



**Faculty of Engineering**  
**Department of Textile Engineering**

*REPORT ON*

**Industrial Attachment**

At

**The Delta Composite Knitting Industries Ltd.**

**Course Title: Industrial Attachment**

**Course Code: TE-431**

*Submitted By*

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**Supervised By**

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Daffodil International University

A thesis submitted in partial fulfillment of the requirements for the degree of

**Bachelor of Science in Textile Engineering**

Advance in Wet Processing Technology

**Duration: From May 10, 2018 to July 10, 201**



## **DECLARATION**

We hereby declare that, this work has been done by us and not copied from elsewhere; we also declare that neither this report nor any part of this report has been submitted elsewhere for award of any degree or diploma.

**SUBMITTED BY:**

**Md. Tarikul Islam Tusher**

**ID- 141-23-3840**

.....

Signature

## LETTER OF APPROVAL

It is herewith certified that **Md. Tarikul Islam Tusher, ID- 141-23-3840**, Department of Textile Engineering, Daffodil International University, Dhaka, Bangladesh, has carried out their Industrial attachment at "**The Delta Composite Knitting Industries Ltd.**" under my direct supervision. They have successfully carried out Their internship and ready to present Their report, which is required in partial fulfillment of Their B.Sc degree.

I have gone through the final draft of the report and recommend its submission for the degree of Bachelor of Science in Textile Engineering.



.....  
**Supervisor:**

**Fahmida Siddiq**

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Department of Textile Engineering

Faculty of Engineering

Daffodil International University

## ACKNOWLEDGEMENT

First of all, we would like to express Our devotion to the most gracious and the most merciful Allah, Alhamdulillah, since We have been able to finish our Industrial attachment after two months long hardworking.

We wish to express our gratitude to our supervisor, Fahmida Siddiqa, Department of Textile Engineering, Daffodil International University, for giving us the opportunity, trust and freedom that allowed us to explore in the field of our industrial work. It is indeed a great pleasure for us to express our sincere and profound gratitude to her for her scholastic guidance, constructive suggestions and encouragement which we received from her in order to complete internship and to write this dissertation.

A very special gratitude goes to Dr. S.M. Mahbub Ul Haque Majumder, Founder and Professor, Department of Textile Engineering, Daffodil International University.

We are indebted to Dr. Md. Mahbubul Haque, Professor & Head, Department of Textile Engineering, Daffodil International University for his unremitting and valuable guidance and suggestions.

We also like to give special thanks to Engr. A K M Faruque Ahamed Chairman of The Delta Composite Knitting Industries Ltd who allowed us to do industrial attachment in his factory for 2 months.

We are also very much grateful to M. Shohag Ahmed for his suggestion and support. Many thanks for everything.

Our special thanks go to all production officers, supervisors and stuffs of The Delta Composite Knitting Industries Ltd for their helpful hands and cordial co-operation.

Finally, I/we are grateful to all of my teachers who have helped us all over the four years in this Textile Engineering Department.

## **DEDICATION**

It is our genuine gratefulness and warmest regard that we dedicate this work to our beloved Parents & respected Teachers.

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# **EXECUTIVE SUMMARY**

## **1. EXECUTIVE SUMMARY:**

We performed our internship on The Delta Composite Knitting Industries Ltd. By achieving practical knowledge from the industrial attachment it is possible to apply the theoretical knowledge in the technical field. For any technical education, practical experience is almost equally necessary in association with the theoretical knowledge. The industrial attachment is the most effective process of achieving the practical experiences.

We performed our internship on The Delta Composite Knitting Industries Ltd. which is situated on Zarun (south), Kashimpur, Gazipur-1700 The length of our training period during two months. We were joining our training on **May 10, 2018** and it finished on **July 10, 2018**. In a short span the company received the recognition as one of the market leaders. In this industry there are several sections such as Knitting, Dyeing, Dyeing Finishing, Garment wash, ETP, Sampling, Cutting, Sewing, Ironing & Finishing, Quality and IE section etc. All of this sections help us to improve our knowledge.

Their knitting section use various modern machineries for get better quality of fabric. They produce different types of knit fabric such as, Lycra, Rib, Interlock, Fleece, Terry, Jacquard etc. They use high tech machineries to produce a quality garments product. They also add new machineries to increase their production line. Their Dyeing section are more strong than any other textile industry.

The Delta Composite Knitting Industries Ltd. is a complete knit composite industry. They have a better garment section and they produce quality product for reputed buyer. They use modern machineries their all Section.

**INFORMATION  
ABOUT FACTORY**

## **2. INFORMATION ABOUT FACTORY**

### **2.1 Introduction:**

Textile technology education is based on industrial ground. Theoretical background is not sufficient so, industrial training is an essential part of study to make a technologist technically sound in this field. Industrial training provides us that opportunity to gather practical knowledge. Textile and RMG (Ready Made Garments) are leading export-led industries in Bangladesh, in respect of foreign currency earning and employment. Recently, in the post-MFA era, the composite knitting industries are playing the crucial roles in country's RMG sector. Among Them, The Delta Composite Knitting Industries Ltd. has occupied a pivotal Place. It has been possible because of its multi-dimensional and epoch-making activities since its inception in 1998. The Delta Composite Knitting Industries Ltd. factory is located at Kashimpur, Gazipur - 30 minutes' drive from the Zia International Airport, Dhaka. The total factory space is 2,56,332 sft, including two 6-storied, one 5-storied and one 3-storied buildings. The factory arena is highly protected with boundary walls and private security guards. A camp of Bangladesh Govt. Ansar force in also established within the premises to confirm cent per cent security.

The Delta Composite Knitting Industries Ltd. is truly integrated commitment. This Industries all division has the capability to offer a complete product range for the export & domestic textile markets. With high advanced technology & an emphasis on developing local human resources, this Industry has the potential to make an important contribution to the nation's growing Knit garments export sector.

The rationale behind the existing structure & future expansion of the textile division is to capture value added at each stage of the Knitting process.

The Delta is a composite unit, having knitting, dyeing, finishing and sewing units under a single roof. Besides, they have our own printing, embroidery and washing units on the same premises. All these unit work as an integrated whole to meet the buyer's stipulated time and need based demands.

Mainly they export T-shirt and different types of men's, women's and kid's knit apparels made from various kinds of knit fabrics.

## 2.2 General Information about the Factory:

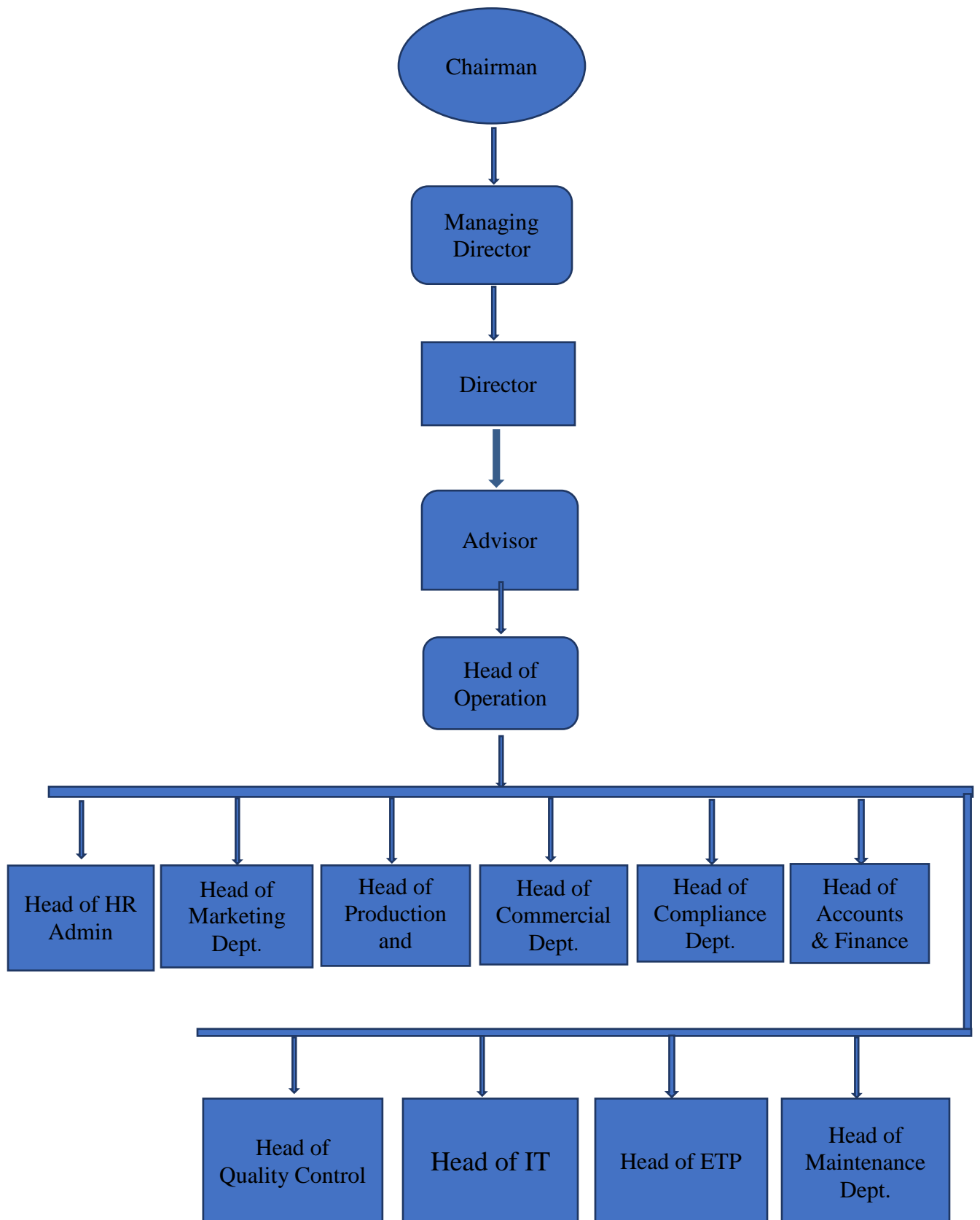
<b>Company Name</b>	<b>The Delta Composite Knitting Industries Ltd.</b>
<b>Chairman of Company</b>	Engr. A K M Faruque Ahamed
<b>Corporate Office</b>	House: 389, Road: 6 (East) DOHS, Baridhara, Dhaka-1216, Bangladesh Telephone: +880-2-8813636-7, 8824092 Fax : +880-2-9297746
<b>Factory Location</b>	Zarun (South), Kashimpur, Gazipur-1700, Dhaka, Bangladesh
<b>Covered Area of Factory</b>	2,56,332 square feet
<b>Year of Establishments</b>	January 1998
<b>Business Line</b>	Manufacturing and Marketing of high Quality Fabrics
<b>Listing Status</b>	Private listed company
<b>Paid up Capital</b>	10 million
<b>Average Annual Turn Over</b>	36 million US \$
<b>Total Work Force</b>	5,000 persons
<b>Daily Working Hours</b>	09:00 AM – 05:00 PM
<b>Main Market</b>	Western Europe

<b>Factory Equipment's</b>	Different types of Knitting, Dyeing, Cutting, Sewing, Finishing and Generator machines supplied by mostly Sweden, USA, Italy, Switzerland, Germany, Spain, Japan, China and Turkey.
<b>Product/Service</b>	T-shirt, Polo shirt, Legging, Hoody, Tank top, Jacket, Long pants, Ladies wear and SWEAT etc.
<b>Certification Achievement</b>	ACCORD, Alliance, WRAP, ETI, BSCI, ISO 9001 - 2008 & OEKO-TEX-100.
<b>Buyer Name</b>	Zara, Next, Piazza, Ernsting's Family, Asmara, France SCO, Aldi, Knit Radix, Inter Sports, Norma, C&A, Wal-Mart, Carrefour-Kiabi, Viva Cotton, Tom Tailor, Gymboree, Sams, Matalan and Tema etc.
<b>Bank Information</b>	<ol style="list-style-type: none"> <li>1. Islami Bank Bangladesh Ltd.</li> <li>2. Janata Bank Ltd.</li> </ol>
<b>Web site</b>	<a href="http://www.deltageoupbd.com">http://www.deltageoupbd.com</a>

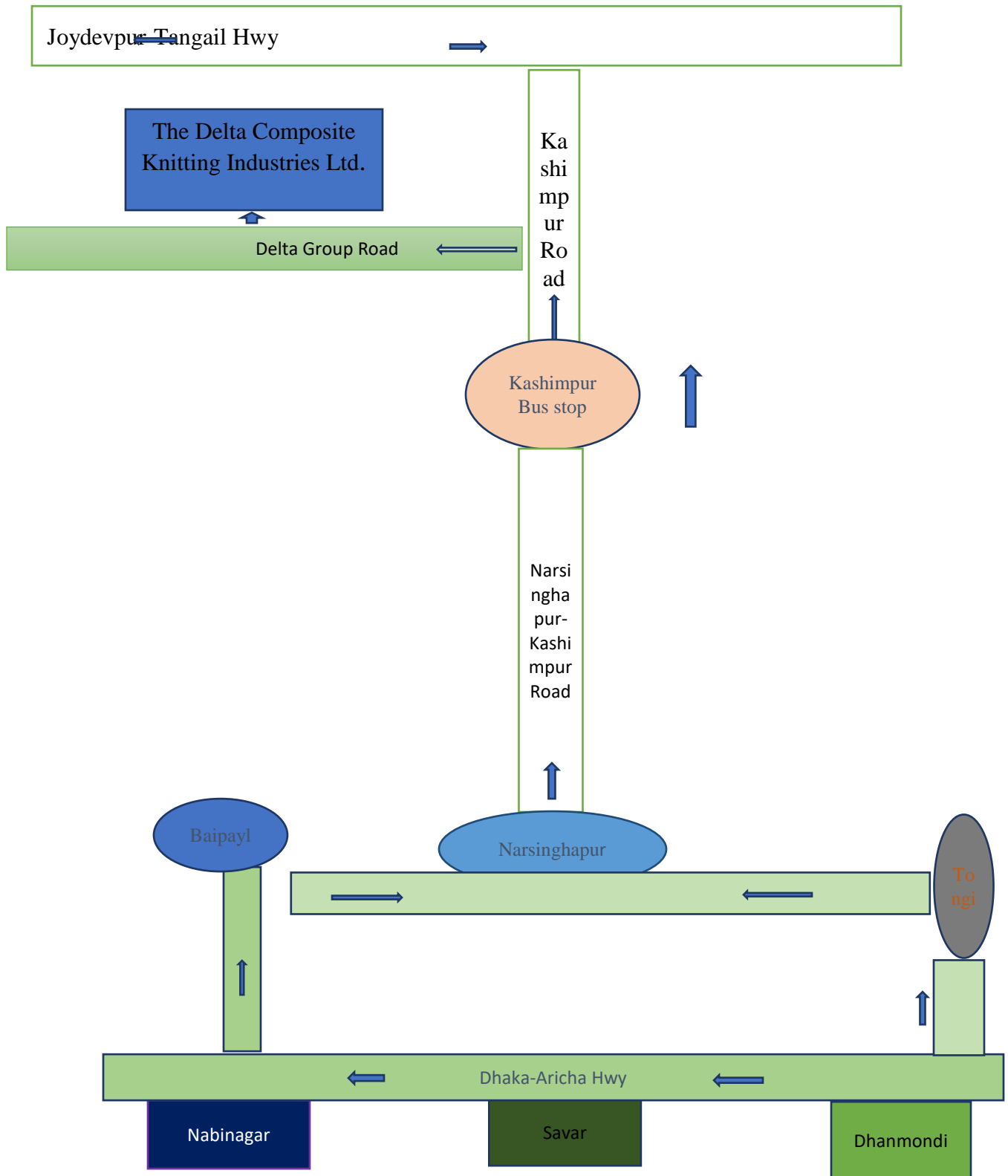
### 2.3 Company Allied:

- Lily cosmetics Ltd.
- The Delta Apparels Ltd.
- The Delta Automobiles
- The Delta Accessories
- The Delta Spinning Mills Ltd.
- The Delta Carton Industries Ltd. The Delta Blended Yarn Mills Ltd.
- The Delta Yarn Dyeing Industries Ltd. The Delta Composite Knitting
- Ind. Ltd

## 2.4 Organogram:



## 2.5 Factory Location:





## 2.9 Major Buyers:

Buyer Name	Country
Gymboree, Xanaka, Viva Cotton, Sams Club, Kids H/Q	USA
C&A, Tom Tailor	GERMANY
Pimkie, Monoprix, Carrefour Kiabi, Spring Field	FRANCE
Zara	SPAIN
Matalan	UK
Terranova	ITALY
Tema	TURKEY
Wal-Mart	CANADA
New Wave Group	SWEEDEN

## 2.11 Company Business Motto, Mission and Vision:

### Business Motto

We source quality, we make quality and we deliver quality. nothing delights us more than the customer's satisfaction.

### Mission

Quality is always the combination of the highest intent, sincerest effort with an accurate execution.

### Vision

To reach the zenith or be the market leader in providing knit garments to our valued customers around the globe.

## 2.12 Production Capacity:

Section	Production per Day
Knitting	15-18 ton
Dyeing	30-33 ton
Finishing	20-22 ton
Sewing	90,000 pieces

## 2.13 Management system:

- Intercom telephone
- Fax
- E-mail
- Written letters
- Oral

## 2.14 Company Policy:

### 1. Recruitment Policy:

Recruitment is done as per following systems. Serving notice/poster in important locations. Personal contacts by own employees. Head hunting for manager/executive.

### 2. Selection:

During the selection of the workers following factors are considered:

- Good physical appearance/fitness
- Age 18 years minimum must be supported by certificate from educational institution or local govt. authorities and confirmed by medical officer.
- Educational qualification as per job profile. Skill ness (practical for operators).
- Wages/salary negotiation.

### 3. Joining:

Selected workers/trainees submit the followings to personal department on joining:

- Prescribed application form duly filled. Two passport size photographs.
- Educational certificate.
- Experience certificate (if any).
- Medical fitness certificate mentioning age.

### 4. Service Confirmation:

On completion of 3 months' satisfactory job performance, company confirms the employees' service permanently. Trainees who fail to show satisfactory performance within this time his/her he/she cannot cope-up within this given period then his/her service is term innate.

### 5. Daily Working Hours and Over Times:

Eight hours a day from 8.30 am to 5.30 pm with one-hour lunch break (maximum 48 hours per week). Maximum two hours' overtime per day (maximum 12 hours per week) with one-hour Tiffin break in the afternoon/evening. Friday is weekly holiday.

### 6. Medical:

Medical facilities are as follows:

- Each worker provided medical allowance @ Tk.150/= per month.
- First Aid facilities with trained first aider are available for each employee. Accident register for injured person is being maintained.

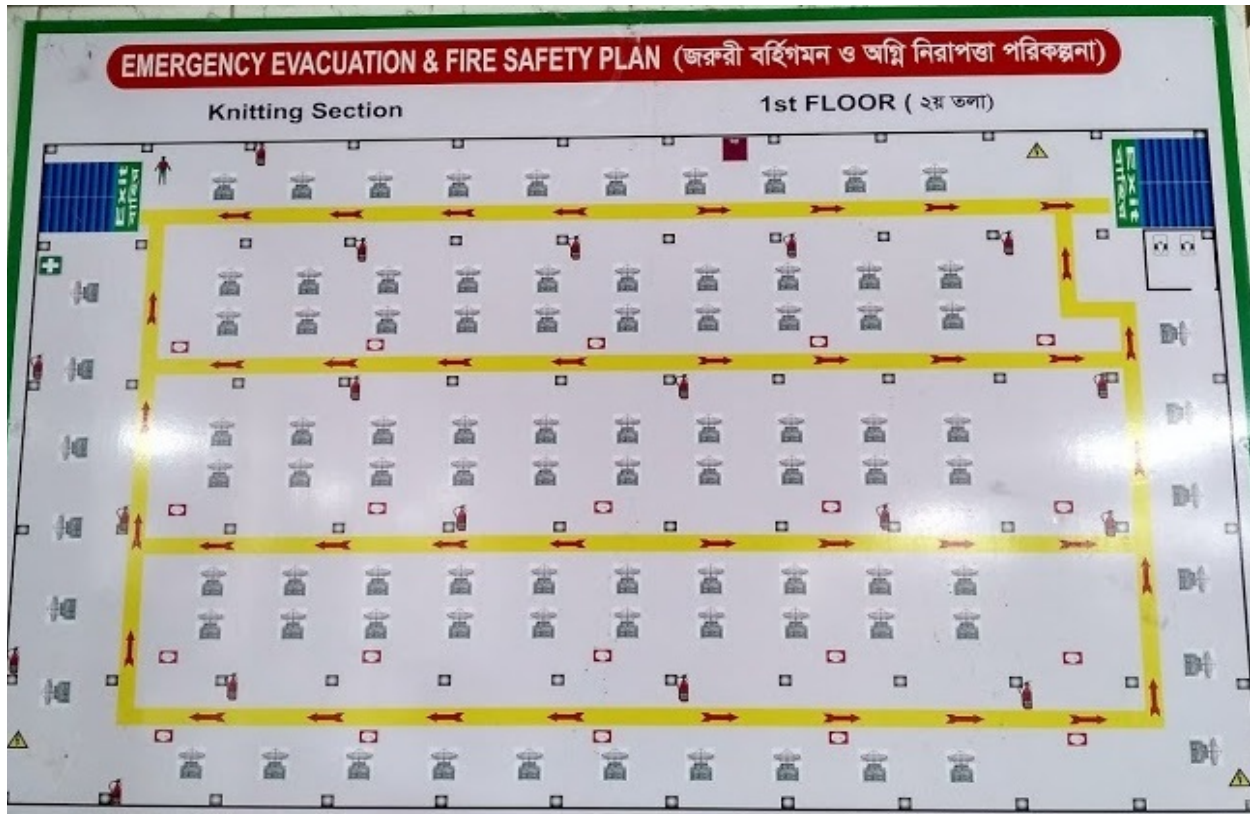
**DESCRIPTION OF THE  
ATTACHMENT**

## **4. Description of the Attachment:**

### **4.1 Knitting Section:**

Knitting is considered to be the second most frequently used method of fabric construction, after weaving. It is one of the several ways to turn thread or yarn into cloth. It is similar to crochet in the sense that it consists of loops pulled through other loops. In other words, knitting is the process of construction of a fabric made of interlocking loops of yarn by means of needles. The loops may be either loosely or closely constructed, according to the purpose of the fabric. The loops or stitches are interlocked using a needle which holds the existing loop and a new loop is formed in front of the old loop. The old loop is then brought over the new loop to form the knitted fabric. Knitting is different from weaving in the sense that a single piece of yarn can be used to create fabric. The knitted fabric consists of horizontal rows known as courses and vertical columns of loops known as Wales. Today, knitting is practiced manually, or with the help of machines. Knitted fabric has certain special characteristics that make it suitable for creating a widerange of garments and accessories like tights, gloves, underwear and other close-fittinggarments. The structure of the loop of knitted fabric stretches and molds to fit body shapes.The air trapped by the interlocking loops keeps the wearer warm.The popularity of knitting has grown a lot within the recent years owing to the adaptability ofvarious man-made fibers, the increased versatility of knitting techniques and the growth indemand for wrinkle-resistant, stretchable, snug-fitting fabrics (particularly in the range ofsportswear and other casual apparels). Today, knitted fabrics form an integral part of hosiery, underwear, slacks, sweaters, suits and coats, rugs and other home furnishing items. Knitting industry has two main divisions: One division produces knitted goods for apparel manufacturers, for sewing centers, for consumers and for others. Other division produces completed apparel like hosiery, sweaters and underwear.

#### 4.1.2 Section Layout:



#### 4.1.3 Raw Materials of Knitting Section:

##### 1. Yarn:

- 100% Cotton
- Polyester
- CD
- PC
- CVC
- CB

#### 4.1.4 Yarn Collect From:

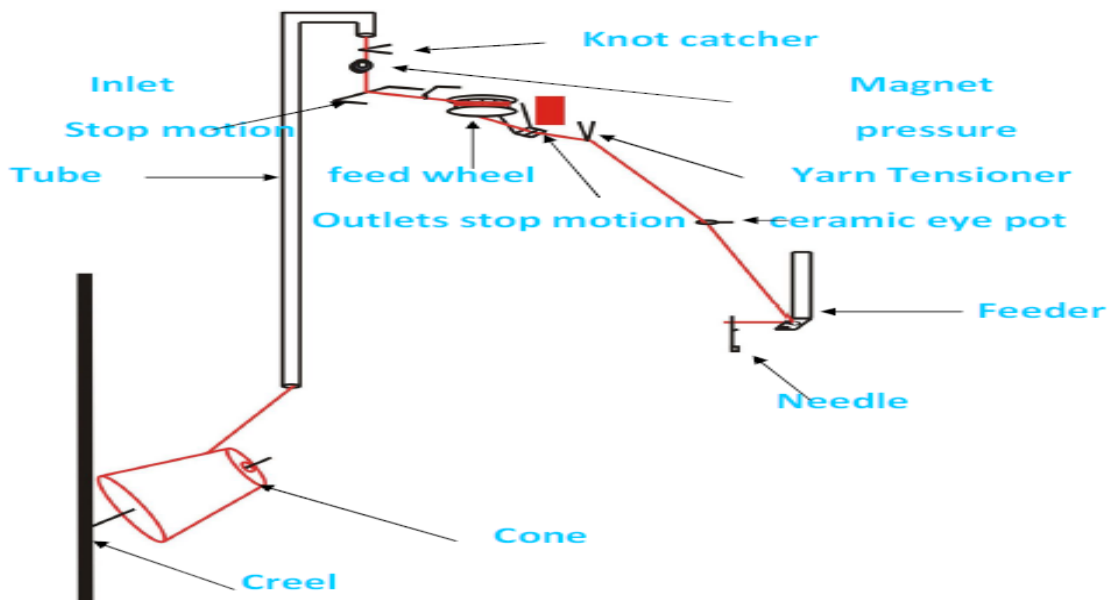
1. Padma Spinning Mill (Beximco).
2. Advance Spinning Mill.
3. Square Yarn Mill.

4. Beximco Synthetics Ltd.
5. JK Cotton Mills Ltd.
6. Jamuna CVC Yarn
7. Shameem Cotton Yarn

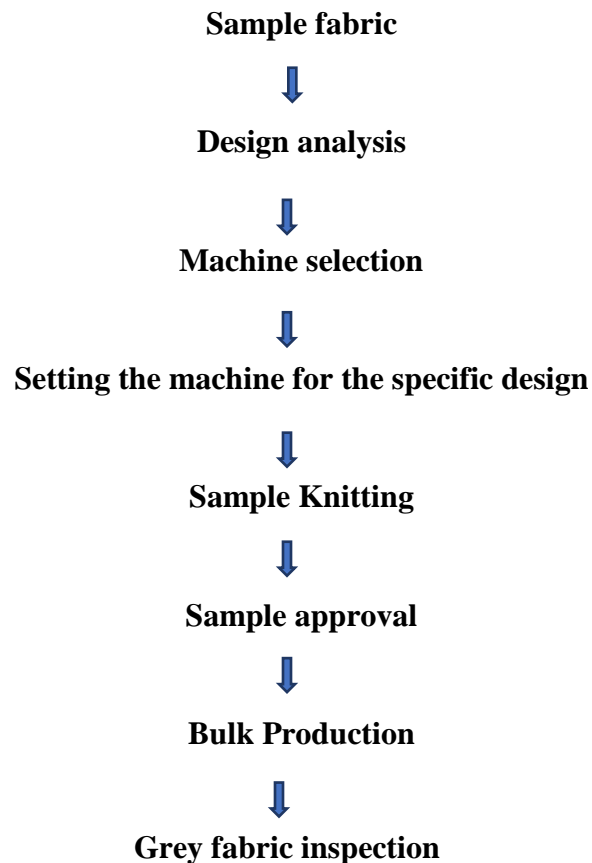
#### 4.1.5 Machine Used in Knitting Section:

Machine Type	Quantity	Brand Name	Origin	Total
Single Jersey	57	Pailung	Taiwan	127
Rib	16	Pailung	Taiwan	
Interlock	12	Hangxing	China	
Fleece	22	Hangxing	China	
Jacquard	5	Pailung	Taiwan	
Flat Bed Knitting Machine	15	Hangxing	China	

#### 4.1.6 Yarn Path of Machine:



#### **4.1.7 Production Flow Chart of Knitting Section**



#### **4.1.8 Description of Production Process:**

1. Firstly, knitting manager gets a production sheet from the merchandiser as accordance as consumer requirements then he informs or orders production officer about it.
2. Production officer informs technical in charge and knows about machine in which the production will be running.
3. Technical in charge calls for leader of mechanical fitter troops, they two take decision about machine for production considering machine condition, production capacity, maintenance complexity, etc.
4. Production officer with experienced mechanical fitter adjusts required stitch length and grey GSM for required final GSM.
5. Supervisor checks daily production regularity and make operator conscious about finishing due time.



