is expanded and after passing the shaft it compresses and reverses to its original shape. If a piece of cotton cloth is passed tightly with the surface of the blanket, it is found that the cloth is longer than the blanket while passing the shaft and as a result, the cloth compresses in order to conform the compressed surface of the blanket just after passing the shaft by rearrangement of the yarns.

Mainly sanforizing machine has 3 functions. Such as-

- ⇒ Shrinkage control
- ⇒ Hand feel
- ⇒ GSM control



Figure: Sanforizing Machine

In Zaber & Zubair fabrics Limited, Sanforizing machineries are –

Machine Name	Machine Quantity	Company Name	Origin / Made By
Sanforizing M/C	01	Monforts	Germany
Sanforizing M/C	01	Tepa	Italy

➤ **Machine parameter**

- Pressure of rubber blanket 2-2.5
- Steam pressure 2-3
- Hot shoe
- Clip expander roller
- Endless woolen blanket
- Skyer
- Hot cylinder
- Water spraying unit.

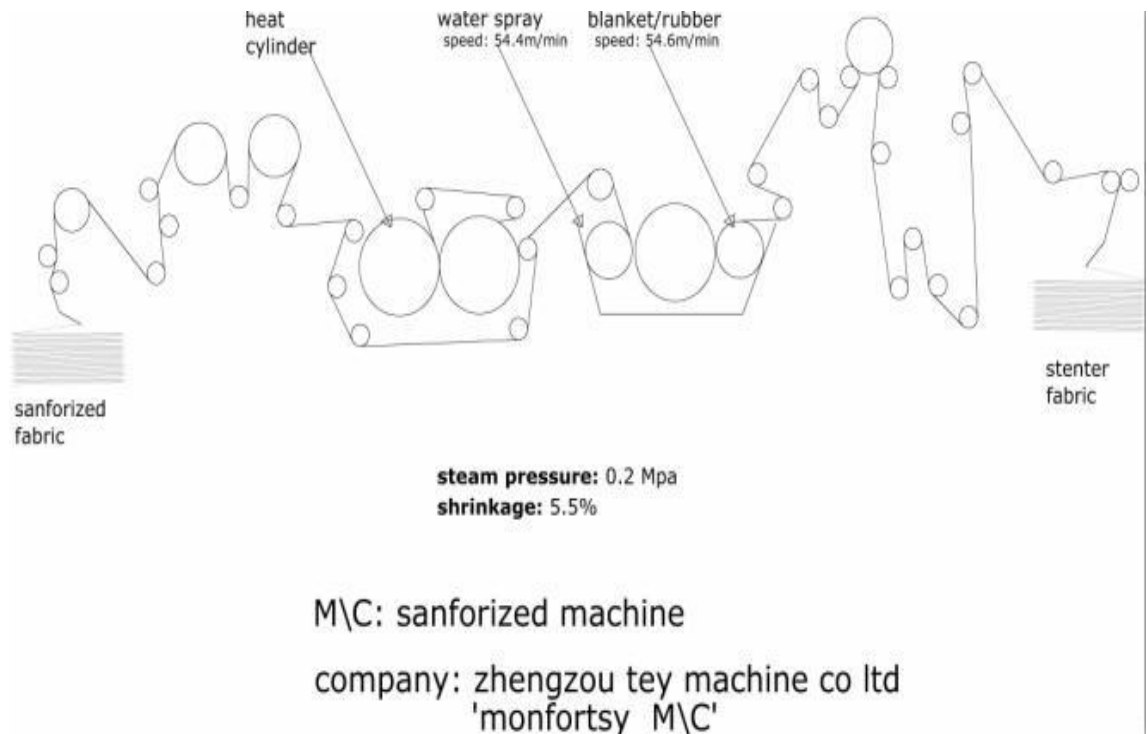


Figure: Line diagram of Sanforizing Machine

❖ **Main units of sanforizing machine**

Rubber blanket
Hot shoe
Clip expander roller
Endless woolen blanket
Skier
Hot cylinder
Water spraying unit

➤ **Controlling point**

Pressure of rubber blanket.
Steam pressure
Fabric speed
Speed of endless woolen blanket
Width of clip expander roller

3.5 Lab & QC Section

The quality department is assigned to maintain consistently uniform quality of the material in process & various stage of its manufacturing.

In Zaber & Zubair Fabrics Ltd quality is controlled in the following way-

- Off line
- On line
- Color pilot plan (Lab dip)

3.5.1. Off line

- Color fastness to rubbing
- Color fastness to washing
- Color fastness to light
- Perspiration test (Acid & Alkali)
- Pilling test
- Tear strength
- Tensile strength
- Dimensional stability
- Fabric analysis (Count, EPI, PPI, GSM, Blend test)
- Abrasion test
- Chemical purity test

3.5.2. On line

- Pick up check
- Size check
- Titration
- Whiteness
- Absorbency
- Drop method
- Wicking method
- Core pH
- Shade continuity of running dyed fabric
- Dye liquor pH check
- Fastness properties of running printing fabric
- Chemical purity test
- Water hardness test

3.5.3. Lab Dip

Lab-dip Submission

- 1) Lab dip request received from marketing
- 2) Registration
- 3) Assign to technician
- 4) Preparation of recipe and others
- 5) Prepare solution
- 6) Pad with solution
- 7) Dry and cure
- 8) Wash and dry
- 9) Shade assessment in light box with provided swatch
- 10) Shade assessment in data color if needed
- 11) If shade match proceed to the following. (if not matched, then trial again with correction recipe)
- 12) Submission to the marketing section or buyer
- 13) Received approval from marketing section or buyer
- 14) Recipe submit to the production floor when shade is approved
- 15) Record keeping

Lab-dip approval procedure

- 1) Prepare three options (A, B & C) of given shade and paste it in folder.
- 2) Send a copy to customer/buyer and concern person of marketing department and keep one copy in the folder for record.
- 3) Concern person of marketing department send an approval and rejection of lab dips.
- 4) If shade approved then send recipe of approved option (A, B or C) to dyeing department.
- 5) If shade is rejected, again work on it according to customer's comments.
- 6) Color matching in charge is responsible for lab-dip approval.

