Faculty of Engineering

Department of Textile Engineering

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Report on industrial attachment

at

Epyllion group

Submitted By

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This attachment is submitted in partial fulfillment of the requirements for the degree of

Bachelor of Science in Textile Engineering

Advance in Wet Processing Technology

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Report on Epyllion Group

DECLARATION

We hereby declare that, this internship report has been done by us under the supervision of **Ms. Nawshin Farzana,** Senior Lecturer, Department of Textile Engineering, Faculty of Engineering, Daffodil International University. We also declare that, neither this report nor any part of this has been submitted elsewhere for award of any degree or diploma.

Submitted by:

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LETTER OF APPROVAL

This internship report prepared by **Md. Salauddin Anik** (ID: 151-23-4143), **Shuvo Biswas** (ID: 151-23-4192) is approved in Partial Fulfillment of the Requirement for the Degree of BACHELOR OF SCIENCE IN TEXTILE ENGINEERING. The said students have completed their project work entitled **"Report on industrial attachment at Epyllion group"** under my supervision. During the research period I found them sincere, hardworking and enthusiastic

Ms. Nawshin Farzana

Senior lecturer

Department of textile engineering

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Daffodil international university

Dedicated

To

Our respected parents

Acknowledgement

Industrial attachment course is a routine academic program of Daffodil International University. At first we want to thank the almighty Allah for making it possible to complete our industrial attachment program successfully. We are highly delighted to express our regards & gratitude to our Head of Textile Department **Prof. Dr. Md. Mahbubul Haque**. Daffodil International University and our supervising teacher **Ms. Nawshin Farzana**, Lecturer for all necessary information for preparing this report.

We also take this opportunity to express our sincerest gratitude to **Mr. Reaz Uddin Al-Mamoon,** Managing Director, Epyllion Group, **Afrita mannan ,** Executive HR Admin & CSR the management, administration & industrial supervisor **Washim Farazi** , Senior Executive HR Admin & CSR the management, administration personnel of **Epyllion Knitex and Epyllion Style Ltd**, who has allowed us to work in his organization within a congenial atmosphere during the industrial training period.

Thanks goes to Managers of different sections, executives and personnel for their excellent guidance & co-operation during the period of our training. During the attachment we were scheduled to work with all the departments of Epyllion Knitted and Epyllion Style Ltd. So, we would like to thank the officials of dyeing, knitting, garments, maintenance & all other departments who gave their valuable time in helping us to achieve our intended goal.

Our deepest appreciation goes to them for their sincere co-operation, support and advice which they have provided us during these two months of training. Our sincere appreciation goes to the entire Epyllion Group team for extending their hands of cooperation throughout the training period.

Finally, we would like to acknowledge that we remain responsible for the inadequacies & errors, which may unintentionally remain in the following report.

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INTRODUCTION

Epyllion group is one of the country's leading knit composite factories. It is a 100% export oriented composite knit textile unit with the commitment to cater the global needs of 21st century for knit & casual clothing. The project has employed the state-of-art technology in its every piece of investments. Aiming at the context of the changing global demand pattern, international environment on trade specially the withdrawal of quota system and gsp and the availability of craftsmanship in the country, the project has encompassed the knitting, dyeing and processing of fabrics and ready-made garments production to be available from one stop service.

The project ensures sampling to supply of finished ready-made garments all from one source, ensuring in time delivery & complying quality. The machines & equipment setup for this project are procured from world class brand, names that are renowned for their high quality, product integrity & dependable production.

The manpower engaged in this project to carry out the day to day business is all highly skilled, purely professional, vastly experienced. The unique combination of organized managerial and technical term in one hand and latest, advanced and balanced technology on the other hand made the project one of the top to be referred in this field in the country. Epyllion group is committed not only to deliver world class product but also to quality assurance, price affordability & social accountability.

Executive Summary

The Internationally recognized Buyers or clients are looking for those countries for producing their apparel products where different types of industries have established as a one stop source for the global apparel market, satisfy and meet customer's expectations by developing and providing products and service on time, which offers value in terms of Quality, Price, Safety, & Environmental impact. And also assure complete compliance with the international quality standards and also provide the employees internationally acceptable working condition/standards. In Bangladesh, there are various Group of Textile Industries those are producing high quality textiles and apparel products. Epyllion Group is one of them. Epyllion group has a number of sisters concerns in the family. These are Epyllion Knitex Ltd., Epyllion Fabrics Ltd., Epyllion Washing Ltd. Epyllion Style Ltd. And Epyllion Knitwear's Ltd. Epyllion Group is one of the greatest Knit Garments Manufacturers and Exporter, having all state of the art facilities with the annual turnover $30 Million (Appx). They have different types of knitting, Dyeing, Cutting, Sewing and Finishing machineries supplied by mostly Taiwan, China, Japan, U.K, U.S.A, and Singapore etc. which are very largest. It has high production where 32 tons of dyed and finished fabrics are produced per day. The production is controlled by technical persons. All the chemicals and dyes use for dyeing and finishing well branded. They produce their products for their buyer and client those are coming from international market like U.K, Sweden, Ireland, France, Germany, U.S.A, Malaysia, Belgium, Spain. They follow all the system for their machines maintenance so production can't hamper. In this report, I've tried to give some information about Textile Division & Garments Division of Epyllion Group and I've observed that they produce high quality fabric and fulfill the special requirements from the different types of buyers by following different internationally recommended standard method.

CHAPTER

1

Project Description

1.1-Location of Factory

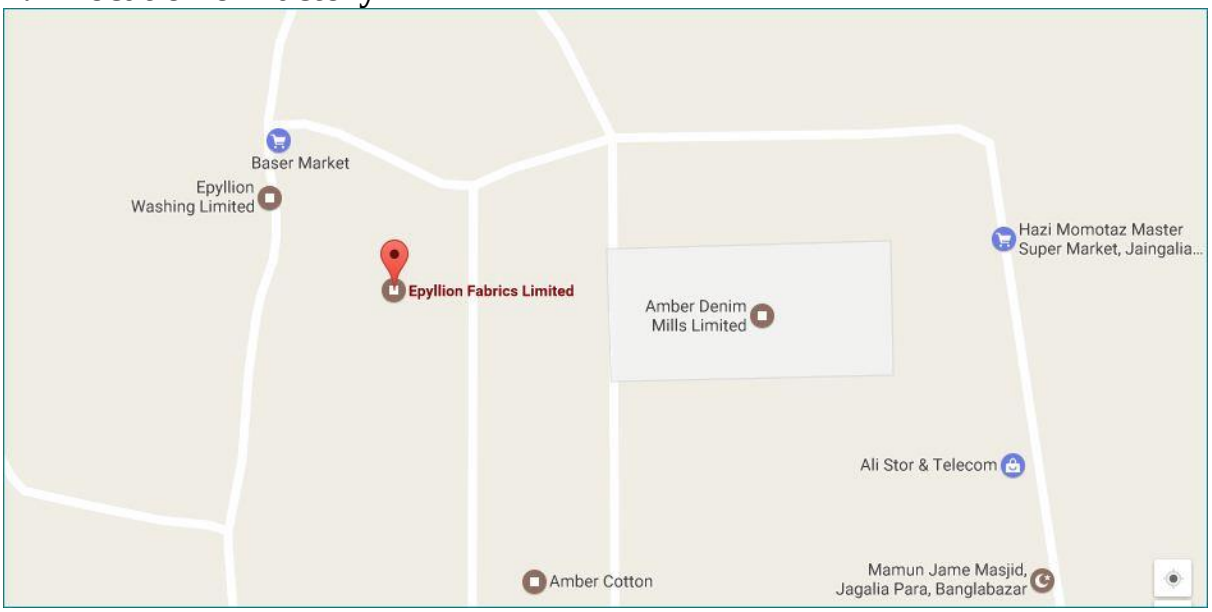


Fig1.1-Location of *Epyllion Fabrics Limited*

1.2- Project at a glance

Name	: Epyllion Group
Type	: Export oriented Ready Made Garments Industry
Status	: Private Limited Company
Year of establishment	: 1994
Total manpower	: 15676 (staff & worker)
Land	: 2, 85,000 Sq.ft.
Address	:Jangalia Para, Vawal Mirzapur, Gazipur Sadar Gazipur-1703

1.3-History of the project development:

- The renowned and obliterated industry assumed its new appearance as garments in 1980s.
- Epyllion Group within a brief time of its inception in 1994 secured a remarkable position in the emerging industry of Ready Made Garments.
- Epyllion Group started with first venture DEKKO knit wears Limited (DKL) in 1993 with 2 sewing lines and total of 200 work forces at Mirpur area.

- ❖ Epyllion Group has new swelled up with 8000 workforce with 48 sewing lines in several locations of Dhaka and Gazipur. Today it has one of the most sophisticated vertically integrated set-ups.
- ❖ At present they are capable of producing 30 tons high quality fabric and 92,000 pieces ready mead garments in a day.
- ❖ Combining modern technology with skilled manpower under Epyllion's unique inspiring atmosphere, this new Epyllion venture soon rose to the top of the local textile industry.

1.4-Fabric Product Range:

- ➢ Knitting grey fabrics : The knitting unit has the strength to produce various types of fabrics like –
    - single jersey,
    - pique & double pique,
    - lacoste,
    - waffle,
    - rib,
    - interlock,
    - fleece,
    - design interlock,
    - french terry or two thread terry,
    - feeder stripe,
    - engineering stripe,
    - flat knit collar & cuff making with half jacquard design. Lycra attachment is available for all the above fabrics.

- ➢ Dyeing & finishing: To meet the worldwide demand trend the unit has the combination of tubular & open width fabric processing. The plant has the facilities to process

1) 100% Cotton:

- S/J, 1×1Rib, Interlock.
- Drop needle.
- Irregular drop needle.
- 2&3-Thread Fleece.

- Pique.

2) Lycra S/J:

- 7 – 8% Lycra+ 92 – 93% cotton
- Terry Fleece

3) Polyester-Cotton

- Cool-max (50/50)
- 80/20 Blend
- Fleece

4) 100% Viscose

5) Mercerized cotton: S/J

6) Bamboo-Cotton

7) Viscose-Cotton

8) Polyamide: 15% Lycra+45% polyamide+40% polyester

9) Top- Cool: 100% polyester

10) Cool- Plus: 100% polyester

11) **Organic Cotton**: S/J, Interlock

12) **Others:**French Terry, CVC Fleece, Flat knit, Auto man

- **Knit garments** : The garments section has the ability to constantly produce various knit garments like–
    - T-shirts,
    - polo shirts,
    - basic sweat pant,
    - ladies wear,
    - sportswear,
    - tank tops,
    - kids wear,
    - jacket,

- trousers,
- golf shirt,
- fashion wear
- pull over
- etc.

1.5-Accessories:

- Corrugated Carton
- Poly Bag
- Price Tiket
- Embroidery
- Printed Label
- Back Board
- Neck Board
- Twill Tape

1.6-Production capacity:

Dyeing:

EKL: **35, 00,000** Kgs. /year & **10,500** Kgs/day

EFL: **49, 66,500** Kgs. /year & **22,000** Kgs/day

Knitting:

EKL: **16,42,500**kg/ year &**4500**kg/day

EFL: **32,85,000**kg/ year &**9000**kg/day

Finishing:

EKL**: 10** M. Tons/day

EFL: **20** M. Tons/day

1.7-Physical Infrastructure:

Epyllion at Joydevpur have three shades. They are Epyllion Knitex Ltd., Epyllion Fabrics Ltd. and Epyllion Style Ltd. Total area for EKL is 84,000 ft and EFL is 1, 85,000 ft. There are dormitories for workers & officials, both for bachelor and family purposes.

Total area of the industry: **2, 85,000**Sq.ft.

Area of the plant:

EKL: **84000** sq. ft.

EFL: **1,85,000**sq. ft.

Concerns Of Epyllion Group:

- Textile Industries.
- Garments Industries
- Garments Accessories.
- Real Estate.

1.8-Group members:

Textile Industries:

- Epyllion Fabrics Ltd.
- Epyllion Knitex Ltd.

Garments Industries:

- Epyllion Style Ltd.
- Epyllion Knitwears Ltd. Unit – 1 & 2
- Dekko Knitwears Ltd. Unit – 1 & 2
- Mirabella Dresses Ltd.
- Epyllion Jeans Ltd.
- Dazzling Dresses Ltd.

Garments Accessories:

- Epyllion Limited.
- Epyllion Washing Ltd.

Real Estate:

- Nina Holding Ltd.

1.9-Different departments:

A. **Production oriented departments**:

- Knitting section

- Batch section
- Laboratory(testing & formulation)
- Dyeing floor
- Chemical store
- Finishing section
- Quality control department
- Grey & finished fabric store
- Printing section
- Maintenance(electrical & mechanical)

Utility (gas, water, power, steam)

B. Supporting departments:

- Personnel administration
- Procurement
- Marketing
- Human Resource Department (HRD)
- Finance & administration
- Planning department
- Audit department
- ETP (Biological & Chemical)
- Merchandising
- IT
- Medical
- Security

C. Style:

- Sampling section
- Cutting section
- Sewing section
- Finishing section
- Embroidery section
- IE
- Quality assurance

1.10-Its other facilities are:

- Own Network Server
- Own power management
- Own utility management
- Transport facility
- Medical centre
- Fire service facility
- ETP
- Training & development

  Rewards for better performance
- Own audit team
- Salary and other allowance is paid in time
- No child labor
- No gender discrimination
- No sexual harassment

1.11-Certification & Achievement:

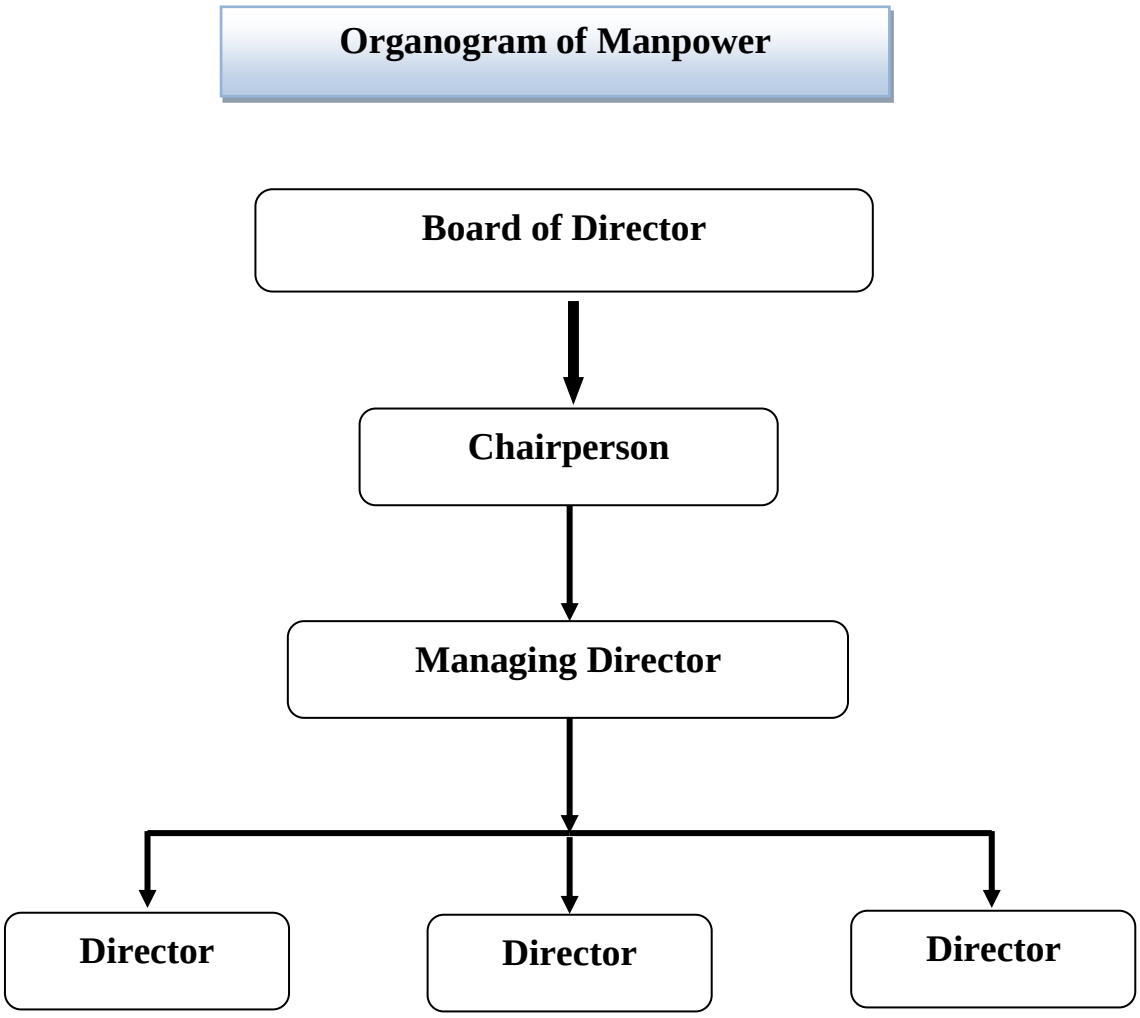
- BGMEA
- BKMEA
- BTMA
- Oëko Tex
- SEDEX
- WRAP
- C-TAPT
- C & A Best Suppliers Award 2004
- ORGANIC EXCHANGE