6. Operators operate machine in high attention as if there were no faults in the fabrics. If he thinks or sure about any fabric fault, then he calls for the mechanical fitters in duty. Mechanical fitter then fixes it if he can or he informs technical in charge. Then he comes in spot.

7. After required production and final inspection in 4-point system, they sent in dyeing section.

#### **4.1.9 Production Parameter:**

- Machine Diameter
- Machine rpm (revolution per minute)
- No. of feeds or feeders in use
- Machine Gauge
- Count of yarn
- Required time (M/C running time)
- Machine running efficiency

#### **4.1.10 Method of Increasing Production:**

1. By increasing m/c speed:

Higher the m/c speed faster the movement of needle and ultimately production will be increased.

2. By increasing the number of feeder: If the number of feeder is increased in the circumference of cylinder, then the number of courses will be increased in one revolution at a time.

3. By using machine of higher gauge: The more the machine gauge, the more the production is. So by using machine of higher gauge production can be increased.

4. By imposing automation in the m/c:

- a) Quick starting & stopping for efficient driving system.
- b) Automatic m/c lubrication system for smoother operation.
- c) Photo electric fabric fault detector.

5. By imposing other developments:

- a) Using creel-feeding system.
- b) Applying yarn supply through plastic tube that eliminates the possibilities of yarn damage.
- c) Using yarn feed control device.
- d) Using auto lint removal.

#### **4.1.11 Different parts of Circular Knitting machine:**

1. Creel: Creel is a part of knitting machine. Here yarn packages are stored for yarn feeding in the machine
2. VDQ Pulley: This part is used to control stitch length and GSM of the knitted fabric
3. Pulley belt: It transfers the motion.
4. Yarn guide pipe: It helps the yarn to feed in the feeder & also reduces ply.
5. Inlet & outlet stop motion: It is an important part of the machine. It stops the machine instantly when a yarn breaks.
6. Feeder ring: It is a ring where all feeders are placed together.
7. Feeder: Feeder is a device where yarn passes through the knitting section.
8. Brush: It cleans the pulley belt.
9. Sinker: It is the most important element of the machine. It helps in loop formation, holds down the loop, and knocks over the loop.
10. Cam: Cam is a device which converts rotary machine drive into a suitable reciprocating action for the needles and other elements. The cams are carefully profiled to produce precisely-timed movements and dwell periods and are of two types, engineering and knitting cams.
11. Needle: It creates the loops.
12. Yarn tensioner: This part gives proper tension to yarn for proper knitting.
13. Adjustable Fan: This part removes lint, hairy fibre from yarn and others.
14. Take up Roller: This part is used to take up the fabric from the cylinder.
15. Cloth Roller: The final product i.e. cloth is wound on this roller.
16. Expander: This part is used to control the width of fabric.
17. Knit cam: This cam helps the needle to form knit loops.
18. Tuck cam: This cam helps the needle to form tuck loops.
19. Miss cam: This cam helps the needle to form miss loops.
20. Needle Detector: This part detects any type of faults of needles.
21. Fabric Detector: This part detects any fault of fabric

#### **4.1.12 GSM depends on:**

- Type of yarn
- Yarn Count
- Stitch length
- Fabric Structure.

- Finishing process.
- Depth of shade.
- Stitch density.
- Machine gauge.

#### 4.1.13 Knitting Calculation:

- WPI: Wales per inch is called WPI.
- CPI: Course per inch is called CPI.

##### Needle calculation:

**Single jersey circular knitting machine needle** =  $\pi DG$

**Rib/Inter lock /Double jersey circular knitting machine needle** =  $\pi DG \times 2$  (two needle bed is here)

**Single bed flat knitting m/c needle** = width  $\times$  gauge

**V bed flat knitting m/c needle** =  $2 \times$  width  $\times$  gauge

Here, D = cylinder diameter, G = Machine gauge, Needle pitch =  $1/G$ .

**GSM:** Grams per square meter of the fabric are called GSM.

**GSM** =  $\{WPI \times CPI \times \text{stitch length (mm)} \times 0.9155\} / \text{Count}(Ne)$

**Stitch density** =  $(WPI \times CPI) \text{ inch}^2 = (WPC \times CPC) \text{ cm}^2$

**No of sinker** = No of needle

**No Wales** = No of needle

**No of course** = No of feeders = No of yarn (per revolution of cylinder)

**Course per minutes** = No of feeders  $\times$  cylinder rpm

**Course length** = yarn required for each course.

**Fabric width** = wale spacing  $\times$  Total no of Wales =  $(1/WPI \times \text{No of Needles}) \text{ inch} = (\text{No of Needles}/WPI \times 39.37) \text{ meter}$

**For single jersey fabric** =  $(\pi DG/WPI \times 39.37) \text{ meter (open width)} = (\pi DG/WPI \times 39.37) \text{ meter}/2(\text{Folded/Tubular width})$

**For double jersey fabric** =  $(2 \times \pi DG/WPI \times 39.37) \text{ meter (open width)} = (2 \times \pi DG/WPI \times 39.37) \text{ meter}/2(\text{Folded/Tubular width})$ .

**Fabric Length** = Course spacing  $\times$  Total course per hour =  $\{(\text{Feeder} \times \text{cylinder rpm} \times 60)/CPI\} \text{ inch/hour} = \{(\text{Feeder} \times \text{cylinder rpm} \times 60)/CPI \times 39.37\} \text{ m/hour}$

##### Production calculation:

$$\text{Production per hour} = \frac{\text{IIDG} \times \text{S.L(mm)} \times \text{No. of Feeder} \times \text{RPM} \times \text{Eff} \times 60}{\{2.54 \times 36 \times 840 \times \text{Ne} \times 2.2046\} \text{kg}}$$

#### 4.1.14 Inspection Procedure:

Generally, a fabric roll is cut when it reaches its ‘set cut length’ in the circular knit m/c but the roll might cut before reaching the pre-set length if required and weight is recorded other number, quantity, GSM, Knitter, Shift, Style, Yarn lot, Roll Quantity, Machine Revs, m/c no. etc. are written on the knit card. All rolls are kept in front of the inspection m/c time to time and are inspected over the inspection visually in a pre-set speed (m/min) against light. For any major/minor faults like thick-thin place, barre mark, fall out, contamination / fly, holes, oil lines, needle lines, slubs etc. are recorded in inspection report to classify the fabric based on the four point system. In case of fly and contamination, fabric is approved for color while minor needle lines or minor stripes, fabric is approved for white. The concerned inspector records all the details of inspection result on the knit card and inspection report. Collar and cuff is cut when it reaches its ‘set cut no of pieces’ in the flat knit m/c. and kept in front of the inspection table. These are inspected visually under the light box. Any major or minor faulty collar / cuff like having wrongly design, first round problem etc. are properly counted and recorded.

#### 4.1.15 Investigation:

The four-point system is followed to inspect the body and rib fabric. The defects found and points given against them are recorded in the daily body and rib inspection report and daily collar and cuff inspection report.

**Following tables shows the four-point grading system followed by inspection of**

**DCKIL:**

Four Point Grading System	
Size of Defects	Penalty points
0-3''	1
Over 3'' - Not over 6''	2
Over 6'' – Not over 9''	3

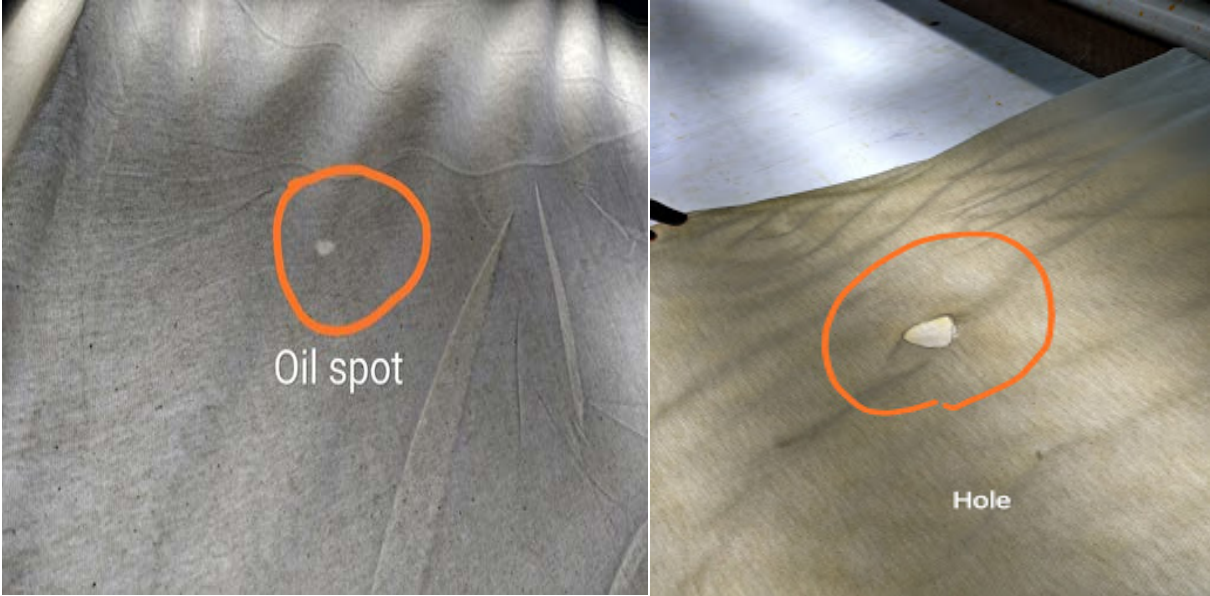
Above 9''	4
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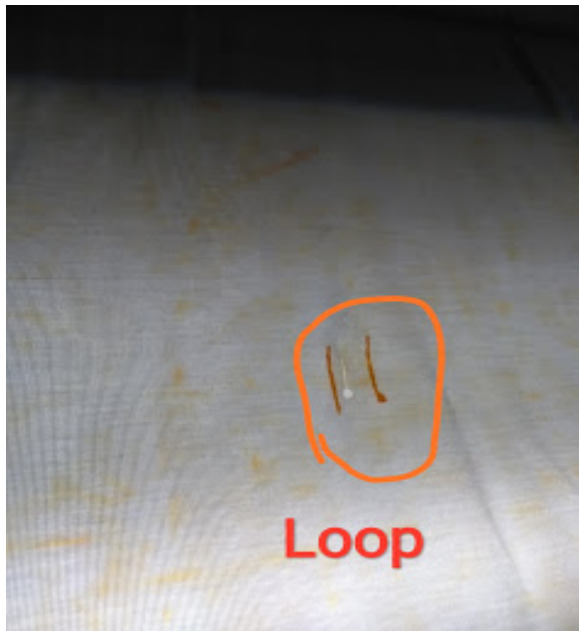
#### **4.1.16 Fabric Fault in Knitting and Their Causes:**

##### **aults Causes Sample**

- 1. Holes or cracks:** Bad needle, take down mechanism too light, high tension on yarn, bad yarn, needle too tight in their slots, dial height too high or too low, badly tied knots, improper stitch setting.
- 2. Drop stitches or cloth fall out:** Take down mechanism too loose, defective needles, wrong needle timing set and needle tricks closed.
- 3. Vertical lines:** Defective needle, dirt in needle slots, needle too loose or too tight in the slots, needles not enough lubricated.
- 4. Barre or horizontal stripes:** Bad yarn, uneven tension, yarn slippage in positive feed, improper stitch cam setting.
- 5. Oil lines:** Fibers & fluff accumulated in the needle tricks, which remain soaked with oil. Excessive oiling of the, needle beds.
- 6. Needle Lines:** Bent Latches, Needle Hooks & Needle stems Tight Needles in the grooves Wrong Needle selection (Wrong sequence of needles, put in the Cylinder or Dial)
- 7. Sinker Lines:** Bent or Worn out Sinkers Sinkers being tight in, the Sinker Ring grooves
- 8. Contamination:** Presence of dead fibers & other foreign materials, such as; dyed fibers, husk & synthetic fibers etc.
- 9. Broken Needle:** High Yarn Tension Bad Setting of the Yarn Feeders Old & Worn out Needle set.
- 10. Rust marks:** Rusty needle Rust in tricks.
- 11. Mixed yarn:** Different yarns are feed.

**4.1.17 Picture of Defect fabric:**





### 2.1.18 Type of Knit Fabrics Produced:

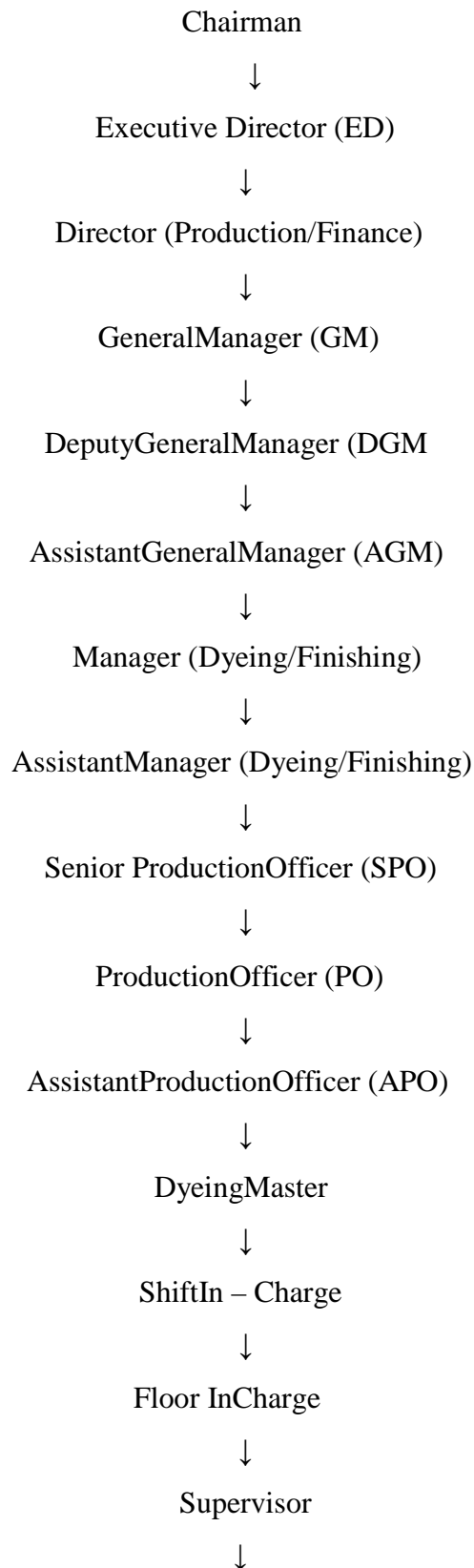
1. Single Jersey
2. Single Jersey Lycra
3. 1×1 rib
4. 2×2 rib
5. 2×1 rib

6. Interlock
7. Terry
8. Fleece
9. Jacquard
10. Baby Terry
11. etc.





#### 4.2.2 Organogram of Dyeing Section:



Operator



Helper

Above managerial system must for better management. But it is very rear because all of the industries are not same in volume and not interested to main all of the class of the managerial system. For this reason, some part of the managerial system could be absent.