↩ Lab dip preparation process

Reactive Dyeing

Process CPS (Chemical-Pad-Steam)



Table: Alkali requisition for CPS process

Shade	Light	Dark
Caustic soda (NaOH)	2 g/l	6 g/l
Soda ash (Na ₂ CO ₃)	10 g/l	10 g/l

Process CPB (Cold-Pad-Batch)

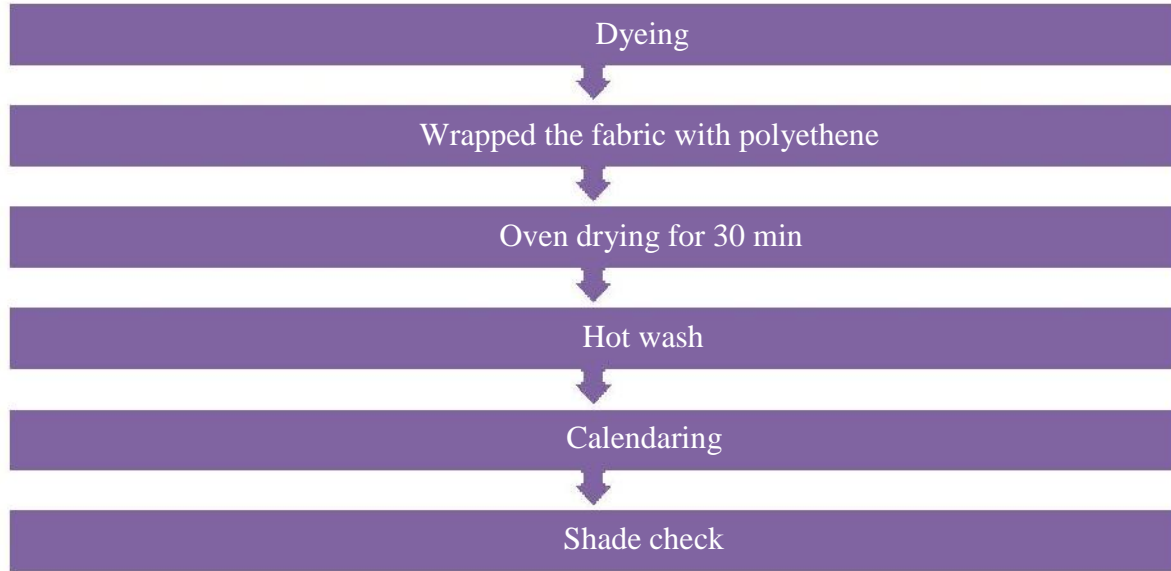


Table: Alkali requisition for CPB process

Shade	Light	Medium	Dark
Sodium silicate (48°Be)	30 g/l	45 g/l	60 g/l
Caustic soda (38°Be)	6 g/l	12 g/l	16 g/l

3.5.4. Lab Tests

- 1) Yarn count (ISO 7211-5)
- 2) Fabric weight[gm/sqm] (ISO 3801)
- 3) Tear strength (ISO 13937-1)
- 4) Seam slippage (ISO 13936-2)
- 5) Tensile strength (ISO 13934-2)
- 6) Dimensional stability (ISO 6330 2A)
- 7) Abrasion resistance (ISO 12947-2)
- 8) Color fastness to washing and laundering (ISO 105 C06)
- 9) Color fastness to rubbing (ISO 105 X12)
- 10) Color fastness to perspiration (ISO 105 E04)
- 11) Color fastness to light (ISO 105 B02)
- 12) pH (DIN EN 1413)
- 13) Fiber content

3.5.5. Description of some of the Lab tests

Yarn count (ISO 7211-5)

Purpose: To determine the yarn count of the fabric.

Apparatus: Scale, Scissor, Weight balance.

Procedure:

1. Ten (10) yarns from warp direction is unrove from the fabric
2. The length of yarns are measured without crimp by a scale
3. Weight of the yarns are taken by electric balance
4. Then count is calculated by the following formula

$$\text{Count} = \frac{\text{No. of Yarn} \times \text{Length in inch} \times 0.0059}{\text{Weight of yarns in gm}}$$

5. Similar procedure is done to determine the weft yarn count

Fabric weight [gm/sqm] (ISO 3801)

Purpose: To determine the GSM of the fabric.

Apparatus: GSM cutter, Weight balance.

Procedure for measuring GSM:

1. GSM cutter is used which is circular in shape having a diameter of 11.2 cm
2. Fabric is placed over a plain surface pad and cut by GSM cutter
3. Then the weight of the fabric is taken by weight balance
4. From the electric balance GSM can be found directly or the weight in gm is multiplied by 100 gives the GSM of the fabric.

Tear Strength (ISO 13937-1)

Purpose: To assess the tear strength of the fabrics.

Apparatus: Digital Tear Tester

Specimen:

For weft tear strength: 58 mm in warp direction
 80 mm in weft direction

For warp tear strength: 58 mm in weft direction
 80 mm in warp direction

Procedure:

1. Clamp a test specimen in the jaws so that 80 mm side of specimen with trimmed edge is parallel to the base and 58 mm side of the specimen is at right angles to the base.
2. Mark the cut in the specimen.
3. Set the pointer to the starting point.
4. Depress the pendulum stop to release the pendulum, allow the pendulum to sewing a full cycle before releasing stop.
5. Read off and record the position of the pointer on the scale.

Result: Result is taken and converts it to grams.

Tensile Strength (ISO 13934-2)

Purpose: To assess the tensile strength of woven fabric.

Apparatus: Titan strength tester.

Procedure:

1. Initial separation between the top and bottom jaw is 200 mm.
2. Ensure the testing equipment is set up exactly as described and calibrated according to the manufacturing instruction.
3. Movement started when mount a specimen centrally and vertically in the jaw ensuring the jaw have no tension applied.
4. Set the machine in motion and measure the load required to break the specimen.

Result: Report the load in lbs.

Color Fastness to Washing and laundering (ISO 105 C06)

Purpose: To assess the color fastness to washing and laundering.

Apparatus: Gyro wash, Grey scale.

Sample size: Dyed sample - 10cm X 4 cm
Multifibre - 10cm X 4 cm

Recipe:

Soap- 5 g/l
Sodium carbonate – 2 g/l
Temperature – 95°C
Time – 4 hrs
Number of steel ball- 10
M:L – 1:50

After treatment: The specimen was dried at temperature below 60°C.

Evaluation: the sample was evaluated by grey scale for-

- Color change in shade
- Color staining.

Dimensional Stability (ISO 6330, 5770)

Purpose: To assess the dimensional stability that means shrinkage.