CHAPTER

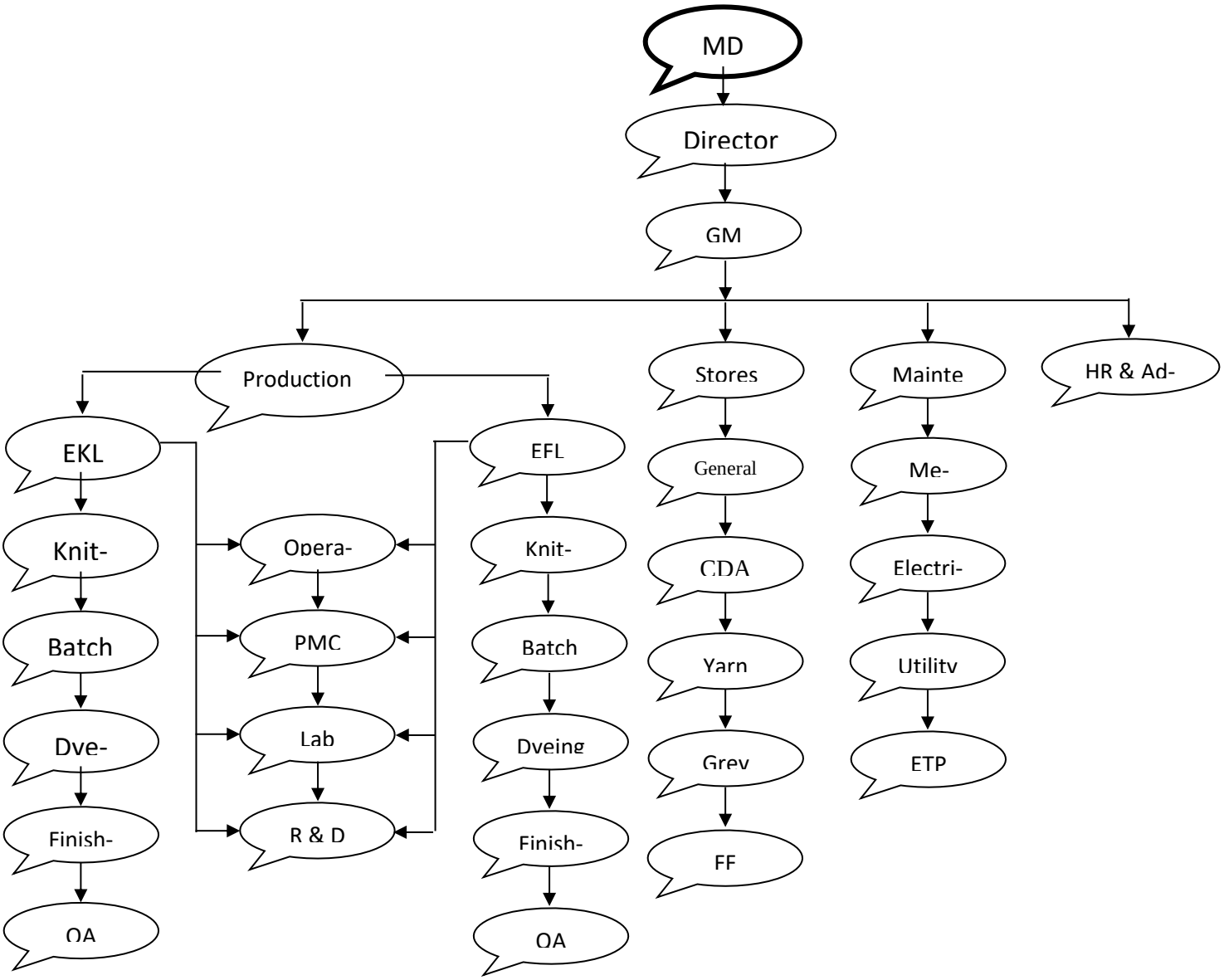
2

Manpower Management

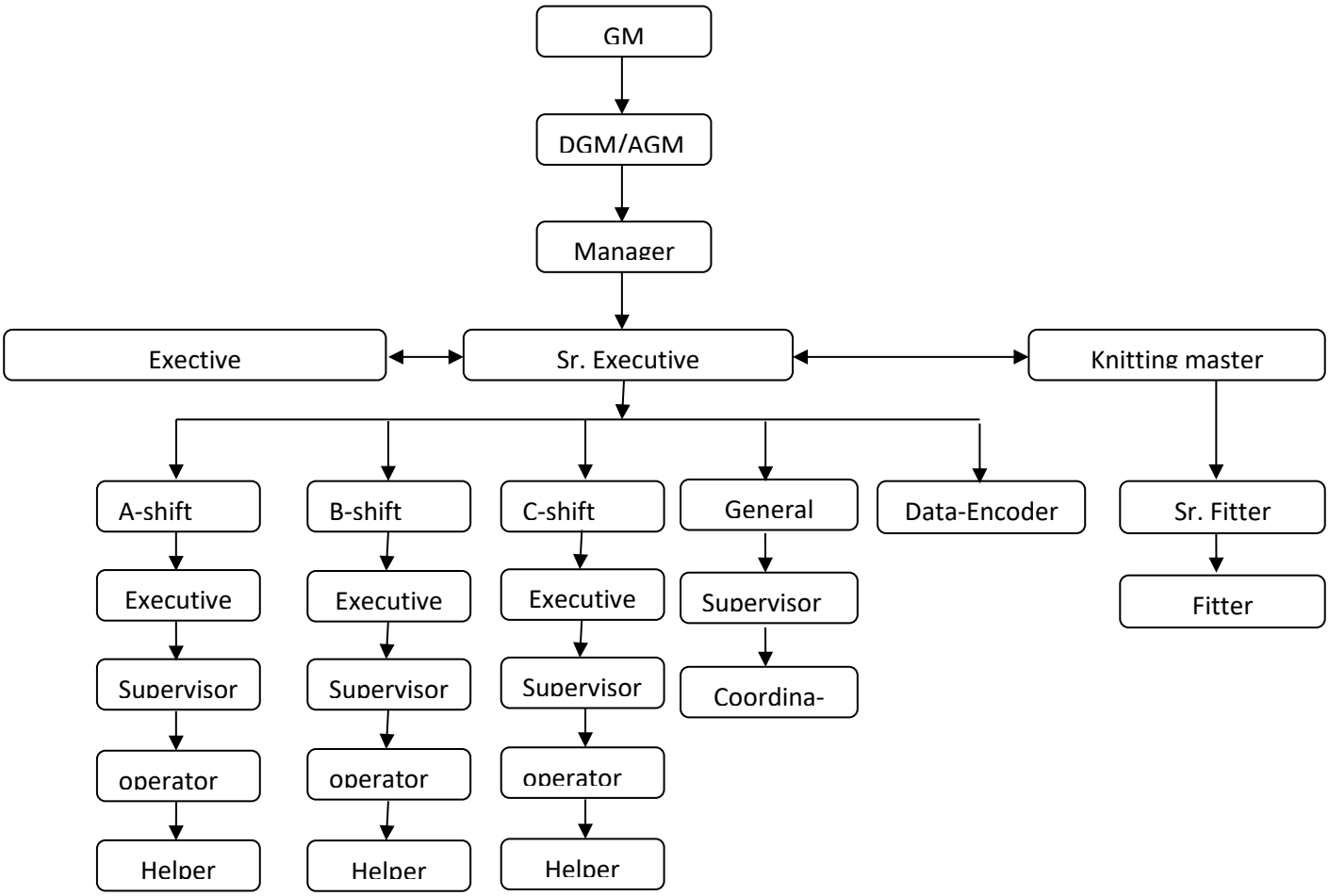
2.1- Manpower of Epyllion



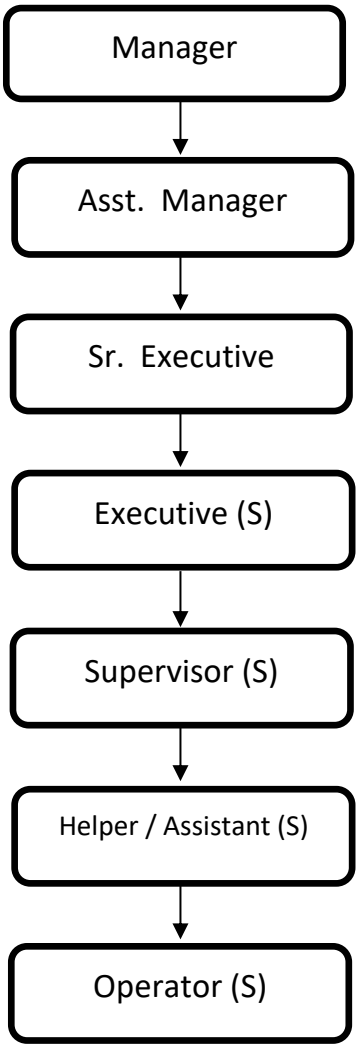
Textile Division



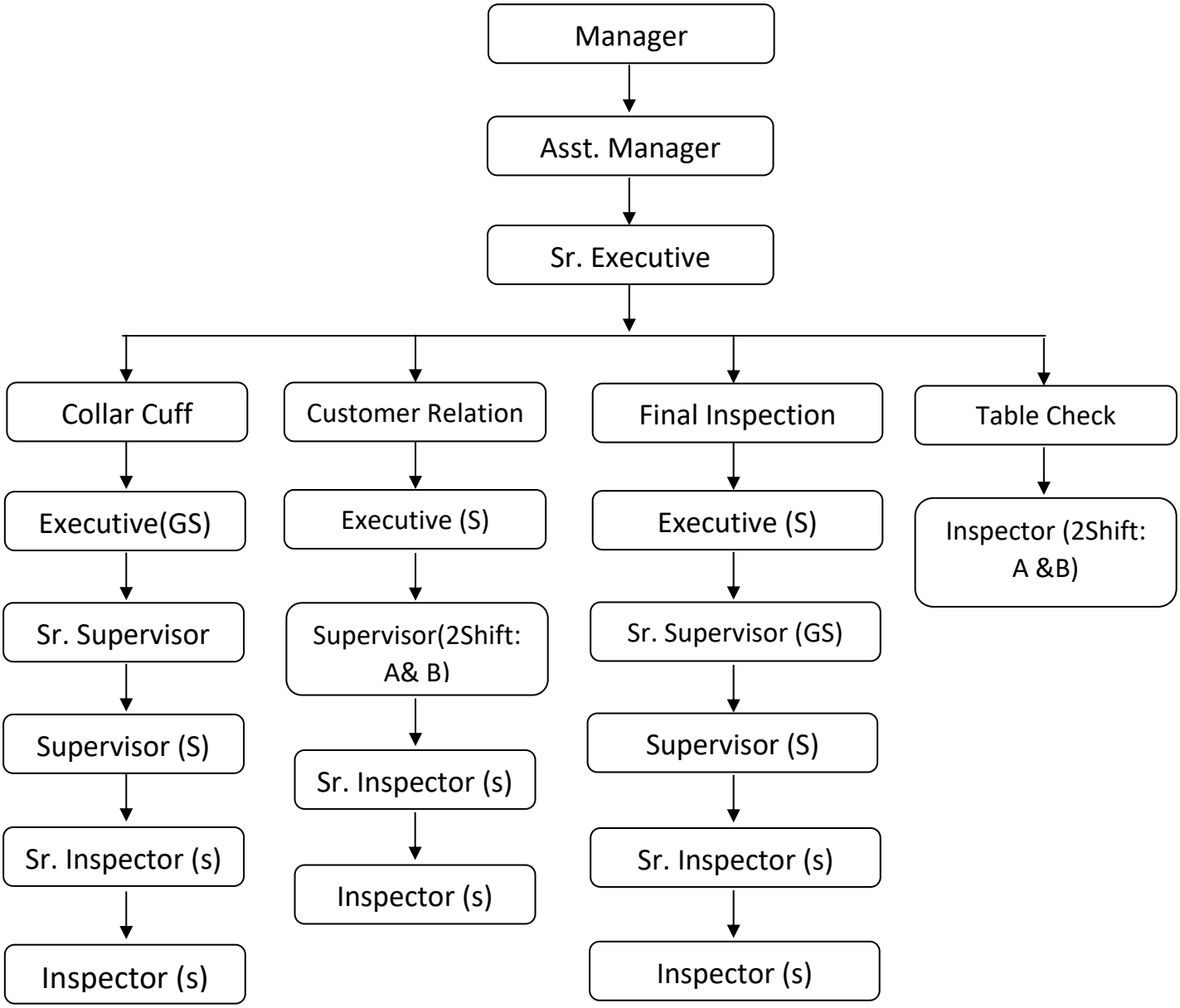
Knitting Department



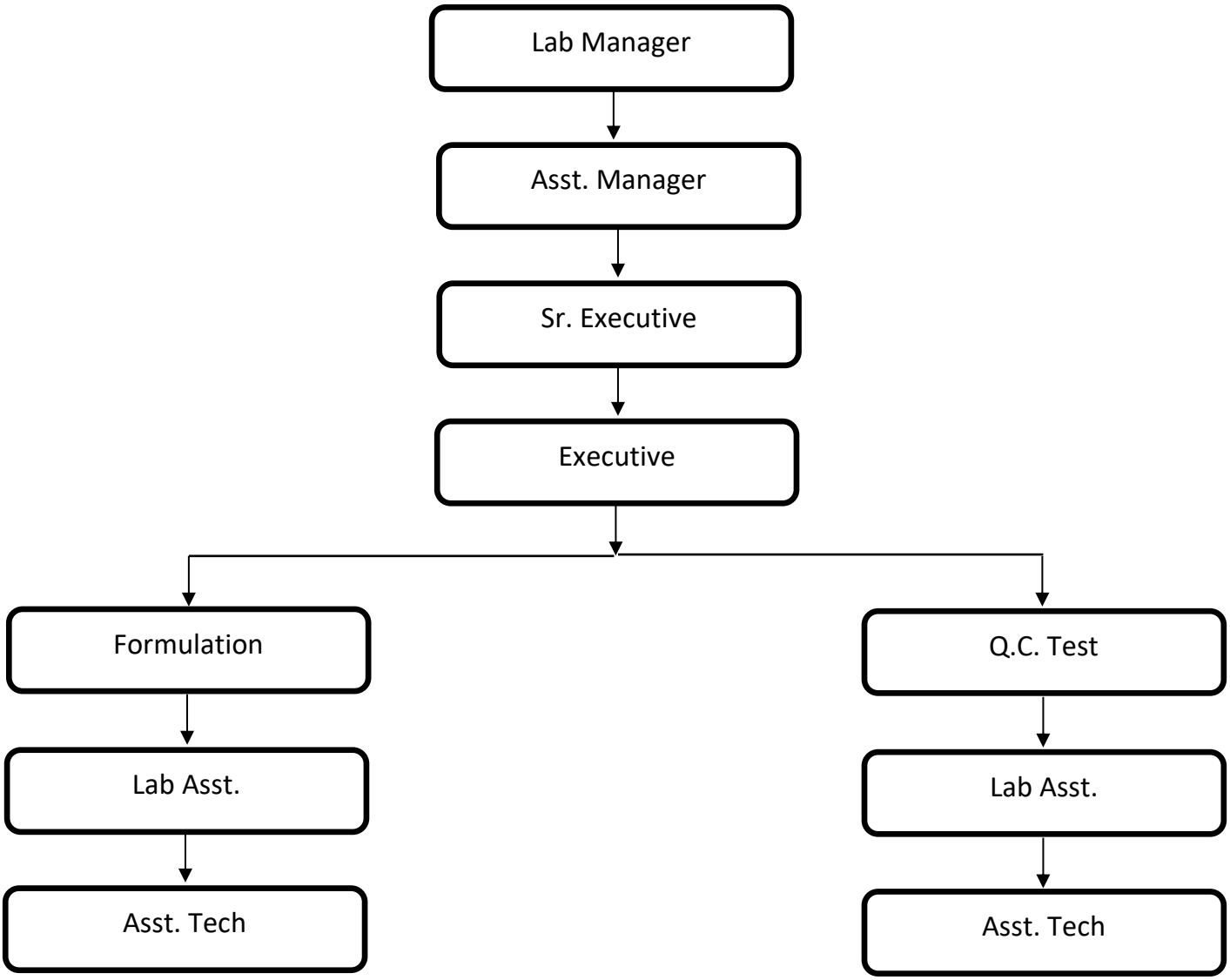
Finishing Department (EFL)



Quality Assurance



ORGANOGRAM LABORATORY



2.2-Management System:

- The company has skilled administration, management and marketing team guided by proficient, dexterous & experienced leaders of offer right solution for the consumers with the right eminence & with the shortest lead-time for the export market in Bangla-desh.

- The best use of continuous development of human resources by providing them Inter-national standard equal opportunity is the keys for achieving comprehensive compe-tence in all level of the organizational hierarchy.

SHIFT CHANGE:

Three shifts per day.

Shift	Duration
General	9.00 am – 6.00 pm
A	6.00 am – 2.00 pm
B	2.00 pm – 10.00 pm
C	10.00 pm – 6.00 am

Responsibilities of Executive:

1. To analysis fabric design.
2. Raw materials preparation & check.
3. Control of supervisor, operator, Asstt. Operator& helper of knitting floor.
4. To match fabric design as required.
5. To find out fabric fault as early as possible.
6. To recover the grey fabric this is rejected from quality department.
7. To check daily production report.
8. To maintain connection with dyeing, finishing & quality control department.
9. To maintain connection with maintenance department etc.

2.3-JOB DESCRIPTION:

1. Title : **Executive**

Section : Knitting, Dyeing & Finishing

Report to : Sr. Production Officer, Knitting, Dyeing & Finishing manager

Job Summary : Executing & following up the production activities. Checking & ensuring the quality of the product as required.

2. Title : **Sr. Executive**

Section : Knitting, Dyeing & Finishing

Report to : Knitting, Dyeing & Finishing Manager

Job Summary : Executing & following up the production activities. Taking decisions about fabric design, sample checking & stripe width checking in case of stripe fabric. Controlling the supervisors, operators, asst. operators & helpers of knitting, dyeing & finishing section.

3. Title : **Manager**

Section : Knitting, Dyeing & Finishing

Report to : AGM

Job Summary : Taking decisions about different operations & activities of the knitting, dyeing floor. Planning & preparing programs for knitting dyeing operation. Overall supervision of knitting, dyeing & finishing section.

Technical Personnel in knitting floor :

In total there are 11 textile engineers in the knitting section. The posts they are occupying are mentioned below –

1. General Manager
2. Asst. General Manager
3. Knitting Manager
4. Sr. Production Officer /Sr. Executive– 3 posts
5. Production Officer/Executive – 5 posts

.

CHAPTER

3

Machine Description

3.1-Raw material

3.1.1-Introduction:

To run the production smoothly raw materials are very important substances in an export-oriented textile industry like Epyllion group. Materials that go to final products i.e. raw materials can be categorized as follows:

1. Yarn
2. Grey fabric
3. Dyestuffs
4. Chemicals and auxiliaries

3.1.2-Yarn:

Yarn is the main raw material for knitting section. Generally combed yarn, card yarn & semi combed yarns are used for cotton fabric production. In EKL & EFL yarns that are used, being delivered from the following spinning mills –

- Thermex Spinning Mills Ltd
- Square Textiles Ltd
- Malek Spinning Mills Ltd
- Nahar Spinning Mills Ltd
- Gulshan spinning mill ltd.
- Apex spinning ltd.
- DBL group etc

Besides the yarn is also imported from Sudan, India,Vietnam in a considerable amount every year.

3.1.3-Grey fabric:

- Single Jersey
- Single Lacost
- Double Lacost
- Double Jersey or Heavy Jersey
- Plain Interlock
- Needle Top Interlock
- 1x1 Rib

* 2x1 Rib
* 2x2 Rib
* Lycra Rib
* Very Rib
* Loop Back
* Fleece Fabric
* Fleece Terry
* Lycra Fleece
* French Terry
* Plated Fabric
* Lycra Single Jersey
* Polo PK
* CVC
* PC
*

3.2-Knitting Section

3.2.1-Machines of Epyllion group:

The knitted fabric is mainly produced in EKL and EFL. There are several types and brand of knitting machine in Epyllion.

3.2.2-Brands of machine used in EKL:

Single jersey knitting machine:

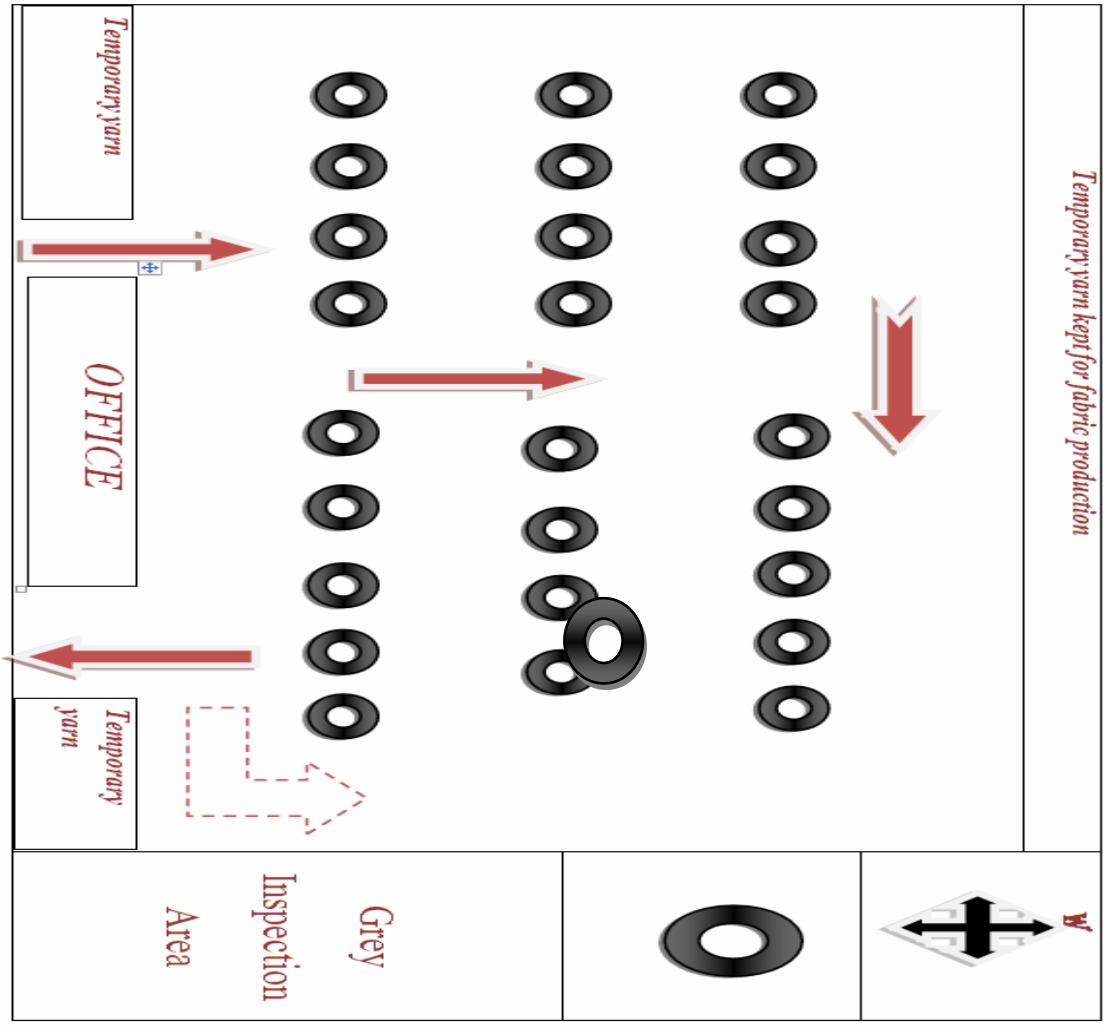
1. Orizio
2. Wellknit
3. Terrot
4. Santoni

3.2.3-List of Knitting Machines:

Table 3.1-Single & Double jersey m/c specification:

Sl no	name	brand	origin	Dia x Gauge
01	s/j	Orizio	Italy	30x28
02	s/j	Orizio	Italy	30x24
03	s/j	Orizio	Italy	30x28
04	d/j	Orizio	Italy	30x24
05	s/j	Santoni	Taiwan	30x20
06	s/j	Wellknit	Taiwan	32x24
07	s/j	Wellknit	Taiwan	32x24
08	s/j	Wellknit	Taiwan	32x24
09	s/j	Orizio	Italy	32x24
10	s/j	Orizio	Italy	30x28
11	d/j	Orizio	Italy	30x24
12	s/j	Orizio	Italy	30x24
13	s/j	Santoni	Taiwan	30x20
14	d/j	Terrot	Germany	34x24
15	s/j	Terrot	Germany	34x24
16	s/j	Wellknit	Taiwan	28x24
17	s/j	Orizio	Italy	30x28
18	s/j	Orizio	Italy	30x24
19	d/j	Orizio	Italy	30x18
20	d/j	Orizio	Italy	30x18
21	s/j	Santoni	Taiwan	30x20
22	d/j	Orizio	Italy	30x18
23	d/j	Terrot	Germany	36x18
24	d/j	Terrot	Germany	36x18
25	s/j	Wellknit	Taiwan	30x20
26	d/j	Pai lung	Taiwan	34x18

3.2.4-Layout plan of EKL:



Knitting machine

Fig- 3.1-Layout of Epyllion Fabrics Ltd

3.3-Dyeing:

Fig 3.2-Total dyeing m/c of EKL

Department	Total no. of m/c	M/c Type	No. of m/c
Batching	02	Turning m/c Back Sewing m/c	02
Grey inspection	01	Grey inspection m/c	01
Dyeing	13	Sample Dyeing m/c	03
		Winch m/c	10

Fig 3.3-Total dyeing m/c of Epyllion Fabrics Ltd. (EFL)

Department	Total no. of m/c	M/c Type	No. of m/c
Batching	02	Turning m/c Back Sewing m/c	02
Grey inspection	01	Grey inspection m/c	01
Dyeing	24	Sample Dyeing m/c	09
		Winch m/c	15

3.3.1-Lay Out of EKL (Dyeing)

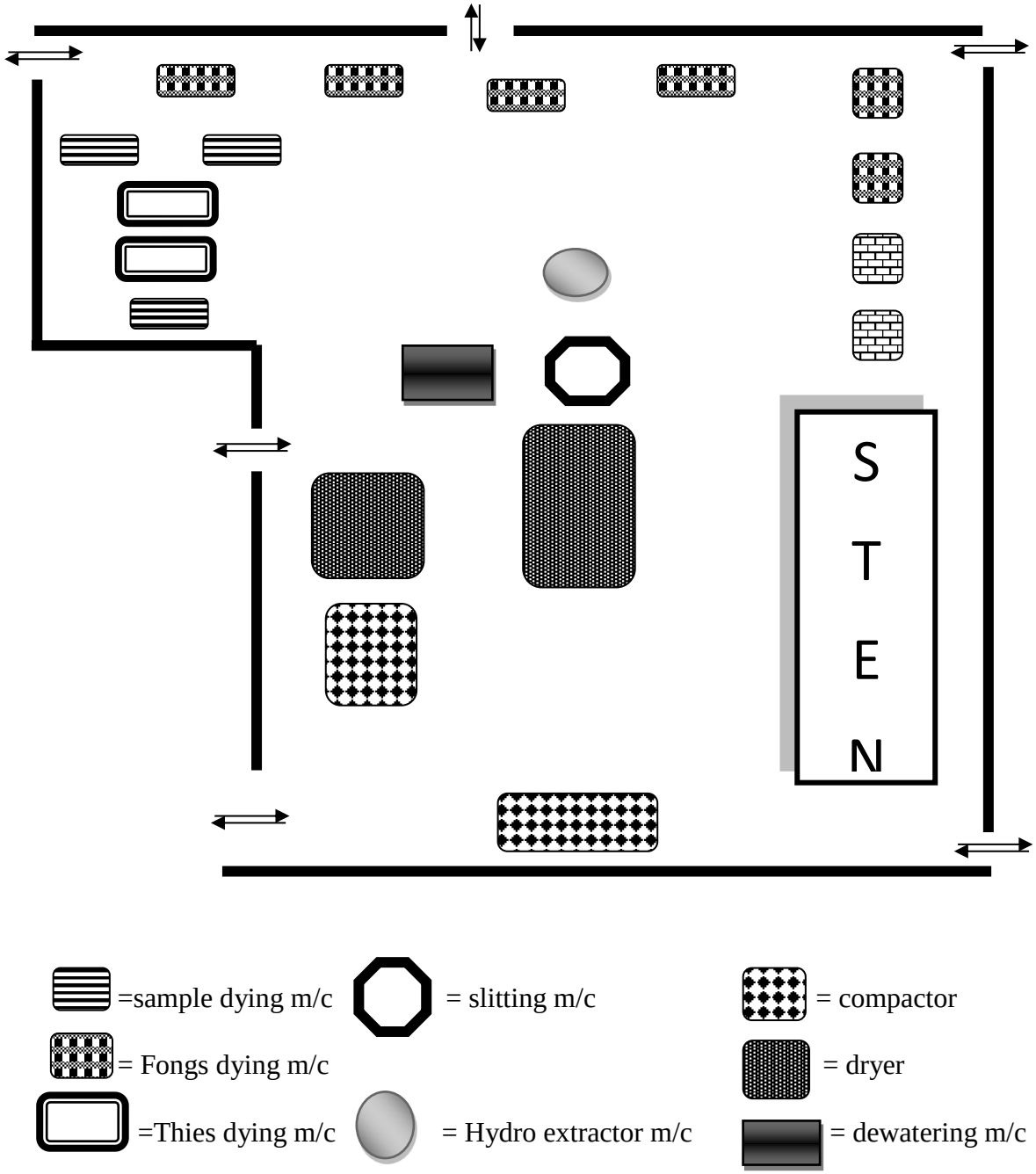


Fig 3.2- Layout of dyeing floor of EKL

3.3.2-Lay Out of EFL (Dyeing)