#### 4.2.3 Process Flow Chart of Dyeing:

Grey Textile Materials (Fiber, Yarn or fabric)



Singeing



Desizing



Scouring



Bleaching



Mercerizing



Dyeing/Printing



Finishing



Marketing

Now I like to discuss shortly about the different terms of the flow chart. Here, grey textile materials are fiber, yarn or fabric which is also consider as the raw materials for dyeing.

**Singeing** is the first steps of pre-treatment. The process by which loose, hairy and projecting fibers are removed is called Singeing.

**Desizing** is the second steps of pre-treatment. By this process gummy materials are removed.

Also size materials removed by this process.

**Scouring** is the third steps of pre-treatment. This process is performed for removing impurities of the textile materials.

**Bleaching** is another important step which is used to reduce natural color of the raw materials. Dyeing performance depends on it much more.

**Mercerizing** is the special types of treatment. It performs if buyer wants. It is an additional treatment. It increases the strength and luster of the materials.

**Dyeing** is the main process where a white material becomes decorated by different colors.

We have to know about the depth of shade of the materials.

**Printing** is called as localized dyeing. Different types of printing are done for giving special appearance on colored or white fabric.

**Finishing** is the last treatment of wet processing. Different types of properties can be added to the materials by different finishing effects.

**Marketing** is our main goal. Say, if we done everything but there have no buyer then everything is waste. So we should have a strong marketing department.

So, all of this is about flow chart of Dyeing.

#### 4.2.4 Loading Capacity of Dyeing Machines:

M/C No	Brand	Capacity	Flauroscent	Loading Capacity on the basis of GSM Range				
				110-120	130-150	160	180	200+
				65%	75%	82%	88%	93%
1	Thies	720	468	540	590	634	670	691
2	Thies	720	468	540	590	634	670	691
3	Thies	540	351	405	443	475	502	518
4	Thies	350	228	263	287	308	326	336
5	Dilmenler	700	455	525	574	616	651	672
6	Dilmenler	1050	683	788	861	924	977	1008
7	Dilmenler	700	455	525	574	616	651	672

8	ATYC	800	520	600	656	704	744	768
9	Dilmenler	150	98	113	123	132	140	144
11	Dilmenler	1050	683	788	861	924	977	1008
12	Dilmenler	1050	683	788	861	924	977	1008
13	Dilmenler	1500	975	1125	1230	1320	1395	1440
14	Dilmenler	1500	975	1125	1230	1320	1395	1440
15	Dilmenler	1050	683	788	861	924	977	1008
16	Dilmenler	1050	683	788	861	924	977	1008
17	Dilmenler	350	228	263	287	308	326	336
18	Dilmenler	350	228	263	287	308	326	336
19	Dilmenler	150	98	113	123	132	140	144
20	Dilmenler	150	98	113	123	132	140	144
		13930	9055	10448	11423	12258	12955	13373
<b>Note: For Turquoise combination &amp; Royal colour loading should not be more than 80% of m/c</b>								<b>AVG X 2 =24182</b>

#### 4.2.5 Bulk Dyeing Machine Specification:

Machine No.	Brand	Capacity (kg)	Origin	Unit	Qty.	Total Capacity	Type
1,2	Thies	720	Germany	1	2	1440	HHP
3	Thies	540	Germany	1	1	540	HHP
4	Thies	350	Germany	1	1	350	HHP
5,7	Dilmenler	700	Turkey	1	2	1400	HHP
6	Dilmenler	1050	Turkey	1	1	1050	HHP
8	ATYC	800	Spain	1	1	800	HHP
9	Dilmenler	150	Turkey	1	1	150	HHP
11,12,15,16	Dilmenler	1050	Turkey	2	4	4200	HHP
13,14	Dilmenler	1500	Turkey	2	2	3000	HHP
17,18	Dilmenler	350	Turkey	2	2	700	HHP
19,20	Dilmenler	150	Turkey	2	2	300	HHP
				<b>Total</b>	<b>19</b>	<b>13930</b>	

#### Machine Type 01

Name of the machine: Winch Dyeing Machine (HHP Jumbo Jet Flow)

Brand Name: Thies

No. of machines: 4

Manufacturer: Germany.

Capacity: 350, 540, 720, 720 Kg

Year of manufacturing: 2000

**Specification:**

- Maximum operating temp – 135<sup>0</sup>C
- Maximum operating pressure – 3.5 bar

**Machine Type 02**

Name of the machine: Winch Dyeing Machine (HTHP Jumbo Jet Flow)

No. of machine: 10

Brand Name: DILMENLER

Manufacturer: Turkey

Capacity: 150 (3), 350 (2), 700 (2), 1050, 1500 (2) Kg

Year of manufacturing: 2003

**Specification:**

- Maximum operating temp – 135<sup>0</sup>C
- Maximum operating pressure – 3 bar
- No of nozzle – 4
- Motor
- Winch motor – 4
- Pump motor – 1
- Stirring motor – 1

**Machine Type 03**

Name of the machine: Winch Dyeing Machine (HTHP Jumbo fuel Automatic)

No. of machine: 04

Brand Name: DILMENLER

Manufacturer: Turkey

Capacity: 1050 (2) Kg

Year of manufacturing: 2003

**Specification:**

- Maximum operating temp – 135<sup>0</sup>C
- Maximum operating pressure – 3 bar

- No of nozzle – 4
- Motor
- Winch motor – 4
- Pump motor – 1
- Stirring motor – 1

#### **Machine Type 04**

Name of the machine: ATYC Dyeing Machine

No. of machine: 01

Brand Name: ATYC

Manufacturer: TERRASSA

Capacity: 900 Kg

Year of manufacturing: 2002

#### **Specification:**

- Maximum operating temp – 1350C
- Maximum operating pressure – 3.5 bar (6 bar max.)

### **4.2.6 Sample Dyeing Machine Specification:**

#### **Machine Type 01**

Name of the machine: Winch Dyeing Machine

Machine Type: Sample Dyeing

No. of machine: 02

Brand Name: DILMENLER

Manufacturer: Turkey

Capacity: 50 (2) Kg

Year of manufacturing: 2003

#### **Machine Type 02**

Name of the machine: Jet Dyeing Machine

Machine Type: Sample Dyeing

No. of machine: 02

Brand Name: FONGS

Manufacturer: SHENZHEN



Capacity: 50 (2) Kg

Year of manufacturing: 1997

### **Machine Type 03**

Name of the machine: Winch Dyeing Machine

Machine Type: Sample Dyeing

No. of machine: 02

Brand Name: SETEX

Capacity: 50 (2) Kg

### **Machine Type 04**

Name of the machine: Bangla Dyeing Machine

Machine Type: Sample Dyeing

No. of machine: 09

Capacity: 10 (3), 15 (3), 30 (3) Kg.

## **4.2.7 Lab Dyeing Machine Specification:**

### **Machine Type 01**

Name of the machine: Rapid Lab Dyeing Machine

Machine Type: Lab Dyeing

No. of machine: 04

No of Can: 24 (Glycerine bath), 10 (water bath).

### **Machine Type 02**

Name of the machine: Smart Dyeing Machine

Machine Type: Lab Dyeing

No. of machine: 02

No of Cane: 16, 18

## **4.2.8 Operation Process:**

### **Preparation:**

1. Turn on power on main panel
2. Open valve for cooling water of main pump

3. Check steam, water & air

+ Steam pressure: 5 – 6 kg/cm<sup>2</sup> G

+ Water pressure: 1.2 – 2 kg/cm<sup>2</sup> G

+ Air pressure: 5 – 7 kg/cm<sup>2</sup> G

4. Adjustment of feeding valve as per production item & capacity

### **Putting fabric into the machine:**

1. Select water supply level

2. Supply water automatically by pushing ‘turn on’ button and stop by ‘turn off’ button.

3. Take up edge of fabric to fabric gate through guide of the reel

4. Put edge of fabric to nozzle

5. Start main pump and put whole fabric with adjusting feeding by valve up to remaining 2 -3 meters’ fabric end

6. Stop main pump and pull up 2 -3 meters of fabric edge by stick

7. Joint both ends of fabric

8. Start main pump & reel to circulate whole fabric and adjust torque of speed

9. Make sure if fabric circulation is normal, then close the door of the gate, (Check again reel speed)

### **Operation:**

1. Close the door

2. In-put the pattern on programmer controller

3. Mix dyeing stuff & chemical in dyeing-mixing tank and pour it with using pouring pump by adjusting feeding valve, after pouring, feeding valve shall be closed

4. Switch ‘run’ on programmer setting device

5. Automatic operation

- Select the switch of water supply to ‘automatic’ on main panel
- Push the button of automatic operation, then automatically operation will go through heating, holding, cooling, washing as per programming. Put ‘stop’ button when finishing buzzer will ring.
- Open the door and take out fabric

### **Caution:**

#### **1. Before operation:**

(1) Check the power (Voltage/hz) wrong Voltage / Hz will cause to brake motor,

meter etc

- (2) Check air pressure
- (3) Clean inside of tube before dyeing
- (4) Set the meter correctly as per dyeing method
- (5) Check every valves

## **2. Starting operation:**

- (1) Check closing the door perfectly
- (2) Set pressure below 1 kg / cm<sup>3</sup> by watching pressure meter
- (3) When temperature will be over more than 800C, do not forget item (1) & (2)
- (4) Do not start pump when tube is empty
- (5) Put definitely cooling water before starting operation because pump & reel is made for cool water

## **3. During operation**

- (1) Check if meter is working correctly during operation
- (2) Check if any strange vibration
- (3) Check if any strange sound of pumping
- (4) Check if pressure in the tube is too high
- (5) Check if temperature in the tube meet programming
- (6) Start pump when feeding steam & cooling water
- (7) Check if reel is working correct under high temperature & high pressure

## **4. Nozzle installation**

Set nozzle base into nozzle-casing and install nozzle by turning it clock wise.

After install nozzle, turn it one round by anti-clock wise to make 2 mm gap. The gap on nozzle shall be adjusted by kind of fabric

## **5. After operation**

- (1) Before opening the door, check if air pressure of inside the tube is 0 kg/cm<sup>2</sup> and temperature of inside the tube is between 800-900C if the pressure is still remained or temperature is more than 800C, it is very dangerous to open the door
- (2) Temperature inside the tube shall be under 800C for manual draining
- (3) Turn off the power after operation and close the valve

## **6. Maintenance:**

- o Keep cleaning seal packing of the door and surface to touch the packing to be prevented from dust and hurting
- o Keep electric portion, pump and control panel not to be wet by water
- o Keep tight valve shaft seal ground packing of each valve by tightening sometime
- o Check valve seat part of air valve & drain valve sometime
- o Keep tight each volt
- o Make often oiling rotating part
- o Inspect mechanical seal according to manual of pump
- o Keep adding grease & oil in pump bearing part according to manual of pump
- o Inspect sometime if safety valve is working correctly
- o Inspect sometime if steam trap is working correctly
- o Inspect meters of pressure and temperature

## **6.12 Production Parameters:**

### **a. pH:**

- During H<sub>2</sub>O<sub>2</sub> bleaching pH 9 – 11
- During reactive dyeing pH 10.5 – 12
- During disperse dyeing pH 4.5 – 5.5

### **b. Temperature:**

- For cotton scouring 90-95°C
- For cotton cold wash 30 – 40°C
- For cotton hot wash 70-80°C
- For cotton acid wash 60-70°C
- For cotton dyeing 80-90°C (For hot brand)  
40-60°C (For cold brand)
- Polyester dyeing: 100-130°C

### **c. Time:**

- For scouring 60-90 mins
- For reactive dyeing 60-90 mins
- For disperse dyeing 60-90 mins

### **d. M:L ratio:**

- For reactive dyeing M:L ration maintained between 1 : 8 to 1 : 10

#### 4.2.9 Dyeing Recipe:

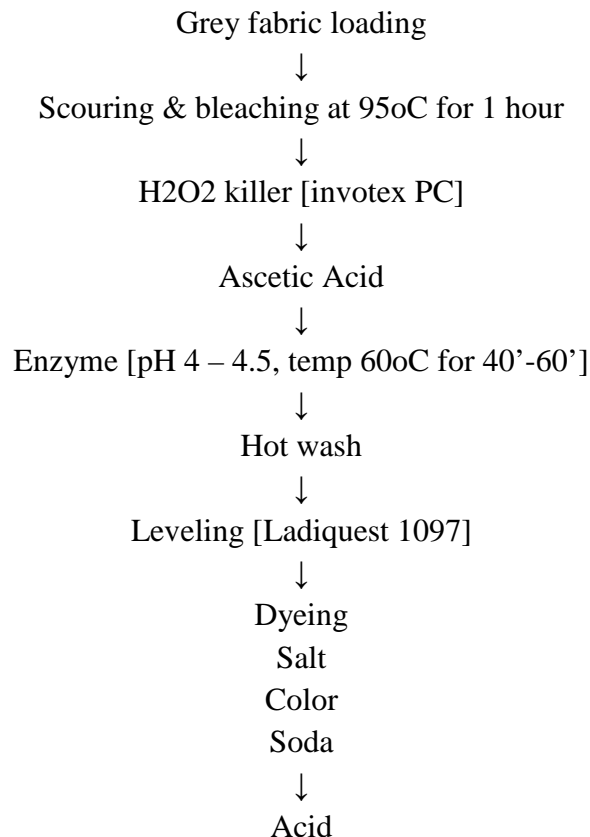
<b>Fabric Composition: 100% Cotton</b>		
<b>Fabric Type: Single Jersey</b>		
<b>Colour Name : Black</b>		
<b>Scouring &amp; Bleaching:</b>		
<b>Product Type</b>	<b>Product Name</b>	<b>Dosage</b>
<b>Anti-foam</b>	<b>Albaflow JET</b>	<b>0.1 g/l</b>
<b>Anti-crease</b>	<b>Albafluid C</b>	<b>0.5 g/l</b>
<b>Peroxide Stabilizer</b>	<b>Gemstap HP-52</b>	<b>0.5 g/l</b>
<b>Detergent</b>	<b>Imerol DLJ</b>	<b>0.5 g/l</b>
<b>Scouring agent</b>	<b>Caustic Soda</b>	<b>2.0 g/l</b>
<b>Bleaching agent</b>	<b>Hydrogen Peroxide</b>	<b>2.5 g/l</b>
<b>Peroxide Killing:</b>		
<b>H<sub>2</sub>O<sub>2</sub> Killer</b>	<b>Bactosol SAP</b>	<b>0.5 g/l</b>
<b>Neutralisation:</b>		
<b>Neutraliser</b>	<b>Platilon 2900(Acid Buffer)</b>	<b>1.0 g/l</b>
<b>Enzyme Treatment:</b>		
<b>pH adjustor</b>	<b>Platilon 2900</b>	<b>0.4 g/l</b>
<b>Anti-pilling Enzyme</b>	<b>Bactosol CA</b>	<b>1.0 g/l</b>