Apparatus: 1. Washing machine. 2. Sewing machine.

Specimen: Cutting length: Weft= 105 cm
Warp= 60 cm

Measuring length: Weft= 100 cm
Warp= 50 cm

Procedure:

1. At first sample is cut according to the specimen.
2. Then the measuring length is marked.
3. Then the sample is sewed around the 4 side.
4. Then it goes to the washing machine for hot water wash.
5. Then dried.
6. Then again measured to get the shrinkage %.

Color Fastness to Perspiration (ISO 105 E04)

The part of garments which come into contact with the body where perspiration is heavy may suffer serious local discoloration. This test was intended to determine the resistance of color of dyed textile to the action of acid and alkali perspiration.

Recipe:

Chemical	Alkali medium	Acid medium
L-histidinemonohydrochloride monohydrate (C ₆ H ₉ O ₂ N ₃ HCl.H ₂ O)	0.5 gm	0.5 gm
Di-sodium hydrogen orthophosphatedihydrate (Na ₂ HPO ₄ .2H ₂ O)	2.5 gm	2.2 gm
Sodium chloride (NaCl)	5.0 gm	5.0 gm
Distilled water (H ₂ O)	1000 ml	1000 ml
P ^H (adjusted with 0.1 N NaOH or 0.1 N CH ₃ COOH)	8.0	5.5

Temperature = 37 ± 2°C
Time = 4 hours
M : L = 1:50
Pressure = 10 lb

Sample size:

(10 cm X 4 cm) dyed sample and (10 cm X 4 cm) multifiber sample.

Apparatus:

1. Perspirometer
2. Multifiber
3. Grey scale

Procedure:

Perspiration fastness was carried out following ISO 105 E04 method where first multi-fiber and fabric face side was attached in shorter edge. Then the composite specimen was wetted in the above mentioned perspiration solution at room temperature, liquor ratio 1:50 for 30 minutes. Excess solution was poured off and composite test specimen was placed between two glass plates under pressure of 10 lb and then placed in an oven (Temperature 37± 2°C) for 4 hrs.

After treatment: The specimen was dried at temperature below 60°C

Evaluation: The sample was evaluated by grey scale for-

1. Color change in shade
2. Color staining

Color Fastness to Rubbing (ISO 105 X12)

Apparatus and Materials

1. Crock meter
2. Crocking cloth
4. Grey scale for staining

Sample size:

Specimen size	14 cm x 5 cm
Crocking cloth size	5 cm x 5 cm

Procedure:

Each test specimen was fastened by means of clamps to the baseboard of the testing device so that the long direction of the specimen follows the track of the device.

For the dry rubbing test, the conditioned rubbing cloth was placed flat over the end of the finger.

At a rate of one cycle per second, to and fro movement in a straight line was rubbed. The rubbing was carried out by moving 10 times in 10 seconds, with a downward force of 9 ± 0.2 N.

Then the specimen was removed from the baseboard, conditioned and rated with grayscale.

For wet rubbing, the conditioned crocking cloth was weighed and then thoroughly soaked in distilled water and reweighed to ensure take-up of 95% to 100%.

Then it was clipped in the finger and carried out the procedure as it is in case of dry rubbing and rated similarly by the grey scale.

Evaluation:

Conditioning and then evaluating was done by using grey scale for color staining.

3.5.5. Machineries list of Laboratory

Machine name	Company	Origin	No. of Machines
Spectrophotometer	X-rite	USA	2
Steamer	Textilmaschinen	Switzerland	2
Tex Steamer	DAELIM STARLET CO. LTD	Korea	1
Rapid Padder	-	China	4
Oven Dryer	DAIHAN LAB TECH CO. LTD	Korea	1
Washing Machine	Siemens	Germany	2
Washing Machine	LG	Korea	1
Washing Machine	Whirpool	USA	1
Washing Machine	James H Heal	England	2
Gyrowash	James H Heal	England	1
Perspirometer	Carbolite	-	1
P ^H Meter	HANNA Instruments	USA	1
Electronic balance	SHIMADZU CORPORATION	JAPAN	1
Crockmaster	James H Heal	England	1
Titan strength tester	James H Heal	England	1
Digital tear tester	James H Heal	England	1
Light and weather	James H Heal	England	1
fastness tester			
Hygro/Thermograph	-	-	1
Digital shaker	-	-	1
Pilling tester	James H Heal	England	1

3.6 Utility Section

Source of utilities in Zaber & Zubair Fabrics Limited are-

Gas	:	Titas
Electricity	:	PDB and Generator
Water	:	Pumps
Steam	:	Boiler
Compressed Air	:	Compressor

Gas:

Gas is mainly used for steam production in Boiler. The gas is supplied by Titas. Generally 36 m³ gases are required to produce 1 ton steam.

Water:

Continuous supply of water for Zaber & Zubair Fabrics Limited is ensured by several submersible and centrifugal pumps and service water is supplied by WASA.

Steam:

Pure steam with required temperature must be produced to meet the continuous demand of steam in different sections.

3.6.1. WATER TREATMENT PLANT (WTP)

Water softening process is used in Zaber&Zubair Fabrics Limited. Deep well water is supplied by several sub-miscible pumps, but this water cannot be used directly in textile processing because it contains various salts otherwise known as hardness. This hardness must be removed or minimized by water treatment plant.

Water Softening Method – Ion Exchange Process

Source of water is deep tube well.