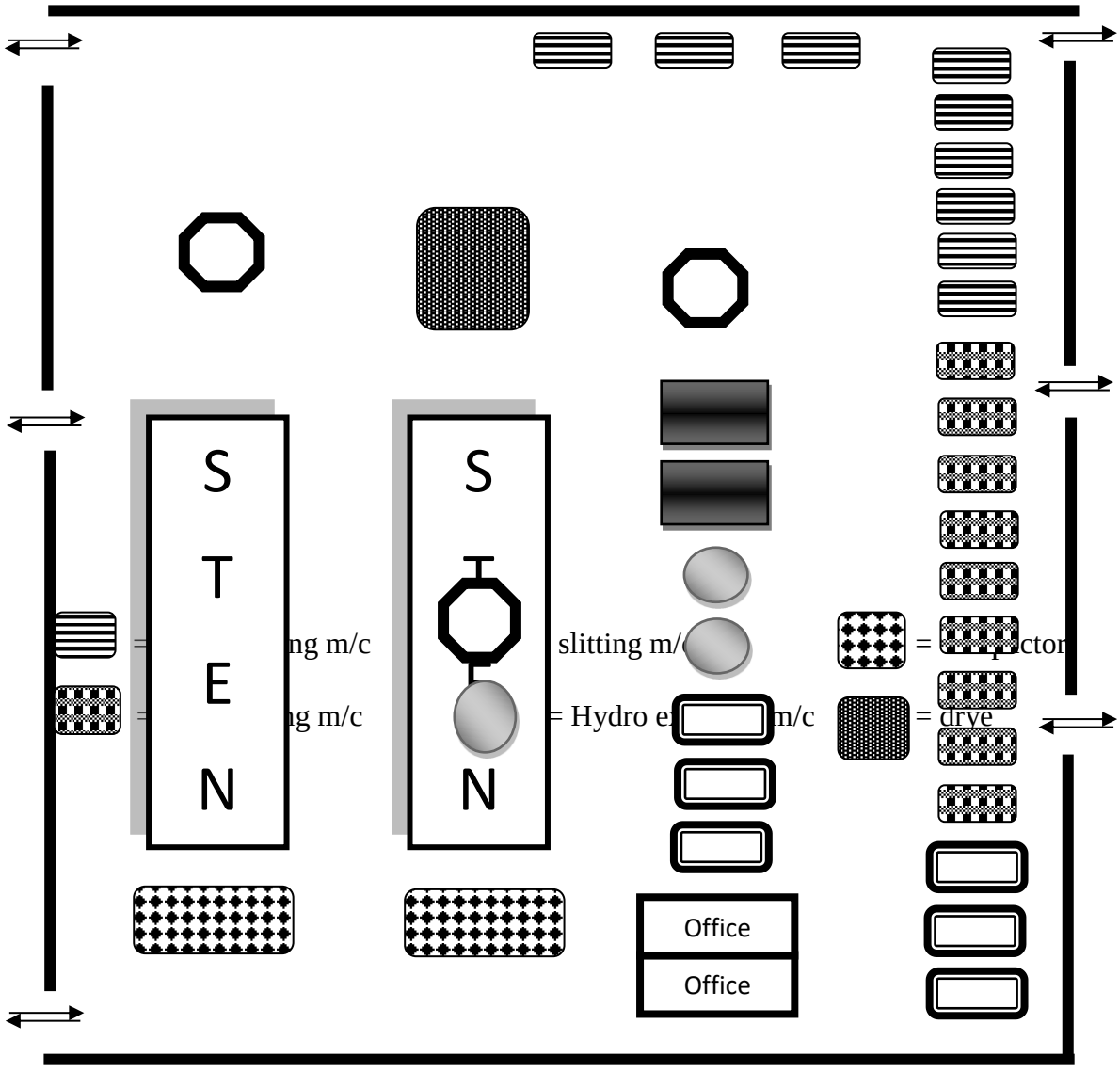
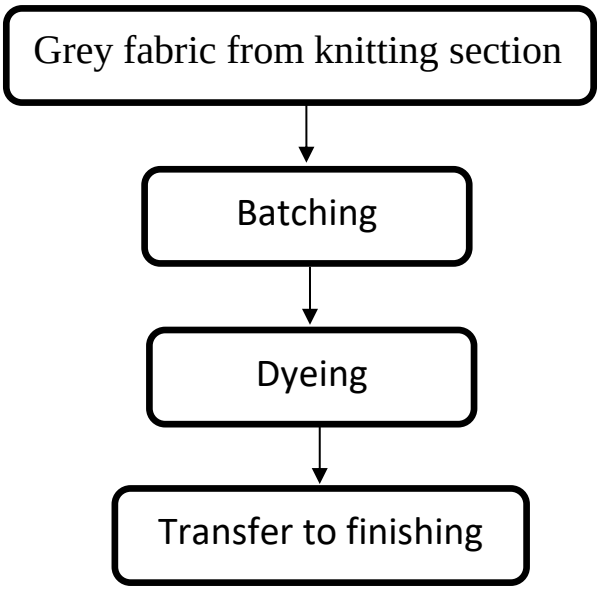


Fig 3.2- Layout of dyeing floor of EFL

3.3.3-Flow chart of dyeing Section



3.3.4-Process flow chart of dyeing:

Grey fabric receive from knitting section

↓

Batching

↓

Select machine number

↓

Fabric loading

↓

Select production program

↓

Pretreatment

↓

Dyeing

↓

After treatment

↓

Fabric unloading

3.3.5-Production Capacity of Dyeing m/c:

Table 3.4- Dyeing m/c specification of Epyllion Fabrics Ltd.

No. of m/c	Name of m/c	Origin	Type of m/c	Capacity of m/c
01.	**Son-tech**	China	**Atmospheric**	**150 kg**
02.	**Son-tech**	China	**Atmospheric**	**75 kg**
03.	**Son-tech**	China	**HTHP**	**30 kg**
04.	**Son-tech**	China	**HTHP**	**10 kg**
05.	**Son-tech**	China	**HTHP**	**30 kg**
06.	**Fongs**	China	**HTHP**	**10 kg**
07.	**Fongs**	China	**HTHP**	**10 kg**
08.	**Fongs**	China	**HTHP**	**30 kg**
09.	**Fongs**	China	**HTHP**	**60 kg**
10.	**Fongs**	China	**HTHP**	**150 kg**
11.	**Fongs**	China	**HTHP**	**150 kg**
12.	**Fongs**	China	**HTHP**	**250 kg**
13.	**Fongs**	China	**HTHP**	**500 kg**
14.	**Fongs**	China	**HTHP**	**500 kg**
15.	**Fongs**	China	**Atmospheric**	**500 kg**
16.	**Fongs**	China	**HTHP**	**750 kg**
17.	**Fongs**	China	**Atmospheric**	**750 kg**
18.	**Fongs**	China	**Atmospheric**	**1000 kg**
19.	**Thies**	Germany	**HTHP**	**1000 kg**

20.	**Thies**	Germany	**HTHP**	**1000 kg**
21.	**Thies**	Germany	**HTHP**	**1000 kg**
22.	**Thies**	Germany	**HTHP**	**750 kg**
23.	**Thies**	Germany	**HTHP**	**750 kg**
24.	**Thies**	Germany	**HTHP**	**500 kg**

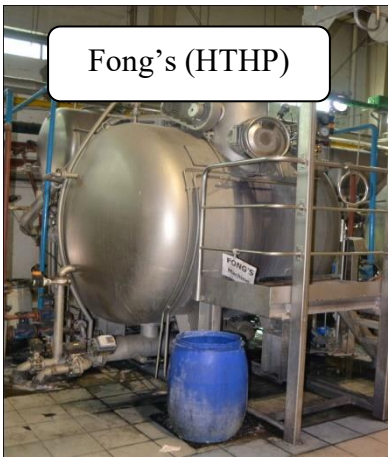
Production Capacity of Dyeing m/c:

Table 3.5- Dyeing m/c specification of Epyllion knitex Ltd.

No. of m/c	Name of m/c	Origin	Type of m/c	Capacity of m/c
01.	**Son-tech**	China	**Atmospheric**	**150 kg**
02.	**Son-tech**	China	**Atmospheric**	**75 kg**
03.	**Son-tech**	China	**HTHP**	**10kg**
04.	**Fongs**	China	**Atmospheric**	**1000 kg**
05.	**Fongs**	China	**Atmospheric**	**750 kg**
06.	**Fongs**	China	**HTHP**	**250 kg**
07.	**Fongs**	China	**HTHP**	**750 kg**
08.	**Fongs**	China	**HTHP**	**500 kg**
09.	**Fongs**	China	**HTHP**	**500 kg**
10.	**Fongs**	China	**HTHP**	**30 kg**
11.	**Fongs**	China	**HTHP**	**30 kg**
12.	**Thies**	China	**HTHP**	**350 kg**
13.	**Thies**	China	**HTHP**	**350 kg**

3.3.6-Dyeing machines of Epyllion

Fong's (Atmospheric)



Fong's (HTHP)

Son tech

Theis

3.3- Different dyeing m/c of Epyllion

3.3.7-A winch dyeing m/c consist of main 6 parts:

1) Kier.(Dye-bath) 2) Heat Exchanger 3) Filter

4) Hot water reserve 5) Addition tank 6) Control Board

Fig: Dye Bath

Fig: Heat Ex-

Fig: Filter

Fig: Reserve Tank

Fig: Addition tank

Fig: Control board

3.4- Different part of winch dyeing m/c

3.3.8-PRODUCTION PARAMETER FOR DYEING

P^H

1. During H_2O_2 bleaching P^H : 9.5-122.
2. During reactive dyeing P^H : 10-11.53.
3. During disperse dyeing P^H : 4.5-5.5

Temperature:

1. For cotton scouring : 95^0C-98^0C
2. For cotton cold wash : 30^0-40^0C
3. For cotton hot wash : 70^0-80^0C
4. For cotton acid wash : 60^0-70^0C
5. For cotton dyeing : 80-90^0C (For hot brand) 60^0C(For colD brand)
6. Polyester dying : 100^0-130^0C

Time:

1. For Scouring: 45-60 minutes
2. For Disperses dyeing 40-80 minutes.

M: L ratio:

For reactive dyeing M: L ratio maintained between 1:6 to 1:10.

Washing for colored fabrics:

- The colored fabrics, to be washed is loaded in the machine
- Required amount of water is taken.
- Detergents added & washing continued at 80^0 C for 20 minutes.
- Cold washing

3.3.9-Description of production process

Scouring-bleaching:

1. Fabric, to be scoured is loaded in the machine

2. Required amount of water is loaded
3. Washing agent| detergent is added
4. Steam pipes are on & scouring agents (i.e., caustic soda/ soda ash) added when the temperature reaches at 70^0 C
5. Then H202 is added.
6. Temperature is then raised to 105^0 C & the process is then carried out for 60-90 minutes depending on the requirements.
7. The liquors are then drained.
8. Then wash with Felosan NOF (detergent) at 98^0C for 5 min.
9. Then cold wash, at 35^0-45^0C & acid wash, at 60^0-70^0C is done.

Dyeing:

1. After acid wash all liquors are drained out.
2. Required amounts of water is taken
3. Then leveling agents, anti-creasing agents, de-foaming agents are added according to the requirements.
4. Steam pipes are on & after 10-15 minutes dyes are added.
5. Salts are added and runtime is 15-20 minutes.
6. Then soda ash, after another 35minutes.
7. Then the temperature is raised slowly up to the mark.
8. The process is carried on & samples are taken after every 30-40 minutes to match with the target shade. It continues until shade matching.
9. If the sample is matched, then the liquor is drained out.
10. Then cold wash at 35^0-45^0C.
11. Wash with Cibapon R (Washing agent) for 5 minutes.
12. Acid wash at 55^0C is done.
13. Fixing agent is added at 45^0C for 15 minutes.
14. Then softener is added at 45^0C for 15 minutes.