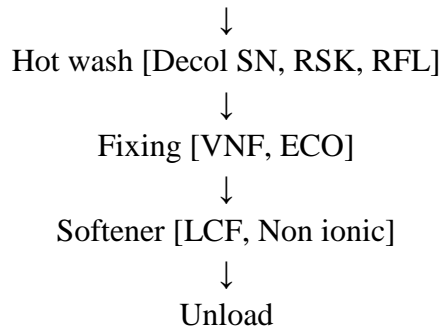
<b>Dyeing:</b>		
<b>Reactive Dye</b>	<b>Novacron Yellow FN2R</b>	<b>0.25%</b>
<b>Reactive Dye</b>	<b>Novacron Red FNR</b>	<b>0.30%</b>
<b>Reactive Dye</b>	<b>Novacron Black WNN</b>	<b>7.50%</b>
<b>Dye bath sequestrant</b>	<b>Ladiquest 1097-U</b>	<b>0.75 g/l</b>
<b>Levelling Agent</b>	<b>Drimagen E2R</b>	<b>0.50 g/l</b>
<b>Anti-crease</b>	<b>Albafluid C</b>	<b>0.50 g/l</b>
<b>Electrolite</b>	<b>Glauber's Salt</b>	<b>80 g/l</b>
<b>Alkali</b>	<b>Soda Ash</b>	<b>20 g/l</b>
<b>Neutraliser</b>	<b>Platilon 2900 (Acid Buffer)</b>	<b>0.5 g/l</b>
<b>Wash off agent</b>	<b>Sandopur SP</b>	<b>2 g/l</b>
<b>Cationic softener</b>	<b>Sapamine CWS</b>	<b>1%</b>
<b>Fabric Composition: 100% Cotton</b>		
<b>Colour Name : Red</b>		
<b>Scouring &amp; Bleaching:</b>		
<b>Product Type</b>	<b>Product Name</b>	<b>Dosage</b>
<b>Anti-foam</b>	<b>Albaflow JET</b>	<b>0.1 g/l</b>
<b>Anti-crease</b>	<b>Albafluid C</b>	<b>0.5 g/l</b>
<b>Peroxide Stabilizer</b>	<b>Gemstap HP-52</b>	<b>0.5 g/l</b>
<b>Detergent</b>	<b>Imerol DLJ</b>	<b>0.5 g/l</b>
<b>Scouring agent</b>	<b>Caustic Soda</b>	<b>2.0 g/l</b>
<b>Bleaching agent</b>	<b>Hydrogen Peroxide</b>	<b>2.5 g/l</b>
<b>Peroxide Killing:</b>		
<b>H<sub>2</sub>O<sub>2</sub> Killer</b>	<b>Bactosol SAP</b>	<b>0.5 g/l</b>
<b>Neutralisation:</b>		
<b>Neutraliser</b>	<b>Platilon 2900(Acid Buffer)</b>	<b>1.0 g/l</b>
<b>Enzyme Treatment:</b>		
<b>pH adjustor</b>	<b>Platilon 2900</b>	<b>0.4 g/l</b>
<b>Anti-pilling Enzyme</b>	<b>Bactosol CA</b>	<b>1.0 g/l</b>

<b>Dyeing:</b>		
<b>Reactive Dye</b>	<b>Novacron Yellow FN2R</b>	<b>0.50%</b>
<b>Reactive Dye</b>	<b>Novacron Red FNR</b>	<b>2.50%</b>
<b>Reactive Dye</b>	<b>Novacron Black WNN</b>	<b>0.05%</b>
<b>Dye bath sequestrant</b>	<b>Ladiquest 1097-U</b>	<b>0.75 g/l</b>
<b>Levelling Agent</b>	<b>Drimagen E2R</b>	<b>0.50 g/l</b>
<b>Anti-crease</b>	<b>Albafluid C</b>	<b>0.50 g/l</b>
<b>Electrolite</b>	<b>Glauber's Salt</b>	<b>60 g/l</b>
<b>Alkali</b>	<b>Soda Ash</b>	<b>15 g/l</b>
<b>Neutraliser</b>	<b>Platilon 2900 (Acid Buffer)</b>	<b>0.5 g/l</b>
<b>Wash off agent</b>	<b>Sandopur SP</b>	<b>1 g/l</b>
<b>Cationic softener</b>	<b>Sapamine CWS</b>	<b>1%</b>

#### 4.2.10 Dyeing Flowchart:

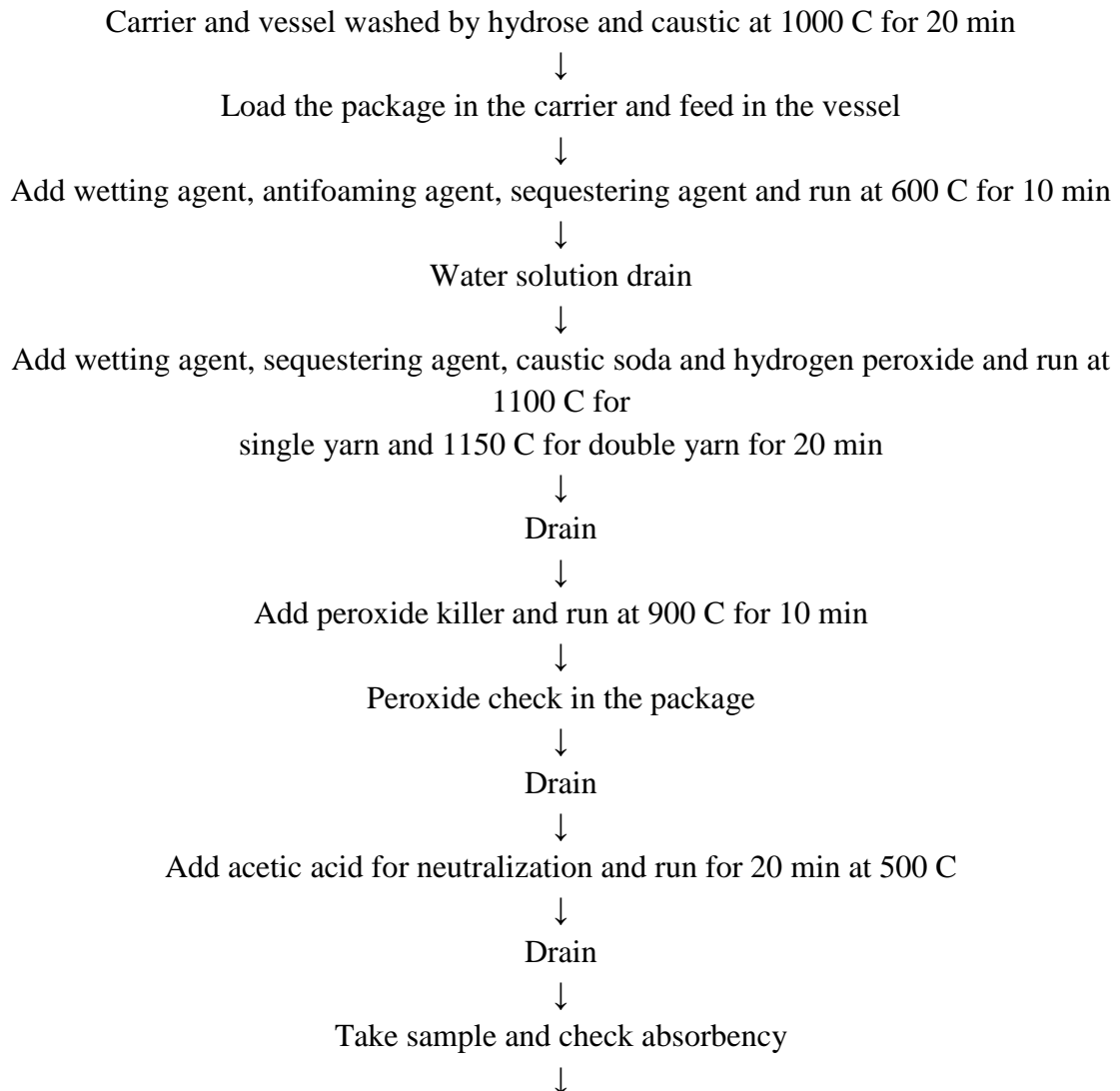
**Production flow chart for 100% cotton:**