Production capacity – 80 m³ /hr = 19, 20,000 liter/day

Actual Production – 15, 00,000 liter/day

Required water – 13, 00,000 liter/day

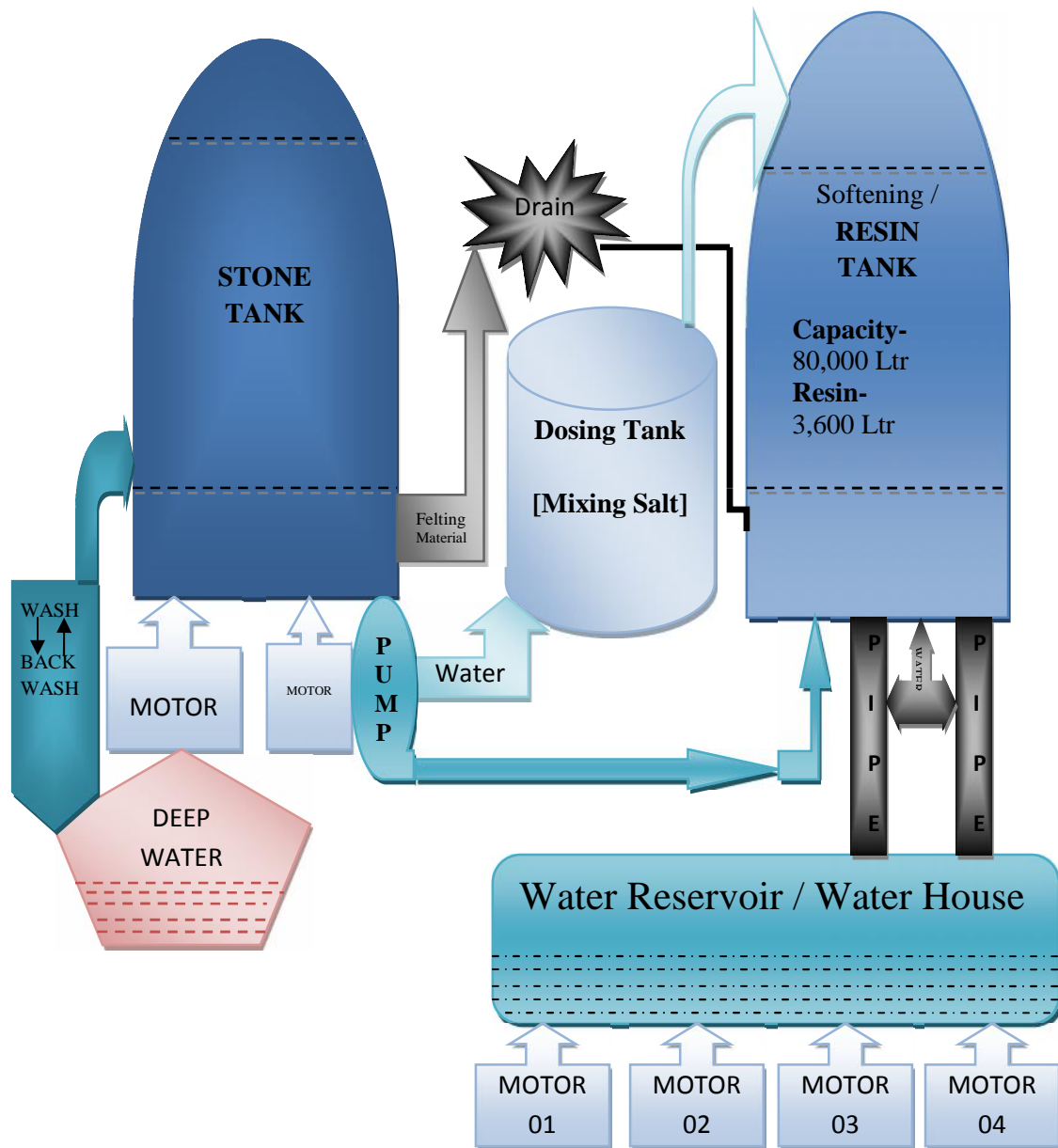


Figure: A diagram of WTP

Table: Standard water quality for dye house

Parameter	Permissible Concentration
Color	Color less
Smell	Odor less
pH	Neutral (7-7.5)
Water hardness	<25ppm(as CaCO ₃)
Dissolve solid	<1ppm
Inorganic salts	<500mg/l
Fe	<0.1mg/l
Cu	<0.005mg/l
Nitrate (NO ₃)	<50mg/l
Nitrite (NO ₂)	<5mg/l
Manganese (Mn)	<0.02mg/l
Total dissolve solid (TDS)	65-150mg/l

3.6.2. BOILER

Steam is produced by boiler. There are 4 boiler used only for Fashion Dyeing floor of Zaber & Zubair Fabric ltd. Their capacity is 15 ton/hour. Steam is generated at the temperature of 212.5°F. Gas pressure for boiler is around 16-19 psi.



Figure: Boiler

Specifications

Technical Details	Boiler Data
Machine name	Boiler
Company	DAELIM Royal Boiler Co Ltd
Type	Smoke tube package boiler
Model	DL-Z
Actual Evaporation	15000 kg/hr
Design Pressure	1 MPa
Heat efficiency	90%
Fuel consumption	1095 Nm ² /hr
Heating surface	276 m ²
Year of manufacture	2008
Type	Turbo
Capacity	270 m ³ / min
Power	45 kw

3.6.3. GENERATOR

In Zaber and Zubair Fabrics Limited, it has own generator section or power house station. Total 12 numbers of generator is available among which 11 generator is running 24 hours continuously for producing electricity to run the industrial production properly. Among the 11 generator, they have the capacity of around 900 kw/ hour. But actually 850 kw/hour can be gained. The gas is supplied from **TITAS GAS**. The pressure of gas is **16 psi**.



Figure: Generator

Specifications

Technical Details	Generator Data
Type	Gas Generator
Manufacturer	Waukesha
Model No.	VHP 710065 I
Manufactured Country	USA
Weight	16470
RPM	1000
Voltage	415
Frequency (Hz)	50
KVA	1150

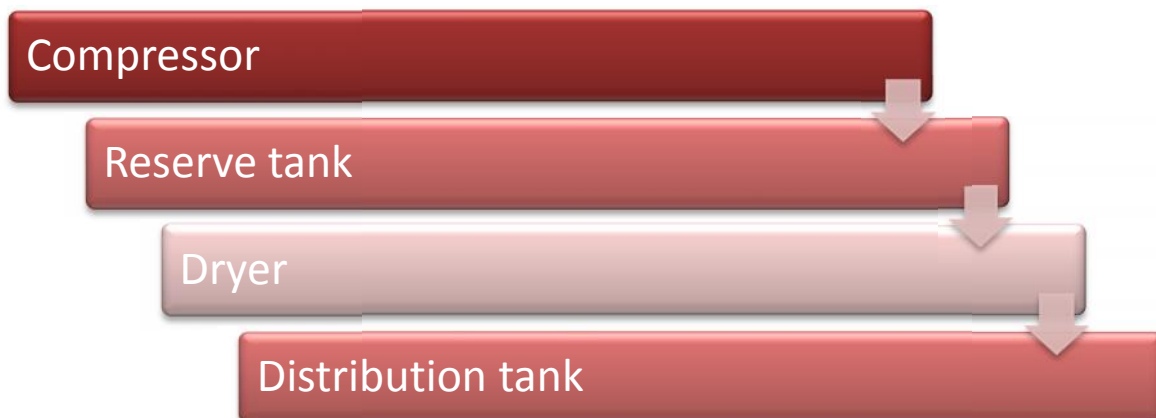
3.6.4. COMPRESSED AIR

Compressor machine is used to make compressed air. It is used for the following two purposes-

- 1) To generate the air
- 2) To supply the air

There are three compressor units. Each unit contains 6 compressors and 6 dryers. In compressor unit, screw is used to increase the pressure.