3.3.10-Total dyeing flowchart:

Dyeing of 100% Polyester

Fabric loaded in the machine

Water loaded

Raise temp to 60˚ C

Run machine 5-7 min to give PES a hot wash (pretreatment)

Bath drain

Water loading

Add acetic acid+leveling agent by injection at 50˚C

Run machine for 5-7 min

Add anti foaming agent by injection by flow return

Check PH

Make dye solution in mixing tank by flow return & boil it for 5-7 min

50% linear dosing of dye at 70˚C for 15 min

Temp raise to 132 ˚C at 2C/min temp gradiant

Run for 60 min

Cooling at 80˚C

Shade check

If not ok do colour addition or colour reduction

After being shade ok,do BD

Give a normal rinse

BD

Add 1000L of water

Raise temp to 60˚C

Injection of boss with flow return at 60˚C

Dose caustic for 4-5 min

Injection of hydrose at 70C

Run at 90˚C for 20 min

BD

Rinse

Fabric unload

Dyeing of 100% Cotton

Kappa A41 and levagel RL inject at 60c

Gluber salt dosing at 60C for 10 min

Then the required color dosing at 60 C for 30 min & run for 15 min

Soda ash dosing at 60C for 80 min & then shade is checked

If it is ok then BD

At last rinse the fabric

Dyeing of CVC (blended fleece fabric)

Polyester part dyeing :

Acid(injection)

pH check(pH=4.5)

Color dosing(15min*45c)

Raising temp at 130c

Sample check

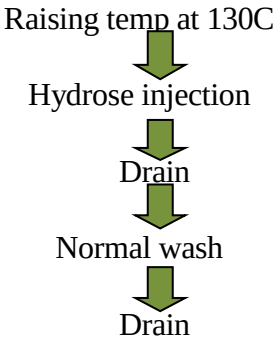
Drain

Normal hot wash

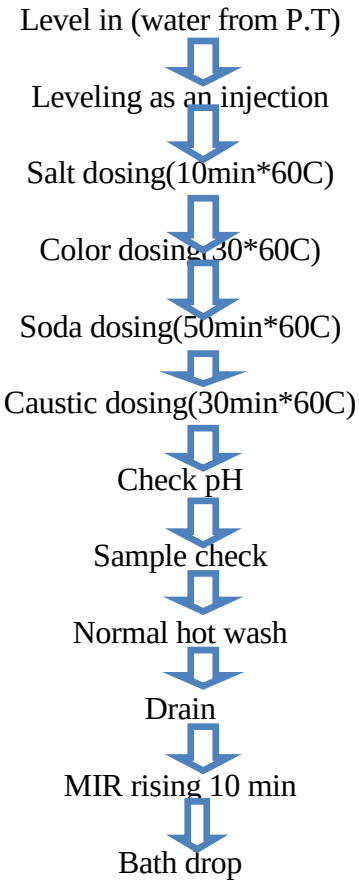
Drain

Reduction cleaning :

Caustic dosing(60C*6min)



Cotton part dyeing :



3.3.11-Dyeing Faults:

1. Chemical stain.
2. Dyes stain
3. Softener spot
4. Crease mark
5. Rub mark
6. Uneven shade

7. Oil Stain

8. Dirty Spot

9. Strength Loss

10. Dyeing Hole

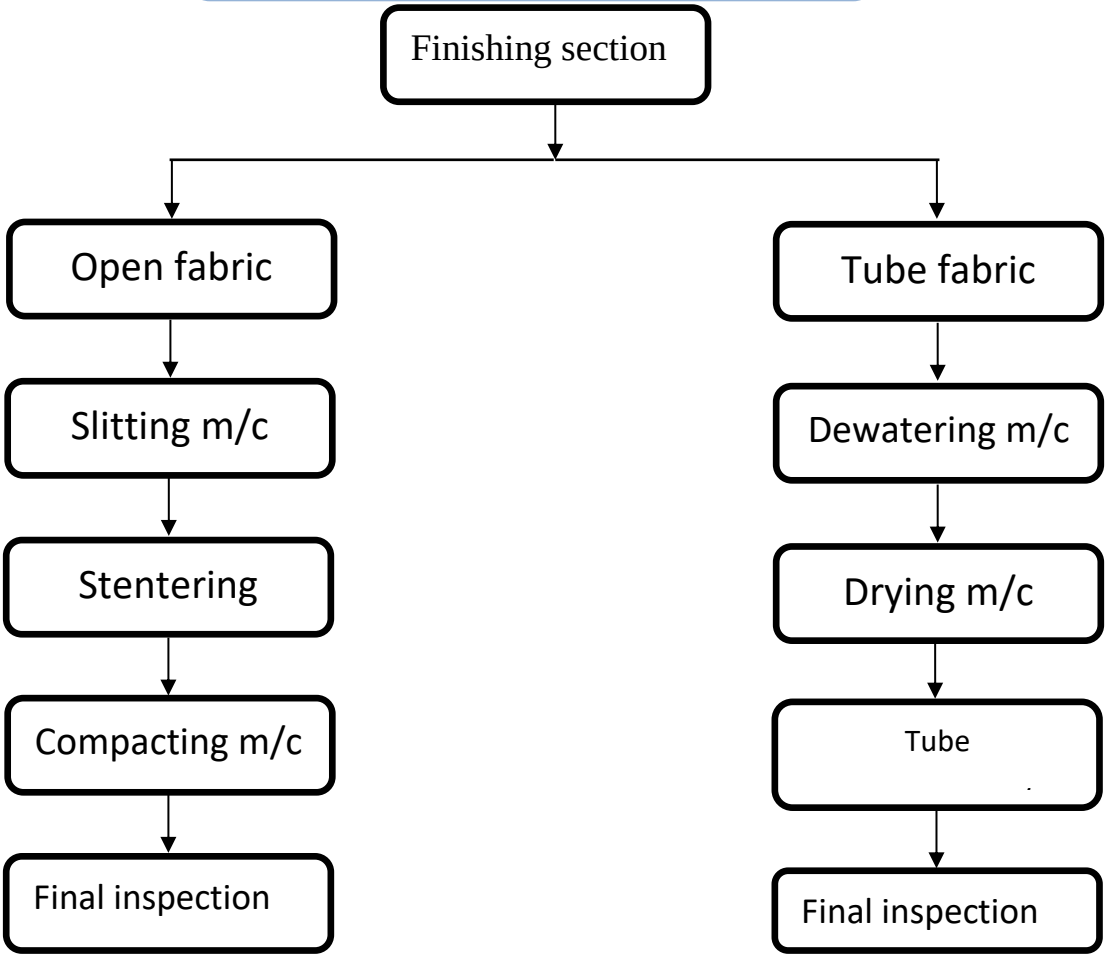
3.4-FINISHING

Textile finishing , in a restricted sense , is the term used for a series of processes to which all bleached , dyed , printed and certain grey fabrics are subjected before they are put on the market . In fact, finishing includes the final treatment of every kind of fabric made from every kind of fiber.

3.4.1-Objects:

- Improving the appearance – Luster, whiteness, etc .
- Improving the feel, which depends on the handle of the material and its softness, suppleness, fullness, etc
- Wearing qualities , non – soiling , anti crease , ant shrink , comfort , etc .
- Special properties required for particular uses – water – proofing, flame proofing , etc. .
- Covering of the faults in the original cloth.
- Increasing the weight of the cloth

3.4.2-Flow chart of finishing Section



3.4.3-Some finishing machine

SLITTER M/C:

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.

Function:

- To cut the tubular fabric for opening.
- To check the fabric fault.
- Rubber pressure roller removes a slight amount of water.

HYDRO EXTRACTOR M/C:

Function: To remove water from fabric by centrifugal extraction.

DEWATERING M/C :

Feature:

- Used to remove excess water after pretreatment and dyeing
- Delivered fabric is crease free state
- Before squeezing ballon is formed with the help of compressed air passing by a nozzle
- It can control the diameter of fabric and GSM and shrinkage by over feeding mechanism
- To impart soft finish to the fabric

DRYER:

Functions:

1. To dry the fabric with help of steam.
2. To control the shrinkage.
3. To prepare for next subsequent process.
4. To dry tubular and open width fabric without tension.

STENTER M/C:

Function:

1. To apply chemicals
2. Drying of fabric.
3. To control width.
4. Curing of fabric.
5. To control GSM.

Compactor m/c:

Function:

1. To control shrinkage.
2. To control width.
3. To control GSM.
4. To smooth the fabric.

Dyeing after the brush Sueding allows maintaining and enhancing the color tone.
Should a vintage effect be desired with enhanced discoloration we suggest that fabrics be brush sueded in OPEN WIDTH after dyeing on the LAFER.

3.5-Quality Control/ Assurance Department

3.5.1-Introduction:

The Quality assurance Department is assigned to maintain consistently uniform quality of the material in process and various stages of its manufacturing. Epyllion Fabrics Ltd. is more about concern about quality. In this factory quality assurance is more preferred than quality control, but both are in advancement.

After collecting fabric rolls from different m/cs, they are needed to be inspected or assured required quality by the quality inspectors as if there were no big production hampered and no complain from the buyers. Here are the details about it.

It is the policy of The Epyllion Knitex Ltd to produce quality dyed knit fabrics that meet or exceed customer's expectations & needs. To implement this policy the top management of EKL is committed to provide adequate resources in terms of good raw materials and trained personnel & continually improve / upgrade its processes and systems

3.5.2-Quality Objectives:

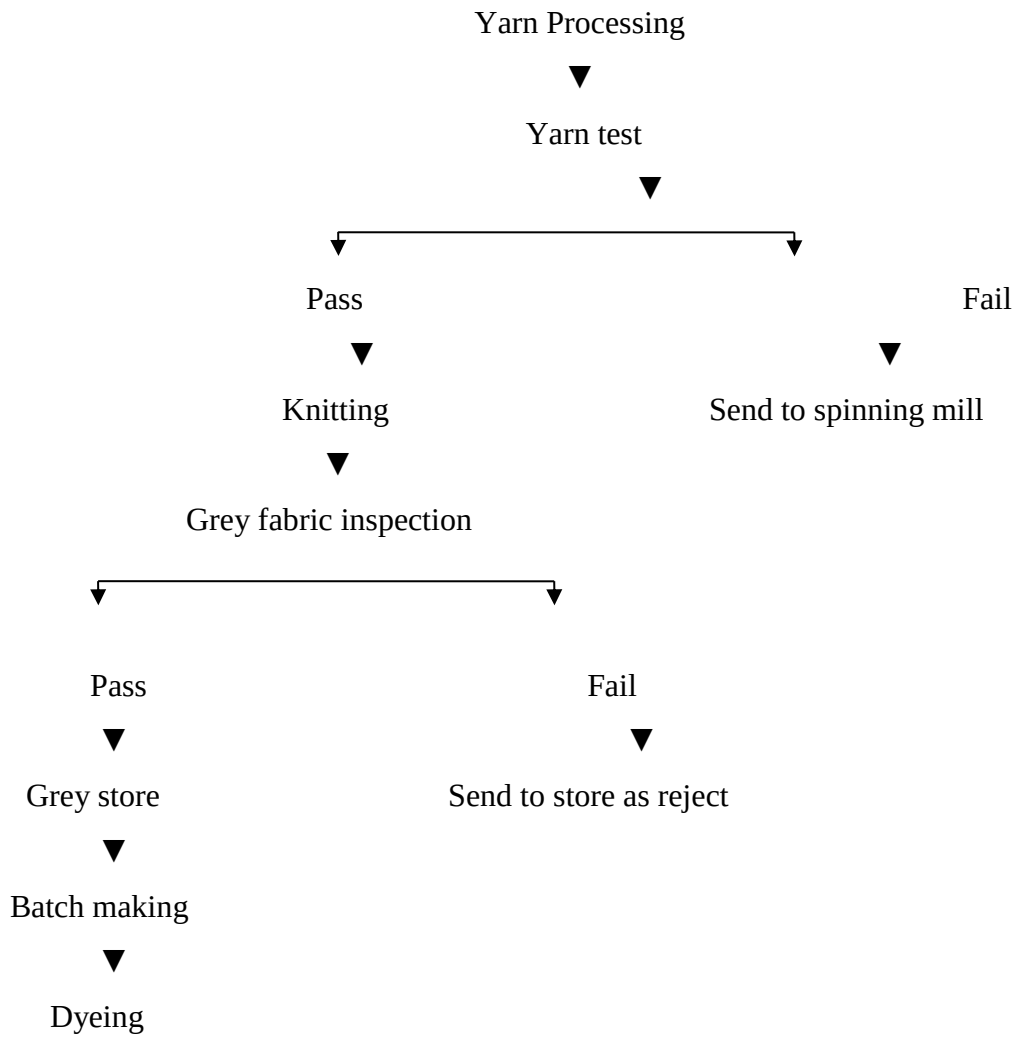
- Overall material/product loss (Level of rejection) for the company during the production process (in a year) shall not exceed 1.5 %
- Defects during dyeing & knitting operations to reduced by 10% by the Jan '03
- Process capability shall be maximized by maximizing the m/c breakdown time. M/c breakdown time should be reduced to 20 % form its current status/position by the mid 2003.

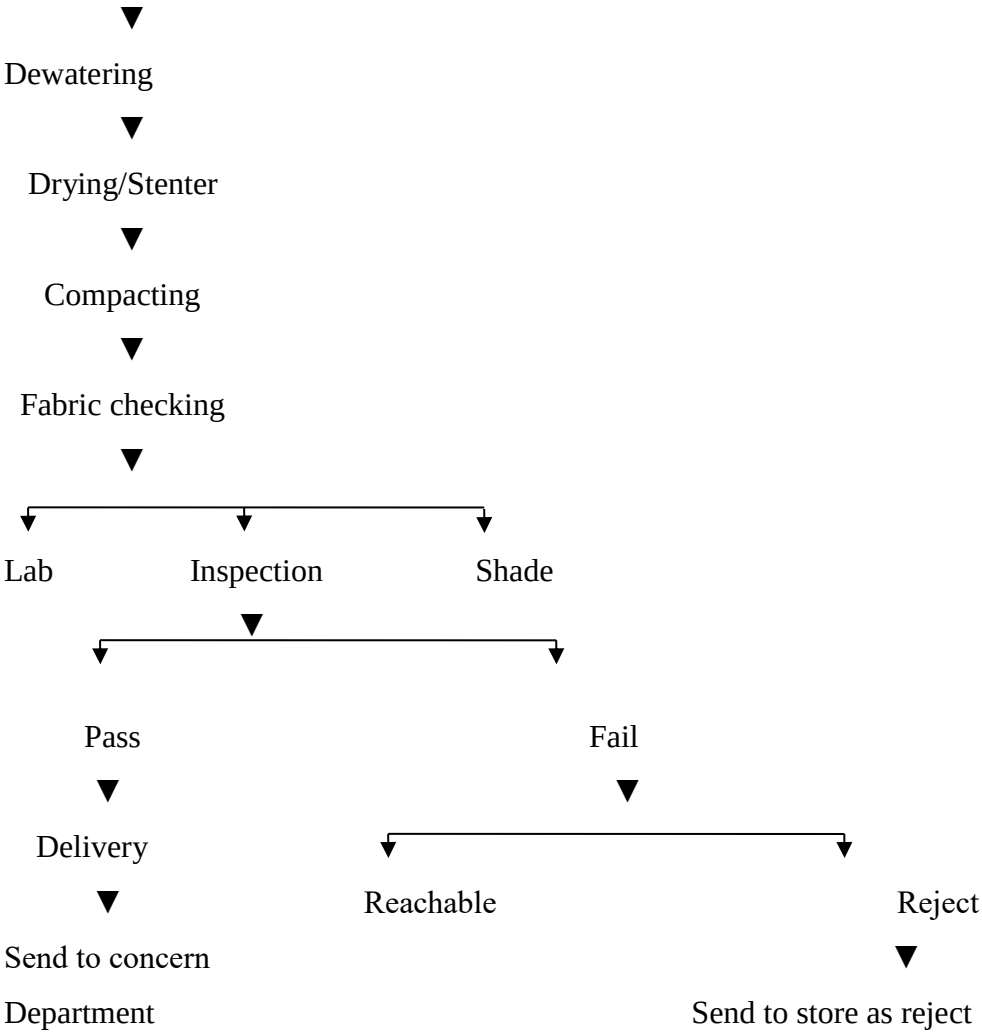
- A quality procedure manual in line with the requirement of ISO9001 shall be developed and implemented by August 2002.
- To ensure better work environment for the personnel working in the organization.
- Research.
- Selection of raw materials.
- Process control.
- Process development.
- Product testing.
- Specification test

Quality Standard:

Epyllion Fabrics Ltd follows the quality standard: ISO-9002:2000.