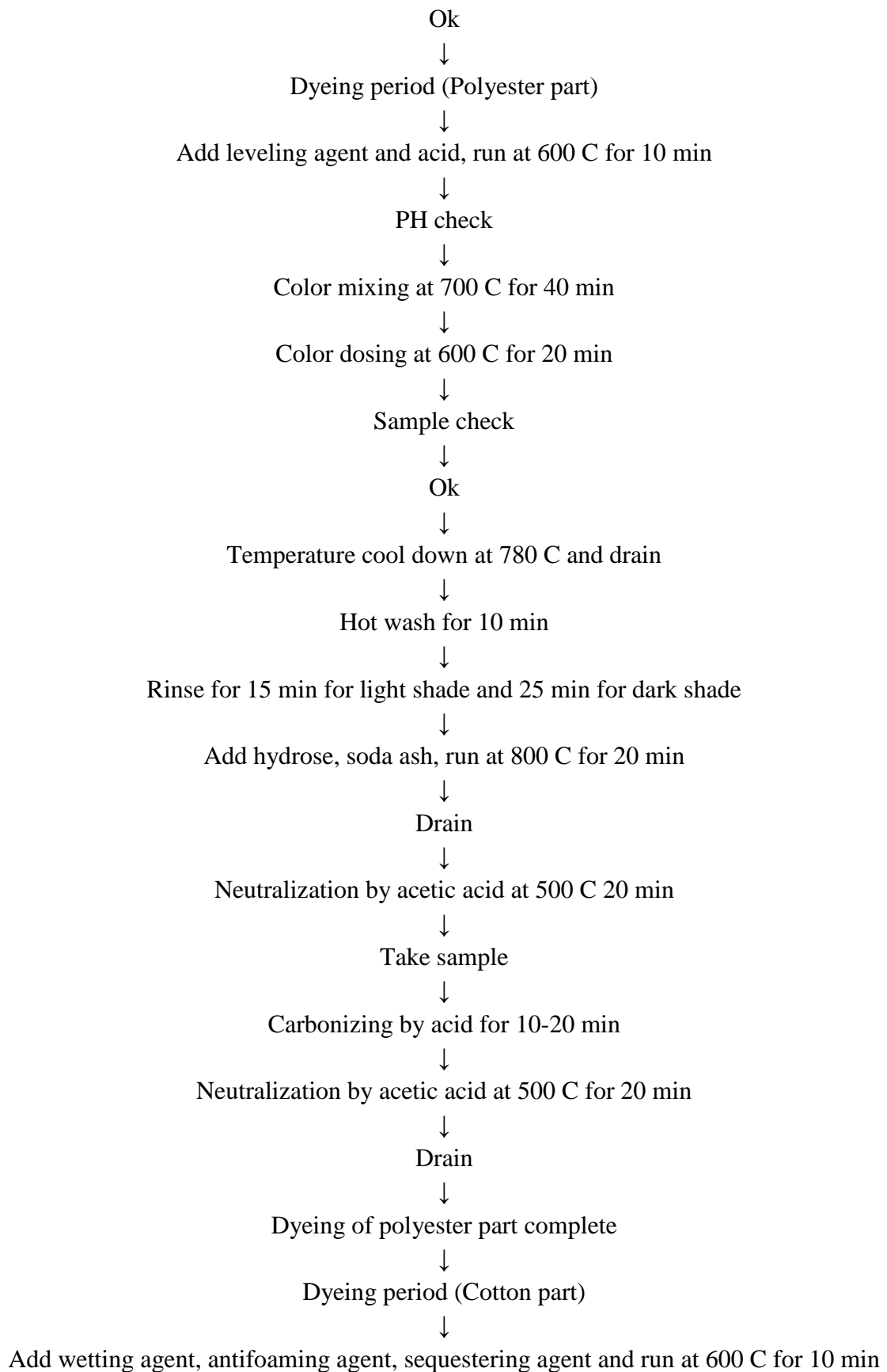


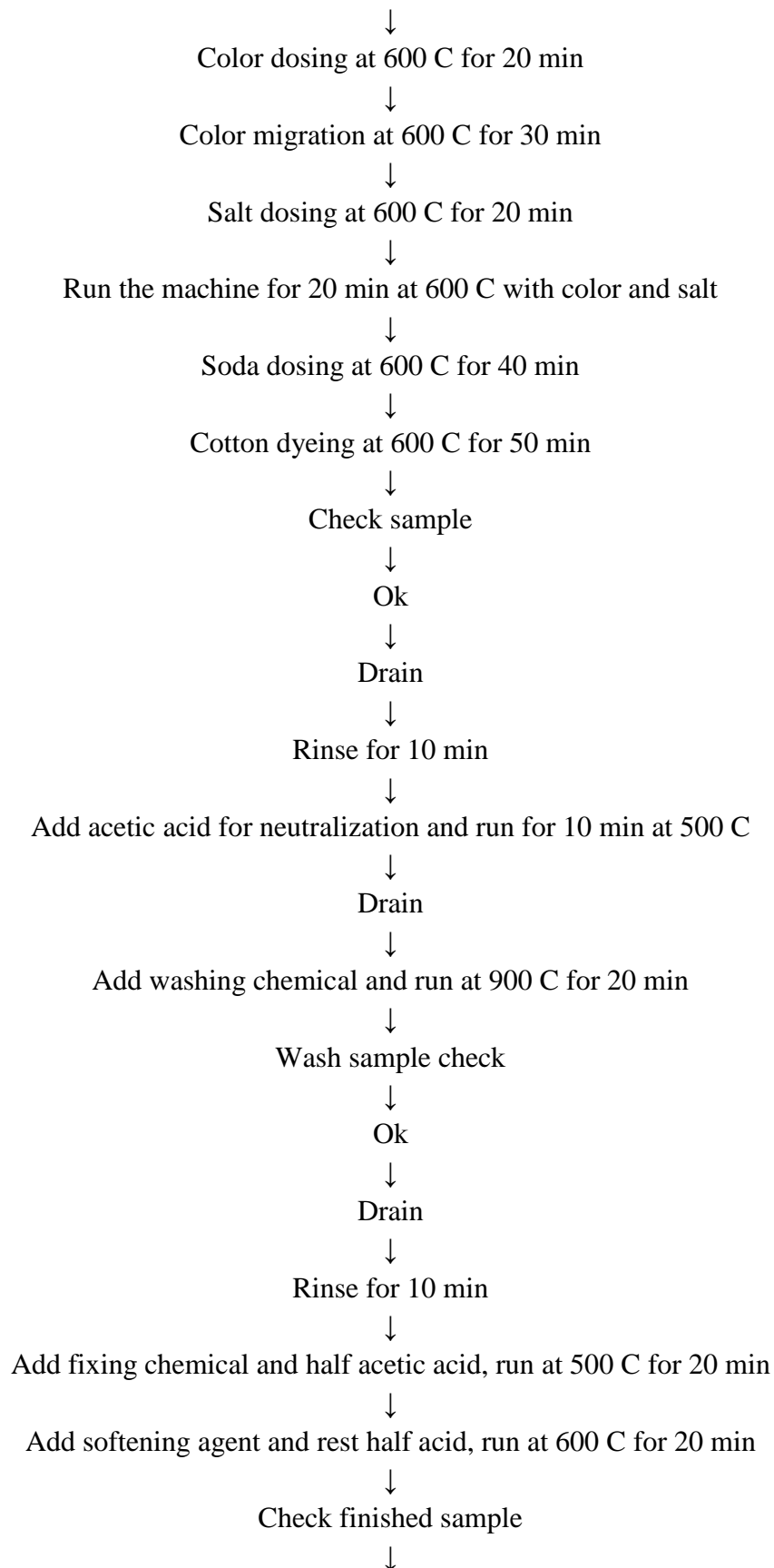
### **Dyeing flow chart of polyester cotton:**

Dyeing sequence of polyester cotton is the combination of polyester and cotton dyeing process. For this reason, this dyeing process is called double part dyeing process. In this dyeing process; polyester part is dyed first than cotton part is dyed.









Ok



Drain

It is note that; dyeing sequence of CVC is as same as P/C dyeing. If we want to dye CVC then we can run the process as same the above process sequence.

### **Dyeing flow chart of cotton with Turquoise Color: (Light Shade)**

Turquoise color dyeing is critical than the normal color dyeing. This type of dyes is used for produce specific color.

Carrier and vessel washed by hydrose and caustic at 1000 C for 20 min



Load the package in the carrier and feed in the vessel



Add wetting agent, anti foaming agent, sequestering agent and run at 600 C for 10 min



Water solution drain



Add wetting agent, sequestering agent, caustic soda and hydrogen peroxide and run at 1100 C for single yarn and 1150 C for double yarn for 20 min



Drain



Add peroxide killer and run at 900 C for 10 min



Peroxide check in the package



Drain



Add acetic acid for neutralization and run for 20 min at 500 C



Drain



Absorbency test of sample



Ok

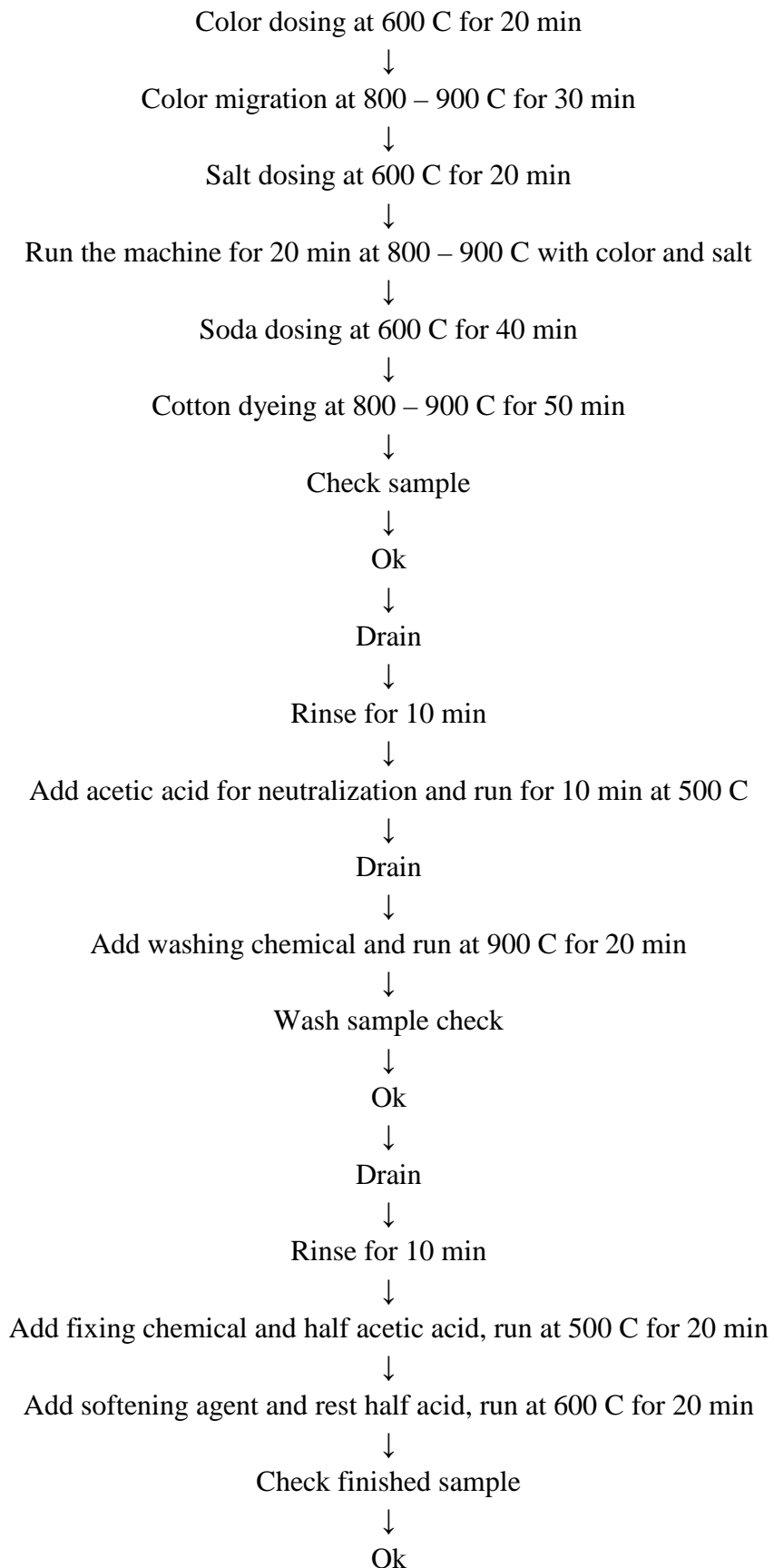


Dyeing period



Add wetting agent, antifoaming agent, sequestering agent and run at 600 C for 10 min

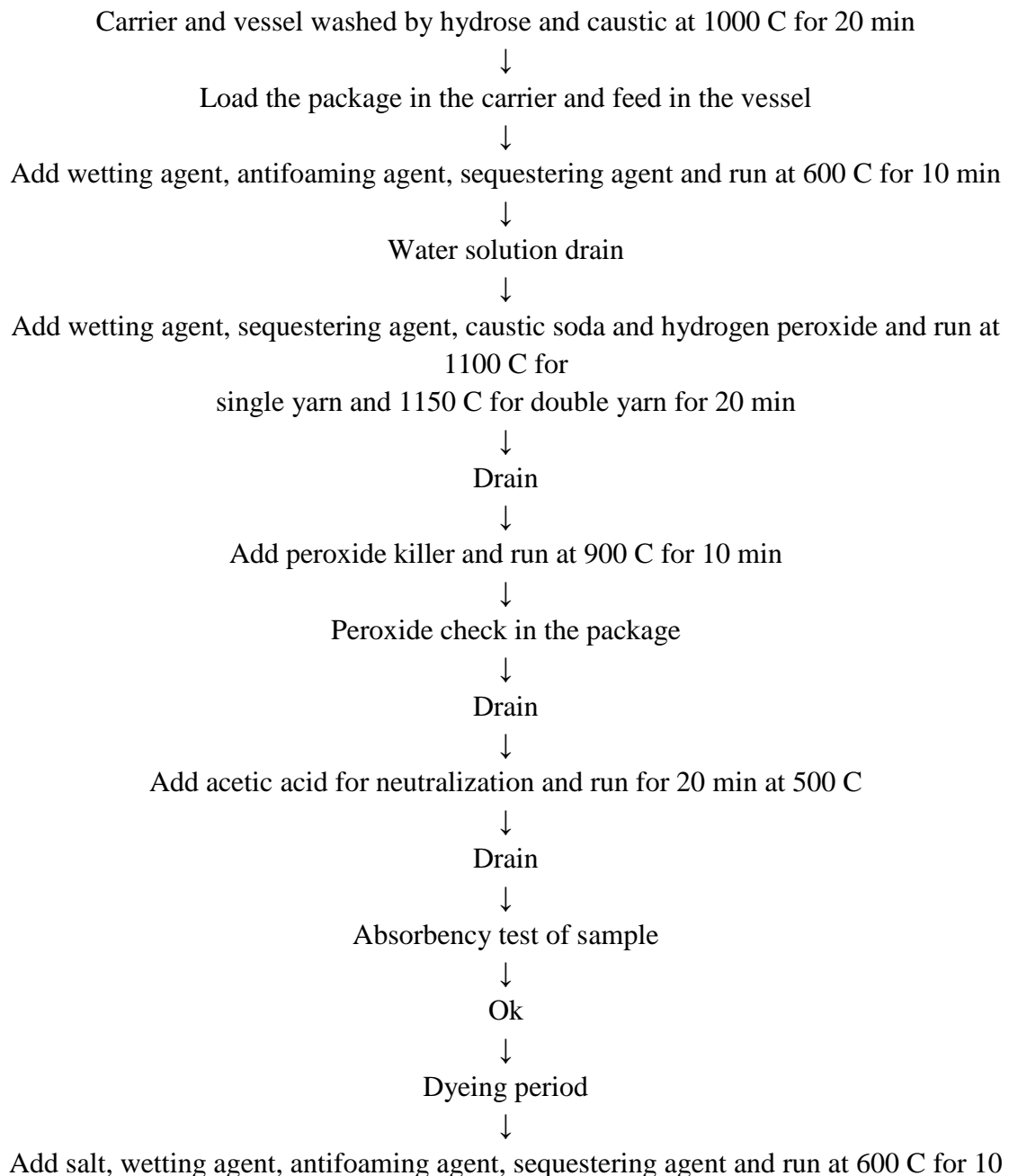


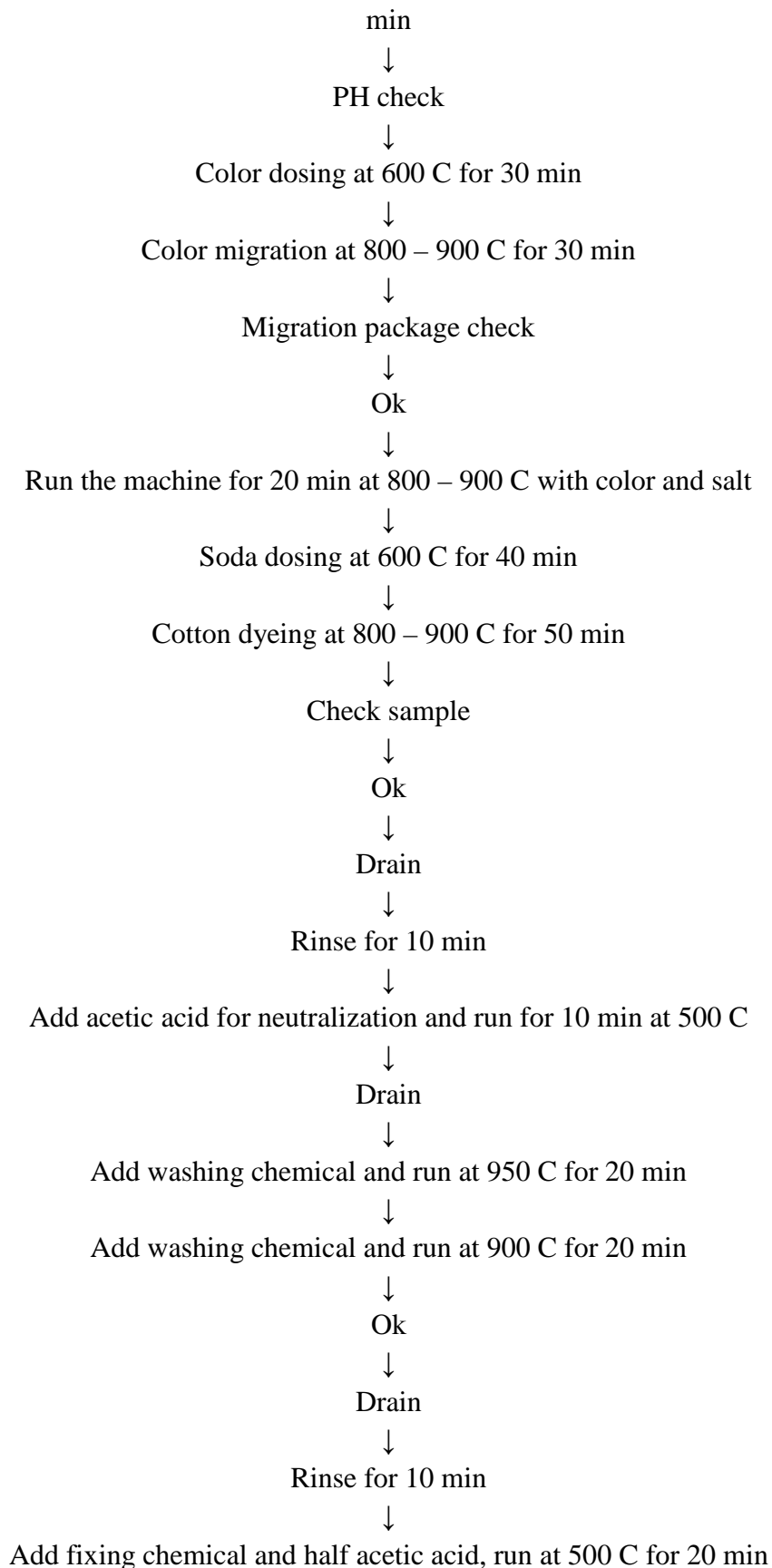


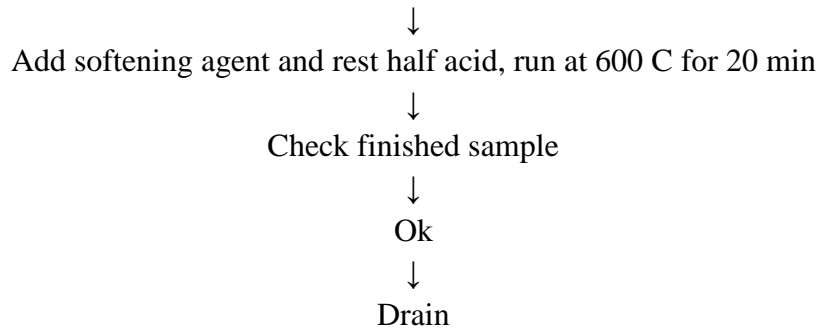
↓  
Drain

### **Dyeing flow chart of cotton with Turquoise Color: (Dark Shade)**

Shade of the textile materials depends on the dyes percentage which is used for dyeing. Chemical which is used for dyeing also vary depending on the dyes used. Generally dark shade means the dyes percentage above 2%. Medium shade dyeing and dark shade dyeing process is nearly same.