Air Flow Diagram



Specification

Technical Details	Compressor Data
Name	Compressor
Model	650 102
Part no	100260.00030
Serial no	1023
Year of production	2002
Rated power	55 kw
Rated motor speed	3000
Maximum working pressure	11.0 bar
Ambient temperature	+3°C / + 45°C
Motor	55 IP



Figure: Compressor

3.7 Maintenance Section

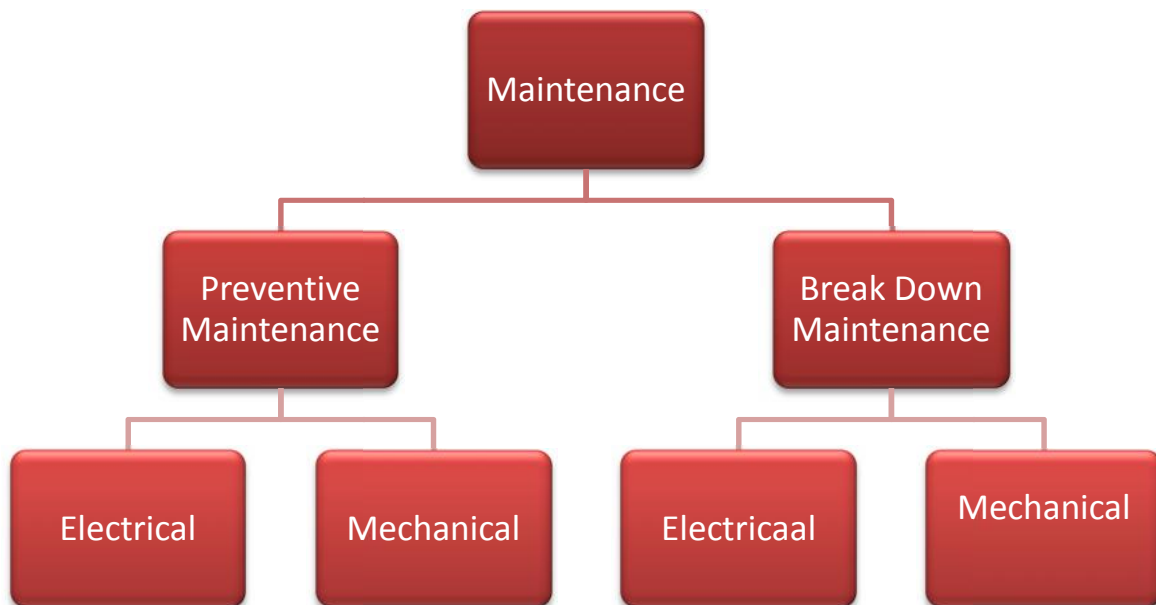
Machines are subjected to deterioration due to their use and exposure to environmental condition. Process of deterioration, if unchecked, culminates in rendering these service facilities unserviceable and brings them to a standstill. In Industry, therefore has no choice but to attend them from time to time to repair and recondition them so as to elongate their life to the extent it is economically and physically possible to do so.

Maintenance of machines is very essential to prolong the machine life and good maintenance is important for economical consideration.

Objectives of Maintenance

- 1) To keep the factory plants, equipment's, machine tools in an optimum working condition.
- 2) To ensure specified accuracy to product and time schedule of delivery to customer.
- 3) To keep the downtime of machines to the minimum thus to have control over the production program.
- 4) To keep the production cycle within the stipulated range.
- 5) To modify the machine tools to meet the need for production.

3.7.1. Maintenance of Machinery



❖ Preventive Maintenance

Preventive maintenance is a predetermined routine actively to ensure on time inspection or checking of facilities to uncover conditions that may lead to production break downs or harmful description. Preventive maintenance aims to locate the sources of trouble and to remove them before breakdown occurs. Preventive maintenance is sometimes termed as “Planned maintenance” or “scheduled maintenance” or “Systematic maintenance” etc.

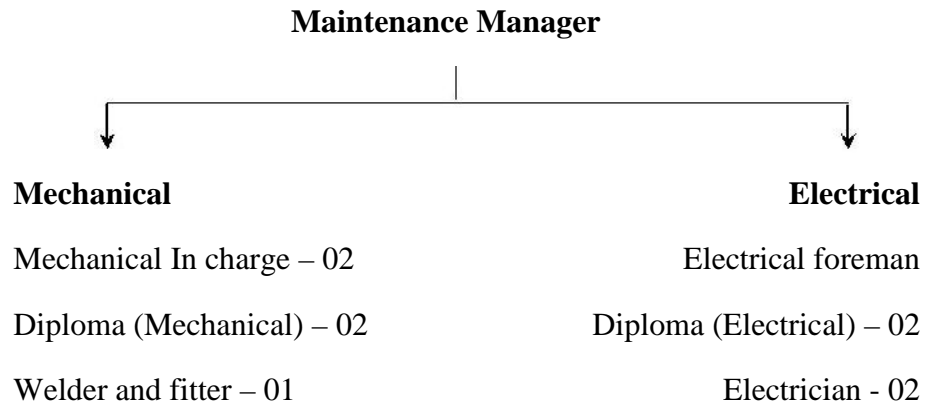
❖ Break Down Maintenance

In this case, repairs are made after the equipment is out of order and it cannot perform its normal functions. Breakdown of a machine occurs due to following two reasons:

1. Due to unpredictable failure of components
2. Due to gradual wear and tear of the parts

Manpower and Shift Set-Up for Maintenance

A Shift	6 AM	-	2 PM
B Shift	2 PM	-	10 PM
General Shift	9AM	-	6 PM



3.7.2. Maintenance in Pretreatment Department

Normally preventive maintenance should be done.