3.5.3-Quality assurance procedure:





The quality assurances procedure of Epyllion Knitex Ltd. and Epyllion Fabrics Ltd.can be checked & controlled in following step-

- In laboratory
- In Grey fabric inspection section
- In Dyeing section
- In finishing section
- In final quality control section

Procedures are described below:

In laboratory:

- Swatch card from buyer according to their re-quirement
- Recipe prediction for sample dyeing

- Sample dyeing until matching with swatch card
- If matching is OK, then it is sent to the buyer for approval.
- If buyer approves the sample then bulk production.

3.5.4-In Grey fabric inspection section:

- Any major or minor faults of knitted fabric are checked in this section.
- Remedy of major & minor fabric faults.
- Decision making in case of major fabric faults.
- Root cause analysis of major & minor fabric faults.
- Decide whether the fabrics will go to batch section or be hold.
- Sending the rejected fabric to the reject store.

Some Points Are Needed To Maintain For High Quality Fabric:

a) Brought good quality yarn.
b) Machines are oiled and greased accordingly.
c) G.S.M, Stitch length, Tensions are controlled accurately.
d) Machines are cleaned every shift and servicing is done after a month.
e) Grey Fabrics are checked by 4 point grading system.

3.5.5-List of Equipments:

Here is the list of equipments to assure quality:-

1) Inspection m/c # 1
2) Inspection m/c #2
3) Scissors
4) Electronic balance
5) GSM cutter
6) Indication sticker
7) Measuring tape

3.5.6-Quality Standard:

Epyllion Fabrics Ltd. follows the quality standard: ISO-9002:2000. Therefore the four point system is followed to inspect the body & rib fabric. The defects found and points given against are recorded in the inspection sheet. Following table shows the four point grading system followed by inspection at Epyllion Fabrics Ltd.

Four point grading system

Size of defects	Penalty
3 inches or less	1 point
Over 3 inch but not over 6 inch	2 point
Over 6 inch but not over 9 inch	3 point
Over 9 inch	4 point

Following table shows common body and rib faults and response by inspection section at Epyllion Fabrics Ltd.

Table 3.6- Differnent fault & rejection criteria.

Rejection criteria for body & ribs		
No.	**Faults**	**Response**
1.	Needle mark	Major needle line is rejected
2.	Stripe	Major needle line is rejected
3.	Barre mark	Rejected
4.	Contamination & fly	Approved for color but for white shed 1 point is assigned
5.	Slubs	1 point
6.	Thick thin place	Reject
7.	Birds eye	1 point
8.	Pin holes	1 point
9.	Wrong design	Reject
10.	Mixed yarn	Discuss with manager
11.	Sinker mark	Major sinker mark is rejected.
12.	Missing yarn	Use 4 point
13.	Holes	Do
14.	Oil line/stain	Do
15.	Chemical	Do

16.	Dirt stain	Do
17.	Crease line	Do
18.	Uneven tension	Discuss with manager

Following table shows the acceptance calculation followed by the inspection section at Epyllion Fabrics Ltd.

Table 3.7- 4 point system

Acceptance calculation
Factory: Roll yardage (A) Total points founds(B) Formula : $\frac{B}{A}$ X100 =points per 100 yard Classification : <= 40 points = A type 41-60 = B type 61-80 = C type Above 80poin = Reject

In dyeing section:

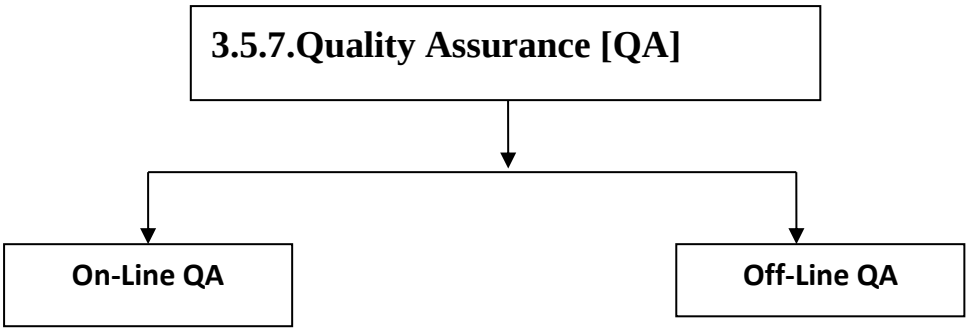
- After approval form the buyer, sample dyeing is done in dyeing m/c in dyeing shed & again matched with the approved sample
- If result is OK. then bulk production,
- During dyeing, samples are taken until accurate shade matching. The interval may be 30-40 minutes
- After dyeing sample is collected after softening matching is done
- Last of all, sample is collected after fixation & matched
- Then allowed the fabrics to be finished

In finishing section:

- Correctly dyed, after treated & matched fabrics are allowed for finishing
- By using a series of finishing machines correct width, softness & appearance are maintained according to requirements
- Then sampling is done for several times to test GSM, Shrinkage & fastness properties.
- Finally fabric is inspected & prepared for delivery

In final quality control section:

- Checking that fabric posses right GSM,width,dia,all around fastness property.
- Finding out all Knitting, dyeing& finishing faults.
- Checking that delivered fabric requires all requirements of buyer.
- Root cause analysis of all knitting, dyeing& finishing faults.
- Decision making whether a fabric will be rejected or delivered.
-



3.5.11-Different Tests for Quality Control:

There are two types of tests are done in Quality Assurance Department. They are –

1. Physical Tests
2. Chemical Tests

Physical Tests:

- Yarn Grade
- GSM test

- Shrinkage test
- Spirality test
- Tensile strength
- Abrasion resistance
- Pilling resistance
- Button Strength Testing
- Lycra% determination
- Crease resistance
- Finished dia test
- GSM test
- Shade check
- GSM of Fabric
- Width test
- Abrasion/pilling resistance
- Dimentional stability
- Shrinkage test
- Fabric weight
- Dimensional Changes in lengthwise
- Dimensional Changes in widthwise
- Seam Slippage
- Spirility test
- Pilling Resistance
- Softness test
- Hairiness test

Chemical Test

- Light fastness test
- Shrinkage test
- Wash fastness test
- Rubbing fastness test
- Pilling test
- Perspiration test
- Fastness to washing.

- Fastness to light
- Fastness to heat
- Fastness to actual laundering
- Fastness to Chlorinated water
- Fastness to water spotting
- Fastness to perspiration
- Fastness to rubbing
- Fastness to washing
- Fastness to perspiration

CDA

- Acetic acid.
- Soda ash
- Common Salt
- Gluber salt
- Sulphuric acid
- Wetting agent
- Sequestering agent.
- Hydrogen per oxide
- Caustic soda
- Water hardness

=0.8%

Responsibility of the Final Q.C.

- After unloading from dyeing cut cut small piece , check shade with std/approved lab dip/production sample & previous production batch (if any) .
- Then instruction to finishing for finish by mentioning specific temperature in dryer .
- After finish again cut sample & check same way like before at dry state .
- Keep the record of every lot after dry & after finished state .
- If any batch is not OK at any stage then make the re-process card for dyeing .
- If any batch is closer to standard but not exactly pass with standard , then make trial for that batch in finishing to make it OK .
- Maintain the resister of all batch .
- Check the shade of Body to Rib , Body to Collar & Cuff .

Responsibility of Quality Assurance Manager:

(1) Responsible for all quality matter of fabric.

(2) Yarn selection.

(3) Monitoring product development.

(4) Organize Laboratory.

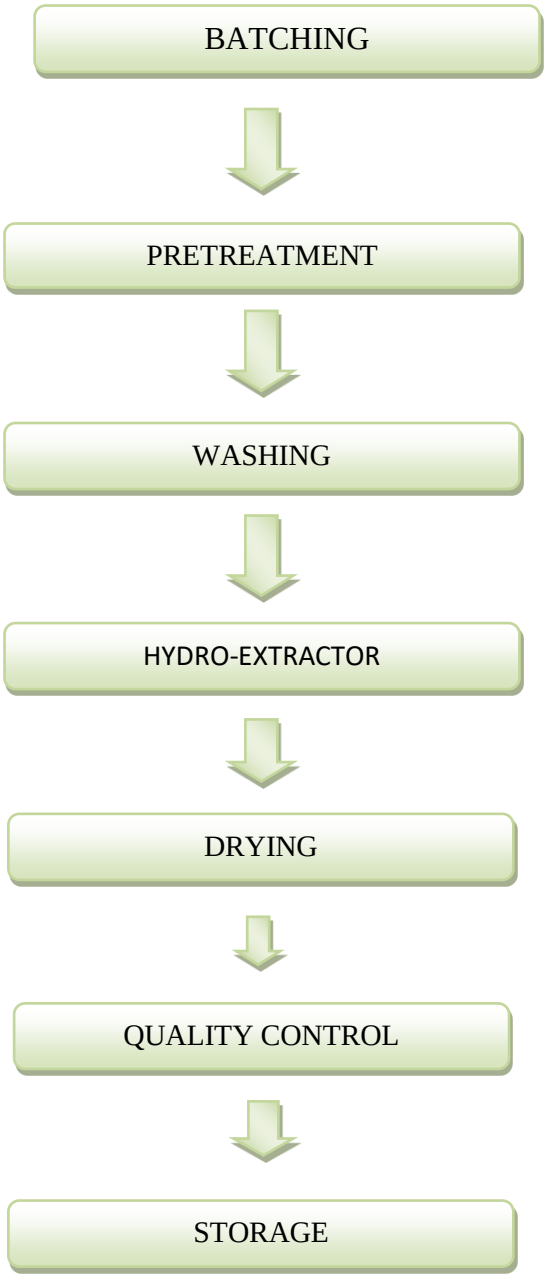
(5) Control grey and finished fabric inspection under 4- point inspection system

(6) Documentation of each dye lot after checking shade.

3.6-WASHING

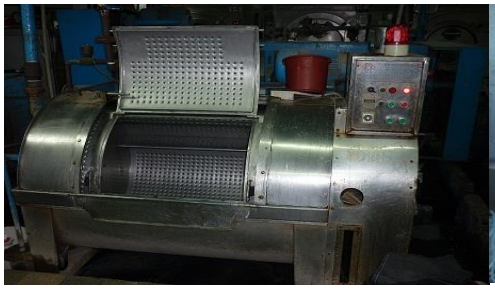
Fig 3.5- Washing m/c of Epyllion washing floor.

3.6.1-Production Flow Chart of Garments Washing



3.6.2-MACHINE DESCRIPTION

3.6.3-Machines used in washing plant



side loading washing m/c

Grinding m/c

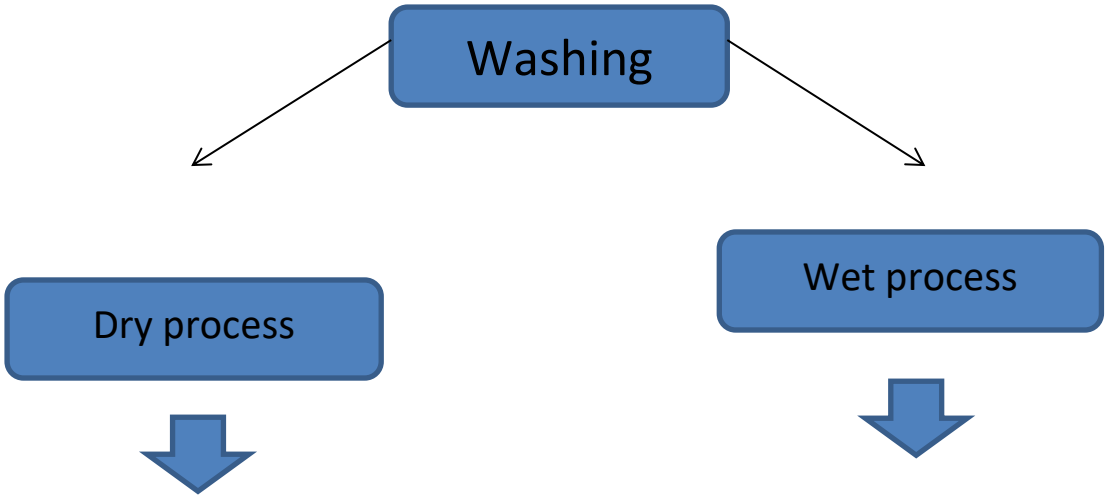
Hydro extractor m/c

Boiler Gas dryer

Dryer m/c

3.6- Differnts types of m/c used in washing.

3.6.4-Washing Types



- a. PP spray
- b. Whiskering
- c. PP sponging
- d. Hand scraping
- e. Grinding
- f. Destroy
- g. Broken & Tagging
- h. Permanent wrinkles
- i. White paste
- j. 3D-effect

- a. Normal wash
- b. Bleach wash
- c. Acid wash
- d. Enzyme wash
- e. Stone wash
- f. Stone enzyme wash
- g. Silicon wash
- h. Caustic wash
- i. Meta Wash
- j. Softener wash
- k. Tinting & Over dyeing

Normal Wash

Normal wash is the most simple type of wash with the lowest washing cost. During normal wash on garments washing effect could be varied by altering washing, temperature, time, quality of detergent etc

Object:

1. Could be removed dust, oil spot, impurities.
2. To remove size material, starch present on the garment fabric.
3. For soft filling to wear.

The normal washing process of batch of 70 kg twill garment are described below

Enzyme Wash

Enzyme are living organism or bio chemical substances that behave as a catalyst toward specific reactions. The action of enzyme during enzyme wash, it hydrolysis the cellulose. Mainly two types of enzyme used in Bangladesh.

1. Acid enzyme(liquid)
2. Neutral enzyme

Enzyme is done on the garments made from heavy fabrics like jeans & denim. before enzymewash, garments should be pretreated.

Objects:

i. To achieve high/low abrasion (softener effect on garment & seem abrasion in sewing area).
ii. Develop the `bio polishing` effect of cotton/denim.
iii. Improve the anti pilling properties.

Garments Wash

A wide variety of different types of woven and knit fabrics dyed by different systems are now used in apparel that is garment washed before retail distribution. Emphasis is on comfort and softness. Also, some fashion trends favor the broken-in look and worn/faded seams that can only be achieved through garment processing.

1. Load machine with garments.
2. Desize with alpha amylase enzyme and detergent.
3. Drain & Rinse.
4. Fill machine with water and heat to 60°C. The liquor ratio can range from 10:1 to 20:1. A number of synthetic detergents can be used. Also, alkaline products such as soda ash or caustic soda can be added in amounts ranging from 0.5 to 2.0 grams/liter.
5. Wash/tumble action for 20-60 minutes, depending upon desired effect.
6. Drain and rinse.
7. Apply softener.
8. Tumble dry.
9. Invert garments, if previously turned.
10. Press, if required.

3.6.5-Washed Samples

Fig: Enzyme Wash

Fig: Deep Bleach

Fig: Acid Wash

Fig : Tie Dyeing

Fig : Burn out

Fig: PP spray

Fig : Cold Dyeing

Fig3.7- Sample of some wash process.