### **4.3 Dyeing Finishing Section:**

#### **4.3.1 Process Sequence of Finishing Machinery**

For Tubular form of Fabric:

- De-watering m/c
- Dryer
- Tubular compactor

For Open form of Fabric:

- Slitter
- Dryer
- Stenter
- Open Compactor

For Collar and Cuff:

- Hydro-Extractor m/c
- Softening m/c
- Dryer

Finishing is the final steps of wet processing technology. A textile product either it is dyed or printed it needs to add some finishing features before marketing. By applying different finishing techniques, a product becomes more comfortable to use. So finishing should be easier to apply.

#### **4.3.2 Objects of Finishing:**

1. To improve the attractiveness of the fabric.
2. To increase the life time or durability of the fabric.
3. To meet up specific requirement of the fabric for achieve the final goal.

Finishing plays an important role in the modern age. Everyone likes to wear finished products with some special types of finishing. Finishing of the fabric depends on the requirement of the buyer. Different types of finishing machine are use in finishing operation.

### **4.3.3 Classification of Finishes:**

Textile finishes are classified in different ways. The most common classification are-

**Aesthetics finishes:** This type of finishes make change or modify the appearance of the fabric or hand/ drape properties of the fabrics.

**Functional finishes:** This type of finishes changes the internal performance properties of the fabric.

**Permanent finishes:** It involves a chemical change in fibre structure and do not change throughout the life of a fabric.

**Durable finishes:** Usually last throughout the life of a fabric, effectiveness becomes diminished after each cleaning and near the end of normal use of the fabrics, the finishing is nearly removed.

**Semi-durable finishes:** Usually last several launderings or dry cleanings and many are removal in home laundering or dry cleaning.

**Temporary finishes:** Removed or substantially diminished the first time an article is laundered or dry cleaning.

### **4.3.4 Finishing Machine Profile (Dckil):**

#### **De-Watering Machine:**

Brand Type Origin Unit Qty. Capacity/Day

Calator Tube Sweden 1 1 6000

Fabcon Tube USA 1 1 6000

Bianco Tube Italy 2 1 7000

Bianco Open Italy 21 14000

Taida Open Turkey 1 1 10000

Dilmenler Open Turkey 3 1 10000

Total Capacity 653000

#### **RELAX DRYER:**



Ruckh Gas heated Tube Germany 11 7000  
Santex Gas heated Tube Switzerland 11 6000  
Total Capacity 13000

**STENTER:**

Bruckner6 Chamber Open Germany 2 1 12000  
Taida 6 Chamber Open China 3 1 10000  
TTM 8 Chamber Open Turkey 3 1 15000  
Total Capacity 37000

**COMPACTOR:**

Fab-Con Tube USA 11 7000  
Ferraro Tube Italy 11 6000  
Lafer Open Italy 2 2 12000  
HAS Open Turkey 3 1 10000  
Total Capacity 35000

**BRUSH & PEACH:**

HAS Peach Open Turkey 31 5000  
I Kuang Brush Open+Tube China 3 1 5000  
Gma Tex Brush Open+Tube Germany 31 4000

### **4.3.5 Description of Different Finishing and Washing Machine:**

#### **Hydro Extractor m/c**

- Manufacturer : Nazar Corporation (Pakistan)
- Extraction% : 65% Maximum
- Speed : 1400 rpm
- Extraction time : 5-7 min
- Function : To remove the water from the fabric by centrifugal extraction.

#### **Dewatering Machine**

- Manufacturer: CALATOR (SWEDEN)

Function:

- Reduce water content
- Apply finishing chemical

- Open the fabric from rope form

**Controlling Parameters:**

- Padder pressure : 4-7 bar
- Pick up % : 80-85%
- Speed at m/c : 8-60 m/min

Chemical application:

- Softener: To soften the fabric
- Acetic acid : 0.25 g/l
- pH : 7.5

**Ruckh Relax Dryer (Germany)**

- Gas burner Heated
- 4 Chamber, 1 burner/ 2 chamber.

**Santex Relax Dryer (Switzerland)**

- Steam Heated
- 2 Chamber
- Machine set up for Ruckh relax dryer is as follows:
- Machine Parameters Set-up Value

Temp. Setting:

- (100-120)°c for White Shade
- (120-130)°c for Light Shade
- (130-140)°c for Dark Shade
- (140-170)°c for Curing

Blower Fan setting Auto

Exhaust Fan setting Auto

Machine Speed 3-35 m/min (depends on quality of fabric)

Over feed 0-40 % (depends on the fabric construction)

Width of Expende Setting 45- 114 cm (depends on the required fabric width)

Burner Gas pressure 10-15 / bar

**Slitter Machine**

Slitter machine is used for tubular knit fabric to make it in open form. In open form fabric finishing line; slitter machine is used after hydro-extractor, de-watering and drying machine.

Slitting is a process that is applied for cutting the tubular fabric through the intended break Wales line on lengthwise direction prior to stenter processing. During slitting, it is required to be aware about the cutting line otherwise, fabric faults can be occurred there.

Objectives of Slitting:

- To open tube fabric according to specific needle mark.
- To prepare the fabric for next stentering process.

Slitter Machine parts and their functions:

1. Rotary Blade: Rotary blade is used for cutting the fabric through break Wales line.
2. Ring: Ring is use to help the cutting process.
3. Guide Roller: After slitting, plaiting of the fabric is done. Guide roller guides the fabric to plaiting.
4. Plaiting: Open fabric is make plait by plaiting.
5. Sensor: Sensor is used for identify the specific Wales line. It makes sense for cutting through break Wales's line.

Checking Parameters:

1. Cutting Line Check: Fabric cutting line is checked by the operator of the slitting machine. Operator checks that the rotary blade cut fabric through break Wales's line or not.
2. Bow and Slant check: Bow and slant is checked in the delivery side of the machine by the Manufacturer: Bianka Slitter m/c (Germany)

Speed: 20-25 m/min

### **Stenter Machine**

Stenter is used for open form fabric. After passing the open compactor, fabric enter into the stenter. Cotton fabric shrinks widthwise and weft distorted due to bleaching and dyeing process. The main function of the stenter is to stretch the fabric widthwise and to recover the uniform width.

Functions of Stenter:

1. Heat setting is done by the stenter for lycra fabric, synthetic and blended fabric.
2. Width of the fabric is controlled by the stenter.
3. Finishing chemical apply on fabric by the stenter.
4. Loop of the knit fabric is controlled.
5. Moisture of the fabric is controlled by the stenter.
6. Spirality controlled by the stenter.

7. GSM of the fabric is controlled by stenter.
8. Fabric is dried by the stentering process.
9. Shrinkage property of the fabric is controlled.
10. Curing treatment for resin, water repellent fabric is done by the stenter.

Machine Specification:

Brand Name :Bruckner

Serial no: 72276-0463

Origin: Germany

Year of manufacture: 1995

Speed range: 15-30 m/min

Temperature range 50-250C

Used utilities: Electricity, Gas, Compress air, Steam

Production capacities: 8 ton /day

No. of chamber: 3

Maximum fabric width: 102”

Minimum fabric width: 30”

Steam pressure: 2 bar

Air pressure: 10 bar

Applied for: Open tube fabric

No. of automatic burner: 6

Extra Attachment: Mahlo weft straightener

M/C parts: Burner, Nozzle, Exhaust air fan, Over feed roller,

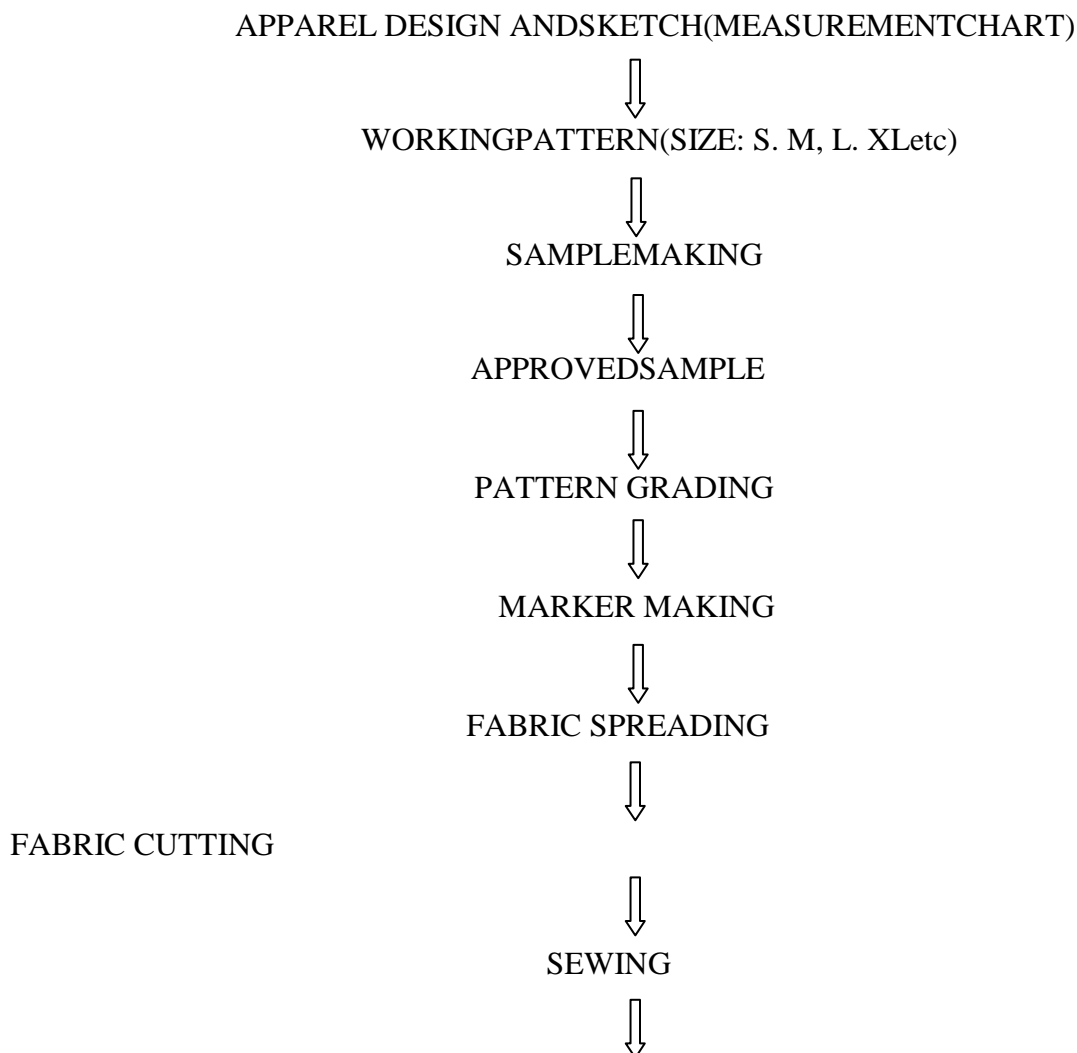
Suction fan, Chain arrangement

## 4.4 Garments Section:

### 4.4.1 Introduction:

Apparel and Garment are two similar words but apparel is used in USA standard and Garment is used in UK standard. Finally it turns into Ready-made Garment (RMG). So Knit Concern Apparel is a USA standard Ready-made Garment. According to Apparel classification it is divided into two parts - a) Bespoke Garment (Tailoring system) & b) Ready-to-wear (Industrial system). In Knit Concern Apparel, Ready-to-wear (Industrial System) is used. In Industrial system, a group of people or a group of sizes (S, M, L, XL etc) is required to make an apparel.

### 4.4.2 Flow Chart of Apparel Manufacturing:



INSPECTION



FINISHING



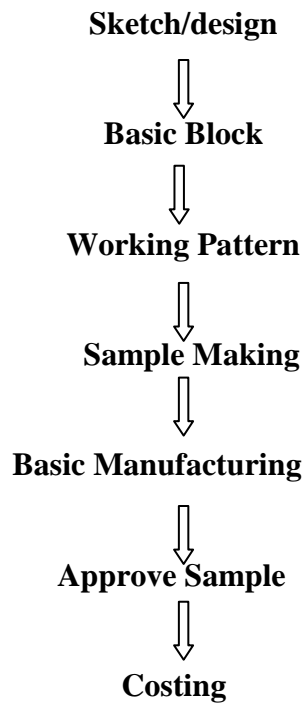
FINAL INSPECTION



SHIPMENT

### 4.4.3 Sample Section:

This section which maintains various types of sample that is called Sample section. The word in Knit Concern Apparel is the "CORRECTS SAMPLE AT THE FIRST TIME". This section works according to the sequence.