Department contains the following machines:

Singeing and Desizing machine

Scouring and Bleaching machine

Mercerizing machine

During maintenance procedure following points should be checked

Machine bearing check

Complete cleaning of machine

Cleaning of drain valves, replace seals if required

Check air supply filters, regulators auto drain seals

Clean filters element

Greasing of unloading roller bearing

Checking of oil level and bolts of unloading roller gearbox

Checking of unloading roller coupling and packing

Checking & cleaning (if required) of main vessel level indicator

Check the oil level of pump bearing and refill if required

Check the function of heat and cool modulating valves

Check all door seals

Check all pressure switches

Check all motor's terminals

Check all circuit breaker, magnetic conductors and relays

3.7.3. Maintenance in Dyeing Department

Normally preventive maintenance should be done.

Department contains the following machines:

Thermosol dyeing machine

Pad steam machine

Cold pad batch dyeing machine

Jigger dyeing machine

During maintenance procedure following points should be checked

- Padder
- Infrared dryer
- Motor
- Motor driving wheel
- Feeding system
- Delivery system
- Heating system
- Electric wiring system
- Electric control panel
- Drainage system

3.7.4. Maintenance in Finishing Department

Normally preventive maintenance should be done.

Department contains the following machines:

- Curing machine
- Stenter machine
- Calendaring machine
- Sanforize machine

During maintenance procedure following points should be checked

- Check and tightening all motor terminals and clean the motor fan
- Brush roller
- Check activity of wide and sensor and pneumatic regulator
- Raising cylinder
- Heating system
- Electric wiring system
- Padder
- Motor
- Motor driving wheel
- Rubber belt
- Check and clean pressure sensor and tightening terminals
- Inspection, cleaning and tightening all the terminals in the panel
- Check and tightening limit switch, safety door guard and the emergency switch

3.7.5. Maintenance in Utility Department

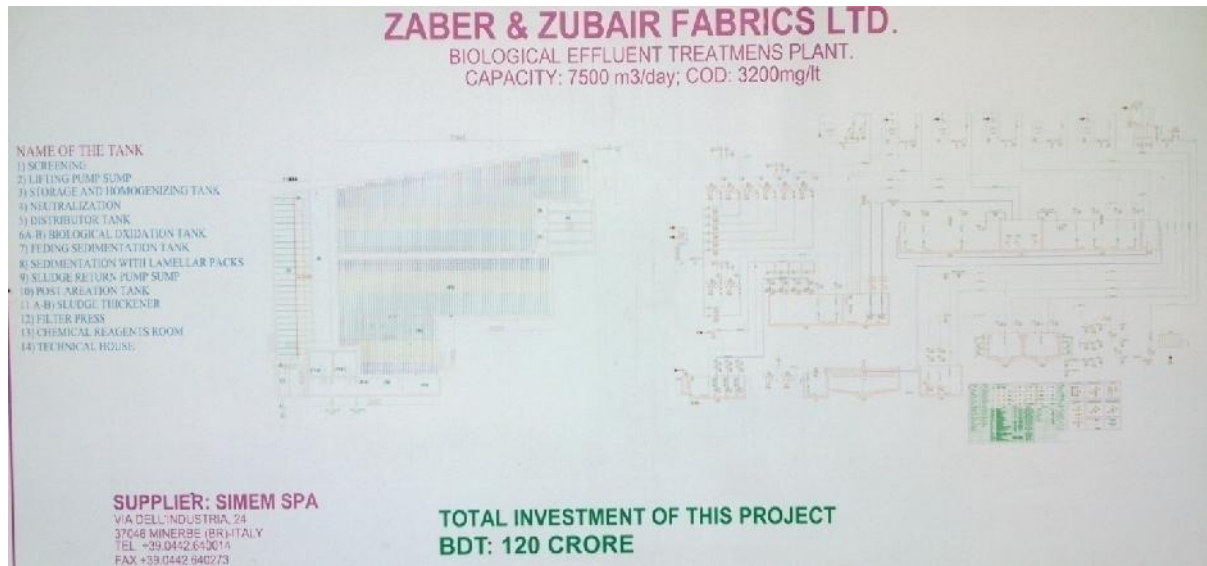
Following maintenance check should be done:

- Boiler gas burner
- Boiler filter
- Water filter
- Heating arrangement
- Boiler pressure control system
- Different parts of generator
- Gas feeding system
- Exhaust system
- Filter
- Compressor moisture management system
- Air duct and conditioning of air

It is necessary to check that all the maintenance is being done regularly and properly otherwise efficiency of each department will be reduced.

3.8 Effluent Treatment Plant

Zaber & Zubair Fabrics Ltd. has 100% biological effluent treatment plant and its layout is given below-



- NAME OF THE TANK**
- 1) SCREENING
 - 2) LIFTING PUMP SUMP
 - 3) STORAGE AND HOMOGENIZING TANK
 - 4) NEUTRALIZATION
 - 5) DISTRIBUTOR TANK
 - 6A-B) BIOLOGICAL OXIDATION TANK
 - 7) FEEDING SEDIMENTATION TANK
 - 8) SEDIMENTATION WITH LAMELLAR PACKS
 - 9) SLUDGE RETURN PUMP SUMP
 - 10) POST AERATION TANK
 - 11 A-B) SLUDGE THICKENER
 - 12) FILTER PRESS
 - 13) CHEMICAL REAGENTS ROOM
 - 14) TECHNICAL HOUSE