CHAPTER

4

ETP

EFFLUENT TREATMENT PLANT

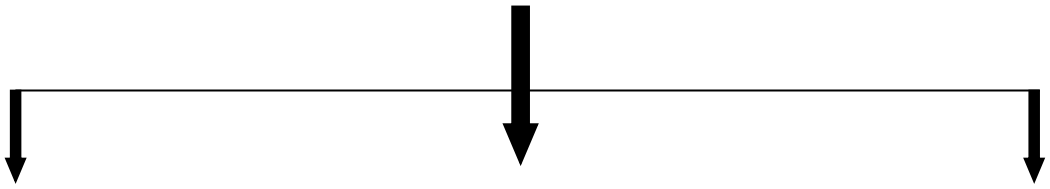
The stream of excess chemical liquor extracted from an industry after using in original purpose is called Effluent. Industrial effluent generated from different process is treated with various chemicals to remove or neutralize the environmentally toxic materials present in it. The plant where this job is done is called Effluent Treatment Plant or ETP.

Now a day, for an export oriented factory it is very common to have an ETP as it is a part of compliance & also Government is very strict in Environmental issue right now.

4.1-Effluent Treatment Plant

At

EPYLLION KNITEX LTD.



Chlorine ETP **Chemical ETP** **Bio-logical ETP**

Brief on Epyllion ETP:

- It posses the above three types of ETP.
- But right now only Bio-logical ETP is used as other two is very cost consuming process.
- Capacity of bio-logical ETP is 2400 m^3/day.
- Oxidation tank capacity is 48000 m^3.

4.2-Why the ETP is so called Biological:

The biological ETP is so called biological because hence biological treatment is used by the help of **bacteria** and micro organism to treat the effluent. Which if kept in determinate environmental circumstances are able to destroy polluting organic matter. From metabolism of organic matter, growth and developing of an activated biomass, CO_2 production ,water, mineral salt and inorganic products of biological waste are determined

4.3-What is bacteria?

Bacteria are tiny living beings (micro-organisms) - they are neither plants nor animals - they belong to a group all by themselves. Bacteria are tiny single-cell microorganisms, usually a few micrometers in length that normally exist together in millions.

A gram of soil typically contains about 40 million bacterial cells. A milliliter of fresh water usually holds about one million bacterial cells .

4.4-Classification of bacteria:

Bacteria can be classified into three different types :

- **Aerobic** types (which require oxygen to live)

AEROBIC DIGESTION

Organic waste + water -----**Enzyme**----> water soluble nutrients + oxygen ----**Bacteria**---> water + carbon dioxide

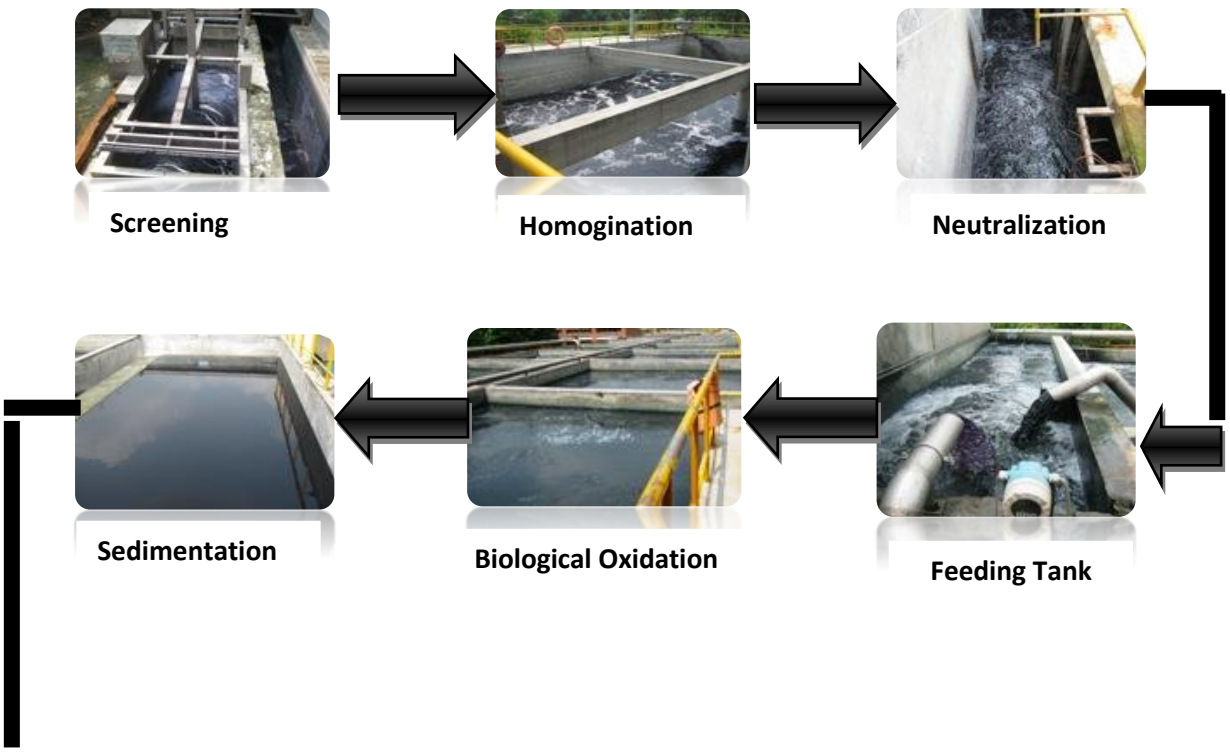
- **Anaerobic** (which can live without oxygen)

ANAEROBIC DIGESTION

Organic waste + Water ------**Enzyme**------->Water Soluble Nutrients -----**Bacteria**---> Water + Carbon Diox

- **Facultative** types can thrive under both aerobic and anaerobic condition

4.5-Process flowchart of biological ETP (by picture) :



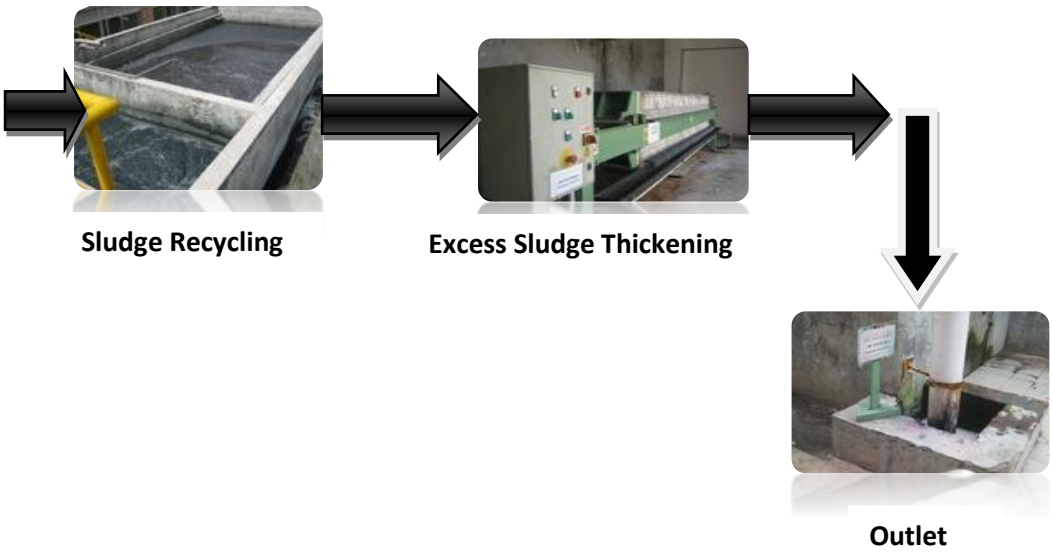


Fig 4.1- Process flowchart of biological ETP

4.6-Mechanism of Biological ETP (Working procedure)

Storage and homogenization of the waste water :

The raw waste water is pumped to the homogenization tank where it is stored within 24 hours. The mass is kept in continuous movement by force mixed to equalize the different waste water of different parameters.(Temperature ,P^H, BOD,COD,TDS,TSS, etc) . Hence oxygen is injected by micro-bubble to achieve a pre -oxidation stage of the waste water.

Neutralization:

The water at inlet is exposed to even remarkably ph value difference for this reason it is need to neutralize otherwise the bacteria and microorganism will be destroyed. The neutralization is done with sulphuric acid (H_2SO_4) by the help of volumetric dosing pump.

Biological oxidation:

It is the main operation in biological ETP which is carried out in a rectangular tank in which with the help of the action effect of the bacteria and aerobic micro-organism on the polluting load occurs the real and proper waste water treatment. The oxygen is injected at 1.2-2.5 mg/l through employ of oxygenizes of various type such as elastic membrane diffusers or high density polyurethane diffusers to maintain the proper (DO) 4.5-5 mg/l to survive the bacteria and micro organism as well as to oxidize the organic pollutants. The main reaction in biological oxidation tank are :

A) Bacteria oxidize the organic dyestuff, break the azo - linkage and make the colorful effluent colorless.

B)They also break the Benzene ring and thus produce nitrogen (N) , sulpher (S) phosphorus (P) and energy.

Bacteria eat Nitrogen (N) , Sulphur (S), Phosphorus (P) for their growth and energy and thus reduce the amount of TDS present in the waste water.

Sedimentation:

Here the sludge which is produced in oxidation tank is sediment to clarify the treated waste water at the outlet of the oxidation tank by the help of a special pipe. Here due to the low accessional speed the biological sludge flocks separate from the water and settled on the bottom. while the clarified water free of substances in suspension goes out from the top of the sedimentation tank by overflow which is ready to discharge freely into the receiving hydro body.

Sludge recycling station:

Sludge recycling is an essential phase of the entire waste water treatment cycle. The sludge which is separated from the water in the sedimentation phase are forwarded to central pump by the action of bottom blade. Through a pipe line the sludge is recycled to the head of the oxidation tank.

Attention:

The sludge recycling must be regulated in such a way that the sludge quantity in the recycling stream more or less twice compared to that in the oxidation tank. Generally the rate is **600-700 mg/l** and standard value is **500 mg/l.**

Excess sludge storage and thickening:

If the quantity of the sludge is exceed the normal level (500-700 mg/l) then the sludge recycling is stopped towards the main oxidation tank and reverse to excess sludge tank until the standard level is achieved. Hence a suitable flocculating agent such as cationic polyelectrolyte at high molecular weight is used to thicken the excess sludge. Successively mechanical dehydrating system such as drying beds, blade, belt or filter presses as well as decanters can be used **.**

Special treatment :

* **Neutrient salt feeding** :

The supply of nutrient salts is particularly important during the start up phase of the plant or during the production breaks . the supply of nutrient salts must be provide for a sufficient quantitative of organic matter to keep the bacteria alive for the total break time period . Feeding is carried out by a pre –set automatic dosing pump . Excess or less amount of dosing is harmful for the bacteria and they become dead.

* **Decolourant dosing :**

Sometimes decolorant is used to destroy the harmful colour of the waste water when it is not perfectly achieved by the biological oxidation. There is a pre-set rate of dosing which must be regulated by the operator.

Caution:

Decolourant is more **electronegative** than bacteria that they are more active than bacteria. So care must be taken while dosng the decolorant that it must not be used before the oxidation tank because if they use before the oxidation tank they will break the benzene ring of the organic dyestuff and thus destroy the **nitrozen, sulpher , phosphorus** which is used as the food of the bacteria in the oxidation tank . as a result the bacteria will be dead due to food scarcity. So they must be used after the oxidation tank.

* **NaOCldosing :**

Sometimes fungi or harmful micro organism are produced in the bottom of the oxidation tank which kill the bacteria . So to destroy the harmful insects NaOCl is used in the oxidation tank .

* **Dosing of de -foaming agent :**

Sometimes foam may form in the oxidation tank which just float the organic matter such as nitrozen, sulpher ,phosphorus from the bottom to the top of the oxidation tank. As a result the bacteria at the bottom of the tank cannot get their food and they will be dead .

* **Dosing of anionic polymer :**

They are used in sedimentation tank as well as excess sludge sedimentation tank .Hence anionic polymer is used .

CHAPTER

5

Maintenance

5.1-Introduction:

Maintenance is a procedure by which we can maintain active functioning in operation according to the behavior and utility of a particular element. In engineering, we use this terminology for maintaining smooth and uninterrupted performance of machines, tools and metallurgical characteristics in practical uses.

5.2-Objectives of Maintenance:

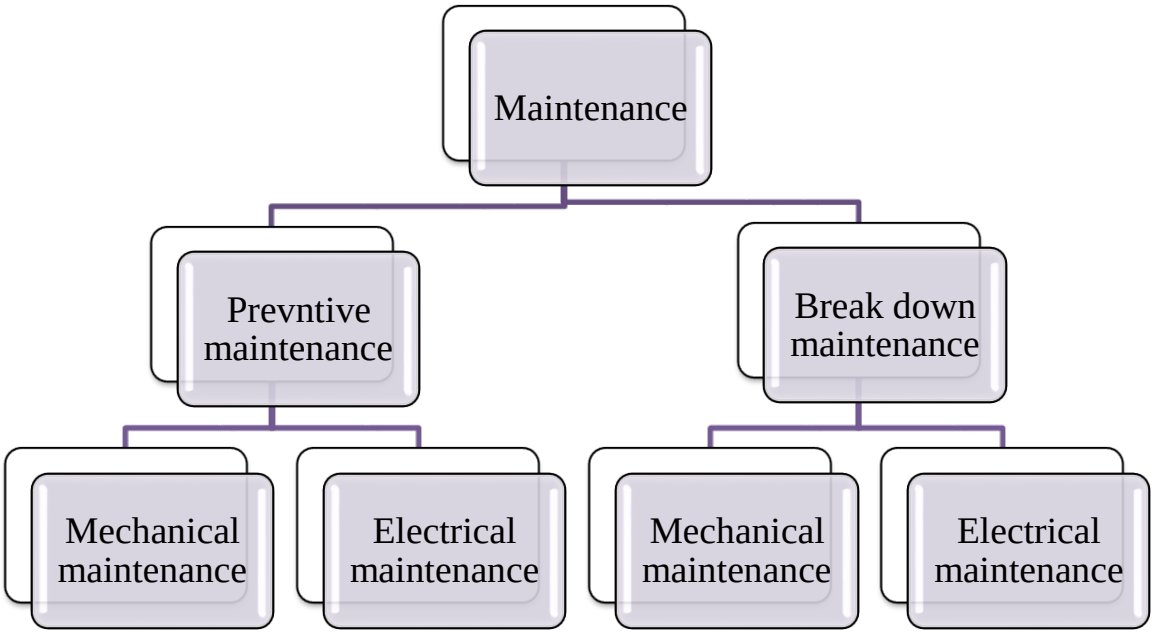
- To keep the factory-plants, equipments, machine tools etc. in an optimum working conditions.
- To ensure specified accuracy to products and time schedule of delivery to customers.
- To keep the down time of machines to the minimum thus to have control over the production program.
- To keep the production cycle within the stipulated range.
- To modify the machine tools to meet the augmented need for production.
- To improve productivity of existing machine tools and to avoid sinking of additional capital.
- To reduce the maintenance costs as for as possible thereby leading to a reduction in factory overheads.
- To prolong the useful life of the factory, plant and machinery, while retaining their acceptable level of accuracy of performance thus avoiding or prosponding incurring of heavy capital expenditure involved in their replacement.