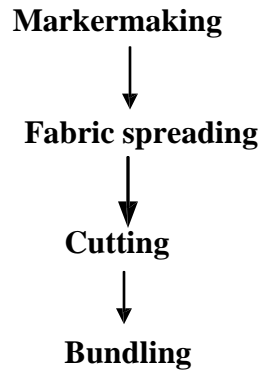


### 4.4.4 Objectives:

1. To make correct sample.
2. To make master pattern.
3. To pattern grading.

#### **4.4.5 Cutting Section:**

Cutting is the process which cuts out the pattern pieces from specified fabric to make the garments. Using the markers from graded pattern and in accordance with the issued plan, fabrics are cut to prepare the garments assembly. Flow chart of garments cutting section.



#### **4.4.6 Marker Making:**

Markers are layout of pattern pieces for the purpose of fabric cutting. Great effort is made to arrange patterns in the most economizing manner within the constraints of fabric type, width, nap, fabric design.



#### 4.4.7 Computer Aided Design (CAD)

The design which is made by computer with the help of Digitizer is called Computer Aided Design (CAD). The CAD can be 2D or 3D. In Knit Concern Ltd 2D is used.

Software Brand:

- **Lectra System**
- **Optitex System**

##### **Lectra Systems:**

**Step One** : At first the pattern needs to be placed on the digitizing table.

**Step Two** : For every part, a new sheet is taken.

**Step Three** : Then click twice the F button and for curve position, any part click C, Any. Fault to take point D = delete

**Step Four** : For Grain Line, click A

**Step Five** : After one part digitizing is finished, click F to finish.

**Step Six** : Repeating the whole process, another part can be digitized.

##### **Effect of Cad:**

All the jobs described so far lend themselves ideally to computerized graphics. The master patterns or blocks can be stored as images in the computer and called up as required, together with a list of each of the pattern parts for that block. With the use of a light pen, each part can be brought up in turn and enlarged on the screen. This job obviously retains its skill and even requires the added skill of computer operation. With interactive graphics, the pattern maker can now adjust each part to match the designer's concept.

##### **Effect of Cad On Garment Design And Pre-Assembly**

- Block images stored in computer
- Grading technique replaced by expert system
- Percentage wasted computed and displayed for each layout
- Fabric pattern constraints incorporated in the program

- Learning system incorporated
- Lay-makers deskilled
- Cutters replaced by CAD/CAM
- Women take over as operators
- Wages reduced

#### **4.4.8 Fabric Spreading:**

Spreading means the smooth laying out of fabric in relation to marker length and marking width i.e. specified length and width.



#### **4.4.9 CUTTING:**

Then cut the fabric according to pattern or marker setting. Fabric cutting is the most important part of a garment factory. Cutting different part of garment apparel according to the pattern is called fabric cutting.



#### 4.4.10 Numbering:

Sorting out the components according to size and for each size make individual bundle. Numbering includes....

- Cutting no
- Bundle no
- Style no
- Quantity
- Color
- Parts no
- Size
- Serial no



The basic components of sewing are -

- ❖ Sewing Thread,
- ❖ Fabric and
- ❖ Elements of Machine.

#### 4.4.11 Sewing machines:

The machines which are used in sewing section.

- Plain m/c
- Over lock m/c
- Flat lock m/c
- Kansai m/c
- Chain stitch m/c
- Vertical m/c
- Two needle m/c
- Feed of the arm m/c
- Zigzag m/c
- Bar tack m/c
- Button holding m/c
- Button attach m/c
- Snap button attach m/c
- Eye late hole m/c



#### 4.4.12 Different types of sewing machines:

**Plain m/c**

**Properties:**

- One needle

- Two tensioners
- Three guide
- One hook
- Two thread
- One bobbin case
- One magnate guide

**Application:**

- Bottom hemming
- Belt top seam
- Belt joint
- Loop tack
- Pocket joint
- Zipper joint
- Flap top
- Flap joint
- Front rise
- Back rise

**Over lock m/c**

**Properties:**

5 thread

4tensioner

2 knives

2needle for 5thread

1needle for 3thread

3looper for 5thread

2looper for 3thread

**Application:**

Used for over lock stitch

**Fat Lock M/C:**

**Properties:**

- 4 tensioner
- Contain a holder

- thread
- needle

**Application:**

- Zig zag stitch
- Knit hemming
- Loop making

**SEWING PROCESS FOR T- SHIRT:**

- ❖ Shoulder Join
- ❖ Neck R/B Make
- ❖ Neck Joint
- ❖ Label Joint
- ❖ Back Tip Joint
- ❖ Sleeve Hem
- ❖ Sleeve Joint
- ❖ Side Seam
- ❖ Sleeve Tag
- ❖ Body Hem
- ❖ Lop Join

**SEWING PROCESS FOR POLO- SHIRT:**

- ❖ Shoulder Joint
- ❖ Placket Joint
- ❖ Placket Top Seam
- ❖ Box Tuck
- ❖ Body Hem
- ❖ Side Joint Seam
- ❖ Side Top Seam
- ❖ Nose Tuck
- ❖ Collar Joint
- ❖ Collar Tape Joint
- ❖ Top Seam
- ❖ Joint
- ❖ Top Joint
- ❖ Top

- ❖ Join
- ❖ Armhole Top Seam
- ❖ Sleeve Tuck
- ❖ Side Stitching Tuck
- ❖ Side Stitching Tape
- ❖ Side Stitching Top Seam

#### 4.4.13 FINISHING SECTION:

Finishing is the last processes to making apparel. The finishing process sequences are as follows

Finishing input( style, color, size wise)

Initial quality check

Stop removing

Ironing/pressing

Inspection

Hang tag

Get up change

Folding

Poly

Barcode

Metal check

Cartooning

Final inspection by buyer





#### **4.4.14 Material used in finishing:**

- Neck board
- Back board
- Full board
- Hang tag
- Tag pin
- Tissue paper
- Al pin
- Ball pin
- Elastic clip
- Hanger
- Poly bag
- Size sticker
- Gum tape
- Inner box
- Master carton box
- Pp belt
- Blister

#### **Cleaning:**

In this process extra sewing thread and various unnecessary things are removed from the garments body. Air suction is done to remove this. Extra part of sewed thread is also cut from the garments by scissor.



**Checking:**

Prepared garments are now passes through the metal detector for checking.if any kinds of metal such as broken needle etc found then the machine stops and the garments are checked to remove the thing.

**Ironing:**

Garments are now being ironed at a high temperature which will cause no harm to the garments. special types of table are used for ironing. table is selected according to the fabric characteristics.

**Tagging:**

After ironing tags are attached with the garments as per buyers requirements. if the tags are needed to be printed, a sticker is made with that. Now the sticker is attached with the garments with heat(100oc-150oc) is applied to fix it.

**Folding:**

Do creases result from applying result to fold. If we wrap a paper around a cylinder, it will be easy to straighten again. If we make a fold in the paper, it will be more difficult. If we apply pressure along the fold.it will be more pronounced.

The delta composite knitting industry ltd uses following folding styles,

- Flat folding
- Roller folding
- Crunching folding

**Hangers:**

Hangers must be secured with a cable tie. All film specification must be same in pre made bags. The supplier must be ensure that the heat setting is adequate to seal the bags sufficiently without overheating the bags and weakening the bags strength. Garments to hang loose in the bags. Bottom edge of the garments to be above the bottom edge of the bags. Hanger opening is to face left.

**Packing and packaging requirements:**

To ensure the cartoon is enough strong and secure the content inside in the normal transport and distribution process according to the standards. Ensure the contents of the pack are packed according to the instruction.

The delta composite knitting industry ltd using following four types of packaging systems,

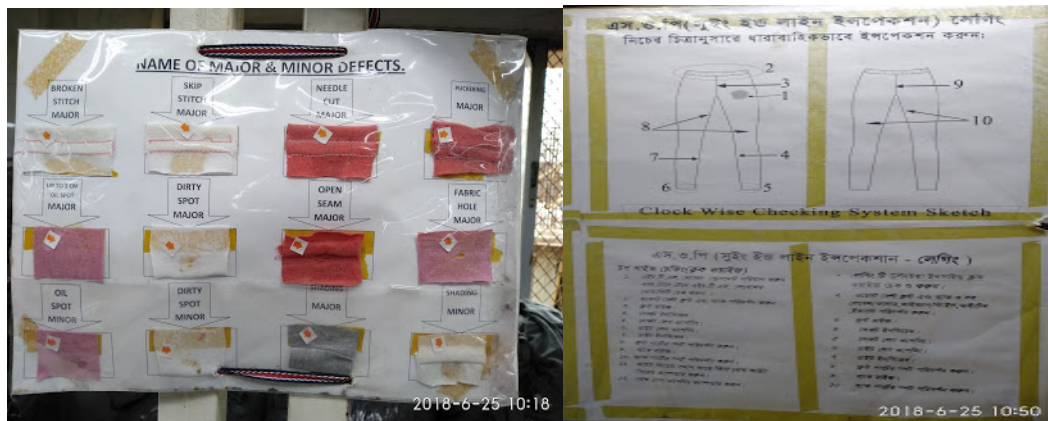
- Solid color & solid size
- Solid color & assort size
- Assort color& assort size
- Assort color & solid size

#### 4.4.15 Final inspection:

Its main purpose is to assure quality. After apparel preparation, before packing this shorts of inspection is done to remove the faulty garments. Defects are identified here and if possible garments are again send to respected section to solve the problems.

#### 4.4.16 Defects in garments:

For the textile and apparel industry product quality is calculated in the terms of quality and standard of fibres, yarns, fabrics color, design and the final finished of the garments. Quality control in terms of garments manufacturing, pre-sales and post-sales services delivery, pricing, etc are essential for any garments manufacturer ,trader, or exporter. Certain quality related problems often seen in garments manufacturing like sewing , color, sizing, or garment defects should neve be over looked.



#### Defect classification:

Types of defects considered in AQL ,,

- **Critical Defects:** are those that render the product unsafe or hazardous for the end user or that contravene mandatory regulations.
- **Major defects:** can result in the product’s failure, reducing marketability, usability.
- **Minor Defects:** do not affect products marketability or usability but represents

workmanship defects that make the product fall short of defined quality standard.

#### **6.9 Basic Symbols for all systems:**

##### **LABELS**

Label is the identification of Apparel. Labels are various types named main Label and Size label.

##### **Main Label:**

- ❖ Indicate the Trade name of Apparel.

##### **Size Label:**

- ❖ Indicate the size of the Apparel.

#### **4.4.17 MERCHANDISING SECTION:**

Merchandizing section is the most important section for any industry. It is quite impossible to continue any industry without this section. The job done from buyers order up to shipment.

##### **OBJECTIVES:**

- To satisfy the buyer requirements.
- To work systematically to achieve good production.
- To shipment the right time.
- To communicate and motivate excellently with buyer.
- To fixed the product price.

##### **ORDER SHEET:**

A group of sheets which contents the followings.

- Apparel Design and Sketches
- Apparel Measurements
- Stitches
- Trimmings and Details
- Other Quality & size ratio
- Packing Instructions
- Other Details etc.

## **4.5 Utility Section**

Utility section contents of

- Boiler
- Generator
- Air compressor

### **4.5.1 Boiler:**

Brand name: Cleaver brooks

Origin: USA

Capacity: 10000 kg/hr

Specification:

- Feed water temperature: 60oc
- Feed water hardness: 2
- System pressure: 500 psi
- Types of steam: wet system
- Steam temperature: 1500c
- Fuel used: natural gas

### **4.5.2 Generator:**

Machine no: 1

- Brand name: Waukesha
- Capacity: 1126 kv

Machine no: 2

- Brand name: Cater pillar
- Capacity: 390 kv

### **4.5.3 Air Compressor:**

Air compressor is a machine which compresses the air and raises its pressure. The air compressor sucks the air from the atmosphere, compresses it and deliver the same under a high pressure to a storage vessel. From a storage vessel, it may be conveyed by the pipeline to a place where the supplied air compressor required.

## **4.6 Effluent Treatment Plant (E.T.P.)**

Effluent means wastewater discharged from a textile wet processing plant contains various types of impurities depending on the type of dyes, chemicals, auxiliaries and process used. The Effluent which is treated by a plant that is called Effluent Treatment Plant. In fact, water is the heart for dyeing Industry and chemical also an important element for different stage of dyeing. Now, it is quite impossible without chemical continue dyeing. So, which chemical we use in Dyeing that mixed with water and finally drain. If the chemical mixed water goes outside through river it is very harmful for not only our environment but also all alive animals.

### **4.6.1 TYPES OF E.T.P**

There are different types of E.T. P are available. Those are

- Biological E.T.P.(Best)
- Chemical E.T.P.
- Biological & Chemical E.T.P.
- Physical ETP

BIOLOGICAL E.T.P.:

- The Effluent will be treated according to sequence or stage by stage.
- Its primary cost or set up cost is very high.
- Its effluent treatment will be best.

#### 4.6.2 E.T. P in Delta:

- Cost of the project is nearly 8. 00, 00,000 BDT.
- Fully Biological E.T.P.
- Manufactured by Water Treatment Technology (W.T.T.) of ITALY.
- 60 lac liter storage capacity
- 30 lac liter processing capacity

#### 4.6.3 Different chemical used in E.T.P:

- Sodium hypochlorite
- Sulfuric acid
- Polyelectrolyte
- Nutrient salt
- Anti-foam
- De-colorant

#### 4.6.4 some picture of ETP process





## **Chapter-5**

### **IMPACT OF INTERNSHIP**



## **5. IMPACT OF INTERNSHIP:**

### **5.1 Knitting section:**

Know about different types of knitting process  
Know about different types of knitting fault  
Know about different types of Cam arrangement  
Know about different types of yarn  
Know about different types of knit fabric

### **5.2 Dyeing Section:**

Know about different types of dyes and chemicals  
Know about different types of dyeing process  
Know about different types of finishing process  
Know about different types of dyeing recipe

### **5.3 Garments Section:**

Learn about cutting of garments  
Learn about sewing of garments  
Learn about pattern making  
Learn about marker making  
Learn about CAD software  
Learn about finishing

## **Chapter-6**

### **CONCLUSION**

## **6. CONCLUSION:**

Industrial attachment program sends us to the expected destiny of practical life. Through The completion of Two Month industrial attachment at The Delta Composite Knitting Ind. Ltd (DCKIL), we have got the impression that the factory is one of the most knit dyeing projects in Bangladesh. Though it was established 19 years ago, it has earned very good reputation for its best performance over any other knit dyeing project. During our industrial attachment program, we had tried to our best to done our duty. Our supervising officer also satisfied to us & offer co-operation in every steps. It is completely a new experience in our life, which will be very effective in our service life. During our training period we realized that practical experience is valuable for service life.

## **Sample Attachment**