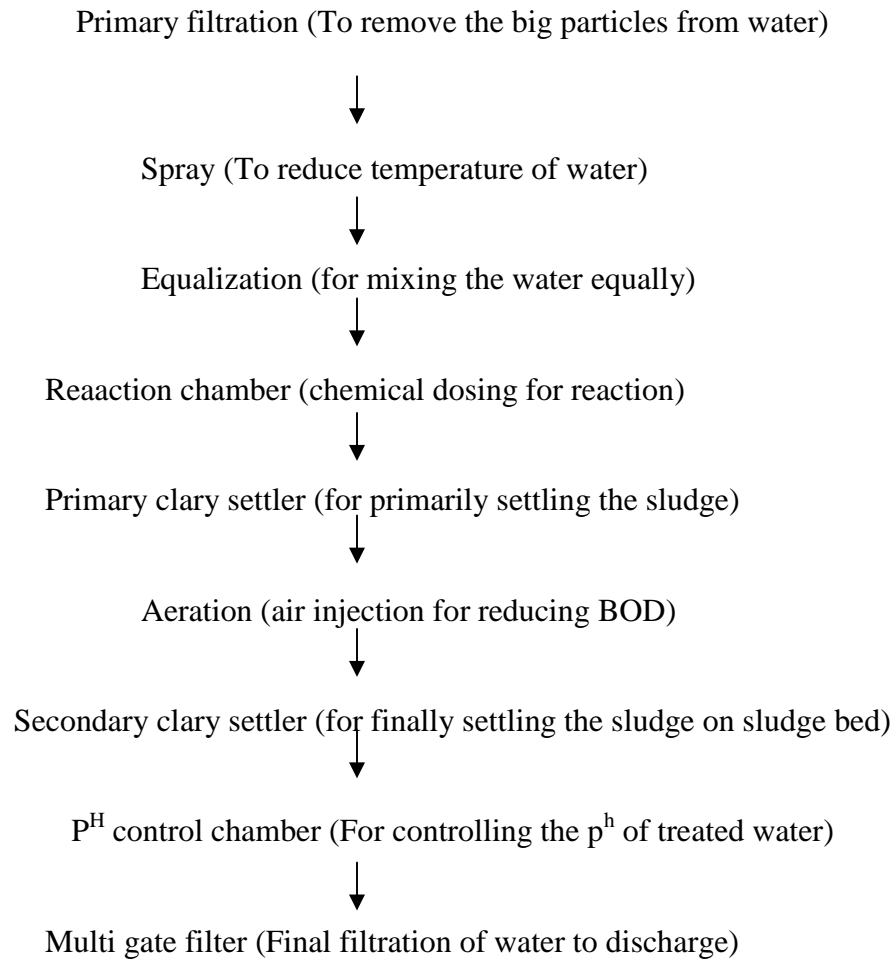
Zaber and Zubair Fabrics Limited has an exclusive Effluent Treatment Plant and one of the largest ETP in the Bangladesh. It has three segmental divisions to process large quantities of water per day and the effluent treatment is 100% biological treatment.

ETP No.	Capacity	Treatment	Designed by
01	6000 m ³ /Day	100% Biological	Joseph Egli Italia Srl
02	2700 m ³ /Day	100% Biological	PANTAREI SRL, ITALY
03	7500 m ³ /Day	100% Biological	SIMEM S.P.A Environmental Division, Italy