5.3-Functions of Maintenance Personnel:

Inspection or Check-Ups:

- **External inspections:** Watching and detecting defects form abnormal sound, vibration, heat, smoke etc when machine is in operation.
- **Internal inspections:** Inspection of parts such as gears, bushes, bearings, tolerances in the parts etc. when machine is under pre-planned shutdowns.
- **Inspections of important machines:** Machines, which can disrupt whole of the production, are delicate and require much time for the repair. Attentions are given for inspection of these machines and schedule for inspection, cleaning lubrication are done rigidly.
- **Inspections of ordinary machines:** Frequency of inspection of ordinary machines is kept as low as they do not affect the production.

5.4-Maintenance of machinery:



5.5-Maintenance tools/equipments& their functions:

Table 5.1- Maintenance tools/equipments& their functions:

Maintenance tools/equipments	**Functions**
1. Adjustable wrench	Used for setting nut & bolts
2. Pipe Spanner	For pipe fitting
3.Spanner	Fixed Spanner for nut & bolts fitting
4.Socket spanner	Handle system for nut & bolt fitting
5. hammer	To apply load where required
6. Screw driver	To release any screw
7. Punch	Used to fit any worn out shaft
8. Lock opener	To open the clip of bearing
9. Hack saw	To cut any metallic thing
10. Outside calipers	To measure outside dia
11. Inside calipers	To measure inside dia
12. Slide calipers	To measure very small dia
13. Vernier scale	To measure very small dia
14. Chain ton	To lift heavy load
15. Welding machine	To join metallic parts

16. Grinding machine	To make the smooth fabrics
17. Tester	To test electric circuit
18. Pliers	To grip anything & cut anything
19. Avometer/Voltmeter	To measure voltage
20. Steel tape	To measure length, width & height
21. Chisel	To cut any metal
22. Gasket cutter	For gasket cutting
23. File	To smooth the rough surface

5.6-Maintenance procedure:

The following tasks are generally done during maintenance:

- Inspections & check ups
- Lubrications
- Planning & scheduling
- Record analysis
- Training of the maintenance crew
- Collection or purchase of spares

CHAPTER

6

Utility Services

6.1-Introduction:

Man, Machine and Material, the three main things that can accelerate the production, if it is used in proper and organized way. In the Industry, UTILITY plays an important role in case of production. Production and profit are closely related. In order to get a quality-finished product, it needs fresh raw materials as well as effective manpower and machinery in good working condition. Utility is closely related to the three M's plays a vital role to maximize the production as well as profit. For smooth functioning of any production unit, uninterrupted and required utility services are indispensable. Success of any industry largely depends on this factor. Any irregularity or lack in the required utility services immediately results in un-expected halt of the production process. An Industry needs various utilities depending on its manufacturing process.

6.2-Functions of utility:

- Utility ensures power supply by generator.
- Utility ensures water supply by pump.
- It ensures steam by boiler.
- It ensures compressed air handling by vacuum planning system.
- It provides fuel and gas supply.
- It provides workshop facilities.

6.3-Available utilities:

The following utility facilities are available at Epyllion Knitex and Fabrics Ltd.

- Water.
- Steam.
- Electricity.
- Gas.
- Compressed air.
- Covered Van for Transportation.

6.4-Sources of utilities:

Water:	Natural water by own supply pump
Steam:	Own supply from Boiler
Electricity:	Generator & PDB
Gas:	Titas Gas Transmission & Distribution Co. Ltd.

Compressed Air: Own supply from Air compressor

❖ **Steam Supply:**

Steam is an important utility for dyeing section. Steam produced by the boiler Supply water is simply treated in the boiler section by the two softener tank Then water reserves to the feed water tank & this feed water tank warms the water Then water passes to the boiler which produces steam & that steam supplies to the factory . Heat generation is a very important factor for washing and dyeing process. Steam is a very efficient & easy way to transfer heat. There is a boiler to generate steam. By pipe line the generated steam is supplied to the washing and dyeing machines & where it is necessary. The boiler has the capacity to generate steam 1.5 Tons/Hr.

Water supply:

Water is supplied by pump. Pump supplies water on the basis of pressure. Pump pressure ranges 0-10 bar. The pump is operated at 2-4-bar pressure. 3 motors are used for uniform water supply. These are automatic on-off system motor. When the pressure is reduced to the desired level (2 bars) then the motor is turned on. Similarly when the pressure is above the desired level (4 bars) then the motor is turned off. So, it has variable water supply capacity & supplies water as required.The water, which is used for cooling, is brought to a tank & again supply by a pump.

WATER TREATMENT PLANT:

Sequence of water treatment plant-

- Iron Remover
- MGF/ ACF (TDS Remover)
- Softener

There are two deep tubeweel by the two side of the treatment plant. There are also two submersible pumps in the deep tubeweel one is 100 ft deep and another is 140 ft deep. The submersible pump transfer raw water in the water tank by creates force. The formation of oxidation of the water by showering with the help of another two pimps in the water tank. Iron content removes by the oxidation.

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BOILER:

Number of Boiler -02

1. Brand Name :Cleaver Brooks, USA
2. Max. Working pressure gauge :10 bar
3. Max heat capacity :3.25 MW

Operation Procedure of Boiler:

These two types of boiler are horizontal fire boiler. At first the boilers take NTA (Natural gas) from the gas line and suck air. Then through the air and gas inside the boiler. For this reason the water is boiled water and produce steam. The steam is supplied by the steam line in the different section.

ELECTRICITY SUPPLY:

It is totally impossible to continue the production without electricity. A frequent supply of electricity is very essential for soundless production. Here all the machines in washing and dyeing section are provided electricity by the govt. electricity with own standby generator of the industry.Epyllion Knitex Ltd. has two generators for power supply to ensure continuous dyeing & knitting operation and help to fulfill their target production. One is gas generator & other is diesel generator. Both of this two generator gas generator is widely used because of lower production cost.

Compressor:

Number of Compressor: 5

Brand	: Roll Air
Capacity	: 2×281 m^3 /hr (EKL)
	3×508 m^3 /hr (EFL)
Pressure	: 10 Bar
Power Consume	: 55KW
Rpm	: 297

CHAPTER

7

Store & Inventory Control

7.1-Introduction:

Inventory is planning and execution involves participation by most of the fundamental segment of business sales, production, purchase, finance and accounting. Inventory is a wider sense is defined as any idle resource of an enterprise however it is semi-finished packing spares and other stocked in order to meet an expected demand or distribution.

7.2-Objectives of inventory control:

1) Financial activities:

a) To save amount of investment

b) To know the cash position

2) Property Protection:

a) Preventable waste

b) Insurable damage

c) Unauthorized use

3) Operating:

a) To obtain the best overall balance between production and inventory carrying cost.

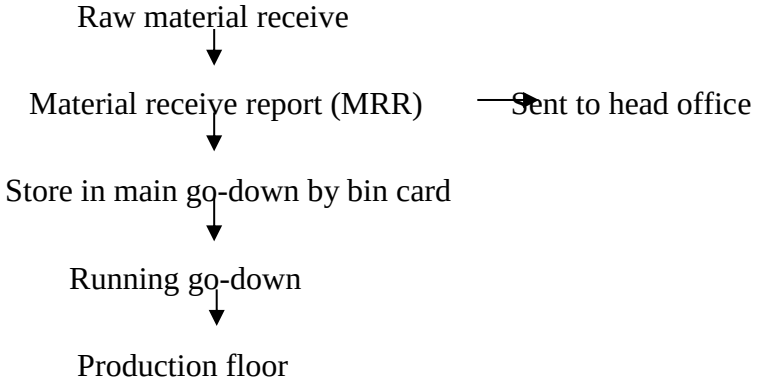
b) To minimize losses

c) To avoid stock out and to keep inventory holding costs in costs in balance

7.3-The types of inventory carried in this mill are as follows:

- **Grey Fabric :** Imported/Own factory.
- **Dyes and Chemicals :** Important.
- **Spare parts and Consumables :** Local/Imported.
- **Packing materials :** Local/Imported.
- **Finished fabrics :** Good/Reject.

7.4- Process flow chart:



1. **Yarn store:**

Yarn store is one of the most important department of the factory. All the yarn either produced inside the factory or imported from outside is stored here. Here yarn of different count and quality is kept according to the order and buyer requirements.

2. **Grey fabric store:-**

All the grey fabrics are stored in grey fabric store after knitting. Different types of fabrics arc listed in the sheet according to the fabric types, quantity & consumer's requirements. Fabrics GSM, shrinkage, diameter & other properties are also taken into consideration. The batches are prepared by taking the required fabrics from the grey store.

3. **Dyes & Chemicals store:-**

Here various types of dyes & chemicals are stored according to the brand & their functions. A list is prepared with all dyes & chemicals name & brands. In the list, the stored quantity of dyes & chemicals are also included. The list is updated regularly (generally everyday) & a copy of this list is delivered to the concerned persons (GM & AGM) of the production floor & lab.

4. **Spare parts store:-**

In Reedisha Knitex Ltd. required amount of spares of different machines are stored in the mechanical store room. All the spares are listed in a sheet which is controlled by the mechanical & maintenance personnel. Spares are arranged in the store room according to their size, quantity & requirements. There are shelves in the store room to keep the small spare parts.

5. **Finished goods store:-**

Dyed & finished fabrics are stored for a short time before supplied to the garments section. All the delivered fabrics are noted on the tally khata according to the lot no,

quantity, fabrics diameter, buyers name, color & with other technical parameters.

6. **General store:**

General store is one in which all the essentials are stored and maintained the flow of operation with a view to mitigating the production order.

Function:

- PR against indent
- Preparation of MRIR after QC
- Issue against sr
- Input in to the ledger
- Physical arrangement by type or group
- FIFO policy

7. **Leftover store:**
    - Received from all garments & floor
    - Sorting by item & color
    - Preparation of packing list
    - Delivery against DO
8. **Others store:**

There is a central store at Epyllion Knitex Ltd. In that store the various types of forms, papers, stationary & other necessary goods are kept.

7.5-Difficulties:

There are some difficulties available in store department which can not be avoided. So the in-charger must take these with a great care to maintain the right and proper flow of the production to meet the delivery.

- Product lead time/Rec. Time
- Shortage of space
- Authorization for issue ,Etc

CHAPTER

8

Cost Analysis

8.1-Introduction:

Costing is a very important task for a factory which runs for business purposes.And it is also strictly followed in the Epyllion Knitex Ltd. Costing of the products considering the raw materials expenditure, salary and wages of officers and workers, distributions and advertisement expenses etc. all direct and indirect expenses is done in this factory. It is determined by a troop of accountants with advice and consultancy of executive director.Cost analysis is a crucial step for any business organization, specially if it is a manufacturing company. Here cost analysis is done in conventional method. Costing is a process by which the setting price of a product is calculated.

8.2-Price of the Product:

Generally price of product is determined by the required profit adding to the total expenses. So,

Price of products= (Direct cost + Indirect cost + FactoryOverhead) + Required profit

8.3-Costing Of the Product:

Costing system mainly describes how the cost of the final product is fixed by the company/beneficial. According to buyer/customers requirement at first the fabric is collected from local and foreign suppliers. Then it id calculated how much dyestuff and chemical is required to the end of the processing of that specific fabric .After that, the final cost is fixed including some profit & manufacturing overhead. Then the unit price is offered to the buyer for approval.

Costing of the product is done by the consideration of the following factors:

- Direct materials.
- Indirect materials.
- Direct labours.
- Indirect labours.
- Manufacturing Overhead

    - ✓ Floor rent.
    - ✓ Machine description.
    - ✓ Utility cost.
    - ✓ Maintenance.
    - ✓ Spare parts.

- ✓ Depreciations
- ✓ Office overhead.
- ✓ Transportation.
- ✓ Refreshment.
- ✓ Miscellaneous.

8.4-Marketing

Marketing is the heart of a company's turnover. Epyllion group has a strong and skilled marketing team and under their effective direction Epyllion group is now one of the prominent groups in the country. Here are the details of marketing activities:

8.5-Consumers of Product:

The mill has a great number of renowned and international consumers. The main consumers of this factory are European country such as Germany, France, Netherlands, Denmark, Italy & England. Following are some regular buyers.

8.6-Product label:

There are following labels used by this mill:

1) **Care Label**: It contains washing in hot or cold water, chemical cleaning, drying conditions etc.

2) Size Label: It contains size of garments.

3) Composition Label: It contains the fabric composition of different fiber type.

4) Decorative Label: Decoration is as buyer or consumer choice wise.

8.7-Package size & label Local market:

Most common sizes are -

S - Small

M - Medium

L - Large

XL - Extra large

XLL - Very very large

8.8-Importing Countries:

This mill relates to the countries for yarn importing, they are :

1) India

2) Korea

3) Thailand

4) Indonesia

8.9-Exporting Countries:

- Spain
- Germany
- Denmark
- European Union
- United State of America
- Canada
- Netherland

8.10-Manpower:

Marketing plays a vital role in the field of displaying/showing the good criteria of the products to the buyer & to communicate with the buyer .there about 30 people in the marketing section of the industry.

8.11-Marketing strategy:

Marketing strategy is a very important factors to sale the products to the buyer. If the marketing strategy is not so developed, it will be very hard to reach the goal. In case of garments marketing the dealings with the buyer is a very important factor.

The Epyllion Group, mainly senior marketing officers, merchandiser & higher officials deal with the buyer. There are some fixed buyers of the industry. The buyers give their orders continuously all over the year. The marketing officers & the merchandisers communicate with the buying houses to collect the orders.

By both side understanding the rate & the order quantity are fixed.

8.12-Merchandising:

Garment merchandising is an intricate and detail oriented job. If it can be done properly can be very rewarding. On the country, if it is done with lack of knowledge, insufficient skill and thoroughness, it can be destructive.

In the **Epyllion Group**, very skilled and experienced personnel run the merchandising section. After receiving an order, the merchandiser with the help of pattern master calculates the total consumption of fabric. Then according to the cost detail sheet and the price mentioned by the buyer costing is done. After the price is negotiated with the buyer order is placed to the suppliers of raw material and accessories.

The manufacturing factory as per the requirement suppliers the fabric and a ledger is maintained regularly to assess the production status. The accessories such as label, button, zipper, sewing thread, packing materials are collected from outside [sometime mentioned by the buyer] through back-to-back L/Cs. The merchandising department also looks for the sources for procuring yarns to produce fabric.

Merchandising section monitors the production status regularly and ensures timely delivery of the shipment.

7.13-Buyer's Compliance:

The factory is full compliance with ILO and Bangladesh Labor Law. Their company policy is as follows:

- No child labour.
- No forced labour.
- Transport facilities for worker.
- Hours of work.
- Voluntary over time.
- Intervals for rest.
- Weekly holidays.
- Annual leave.
- Festival holidays & leaves with bonus.
- Maternity protection.
- Worker's welfare committee.
- Mineral drinking water.

Conclusion

Industrial attachment program send us to the expected destiny of practical life. Epyllion group is a very good industry. It is a green factory. It maintain 100% ETP for the dyeing process. There are very good environment for the worker for working. It has very good management to control the whole process. We went through all the section of Epyllion group. We got a lot of support from our senior brothers of daffodil international university who are working in the Epyllion group. We tried to learn many things from our mill training. We got many support from our teachers.

Through the completion of two month industrial attachment at Epyllion group, we have got the impression that the factory is one of the most knit dyeing projects in Bangladesh. Though Epyllion group was established in 1994 and Epyllion style established in 2006, it has earned very good reputation for its best performance over any other knit dyeing project. 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.