Figure: Effluent Treatment Plant

3.8.1. Process sequence of ETP:

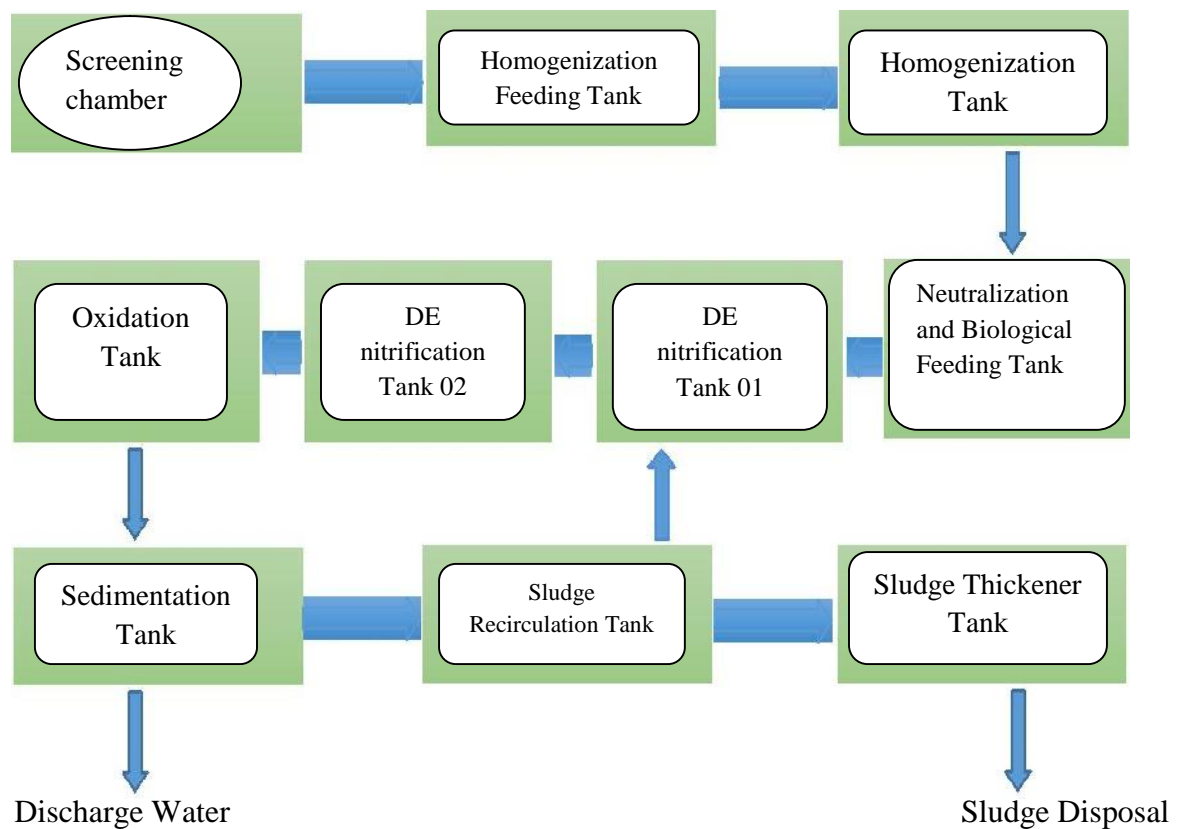


3.8.2. Chemical Contaminations:

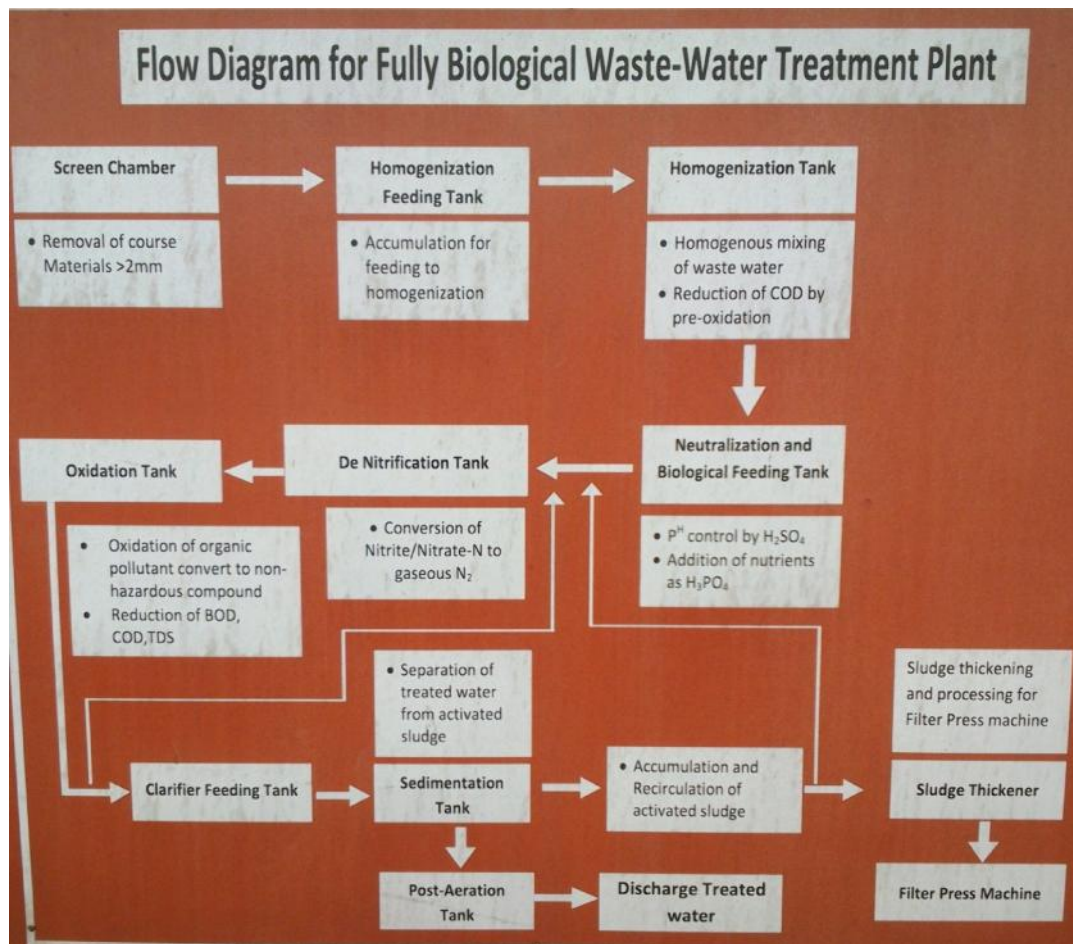
Table: Chemical contaminations from different processing sections

Processing section	Chemical contamination comes to ETP
Scouring	NaOH, Wax, Grease, Fragment of fabric
Bleaching	H ₂ O ₂ , NaOH, Acid
Dyeing	Dye, Salt, Alkali, Acid and Auxiliaries
Finishing	Softener, Finishing Chemicals

3.8.3. Sequence of Waste water treatment:



3.8.4. Wastewater flow diagram of ETP:



3.8.5. Final treated quality:-

- 1) Biological Oxygen Demand (BOD)
- 2) Chemical Oxygen Demand (COD)
- 3) Total Dissolved Solid (TDS)
- 4) Total Suspended Solid
- 5) Color
- 6) pH

CHAPTER-04
IMPACT OF INTERNSHIP

CHAPTER-04

IMPACT OF INTERNSHIP

It was a tremendous experience that I have availed with devotion and commitment. I have an interest in textile industry that's because Textile is the back bone of the economy of the country.

But one thing I want to share its not easy that looks it has a great toughness and complications in its process but the overall it was nice and great. Here I am sharing some of my learning regarding my internship in different departments.

- ↪ In the pre-treatment unit, I know how the pre-treatment is occur and its all types of limitation, faults, remedies, parameter and machine setting procedure.
- ↪ Then I go to printing unit, I know how the printing is occur and its all types of limitation, faults, remedies, parameter and machine setting procedure.
- ↪ Then see all process of Home dyeing unit I know how the dyeing is occur and its all types of limitation, faults, remedies, parameter and machine setting procedure.
- ↪ Then I go to the Laboratory and Quality Control of divine and try to learn about the different types of physical tests, chemical tests and Lab dip which occur in dyeing.
- ↪ Because of secrecy act, the data on costing and marketing activities has not been supplied in details.
- ↪ In spite of our limited time, I could not study in detail of every section.
- ↪ Some of the points in different chapter are not described as these were not available.
- ↪ It is not possible to hold the whole thing of a textile industry in such a small frame as this report. So, I tried hard to summarize all the information that I provided.

Lastly, I tried my best to gather all necessary information but it is true that within this short period it is impossible to achieve 100% success but as I tried to get the best from this industry and once again I would like to thank the authority of "Zaber & Zubair Fabrics Limited." as well as my honorable teachers of Daffodil International University for their altruistic help and advice. I am fortunate enough that I have got an opportunity to have training in this industry. During the training period I have received enough co-operation and association from the authority and all personnel. I wish the best of "Zaber & Zubair Fabrics Limited."

CHAPTER-05

CONCLUSION

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CONCLUSION

Industrial training is an important and essential part of education. The main objective of the industrial training is to provide an opportunity to undergraduates to identify, observe and practice how engineering is applicable in the real industry. It is not only to get experience on technical practices but also to observe management practices and to interact with fellow workers. Industrial training has enriched my knowledge through practical experience in pretreatment, printing, dyeing and finishing etc. Throughout this 8 weeks training period, I have learned all the implementations of the processes, which I have studied theoretically.

The Zaber & Zubair Fabrics 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%.
- 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.
- To eliminate environmental adverse effect by using effluent plant.

Industrial training also gave me an opportunity to enlarge my knowledge of textile administration, production planning, procurement system, production processes, and operating machineries and helped me to adjust with industrial life format. I have found myself fortunate to have my industrial training at Zaber & Zubair Fabrics Limited, one of the largest processing factories for woven and home textile fabrics. This factory has immense production capacity and a lot of efficient man power. During our training period, we have noticed that Zaber & Zubair Fabrics Limited is 100% export oriented quality based textile processing factory. 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. After completion of this industrial training, I have gained a completely new experience in my life which will be very much useful in my upcoming service life.