



Faculty of Engineering
Department of Textile Engineering

Industrial Attachment report on

ESQUIRE KNIT COMPOSITE LTD

Submitted by

Md. Abuhena Mostafa Kamal

111-23-2338

Supervised by

Mohammad Abdul Baset
Sr.Lecturer

Bachelor of Science in Textile Engineering
Advance in Apparel Manufacturing Technology

December, 2014

Declaration

I hereby declare that, this industrial Attachment has been done by me under the supervision of **Mohammad Abdul Baset**, Senior Lecturer, **Department of Textile Engineering** Daffodil International University. I also declare that neither this report nor any part of this report has been submitted elsewhere for award of any degree .

Submitted by:

Md.Abu Hena Mostafa Kamal

ID: 111-23-2338

Department of Textile Engineering
Daffodil International University

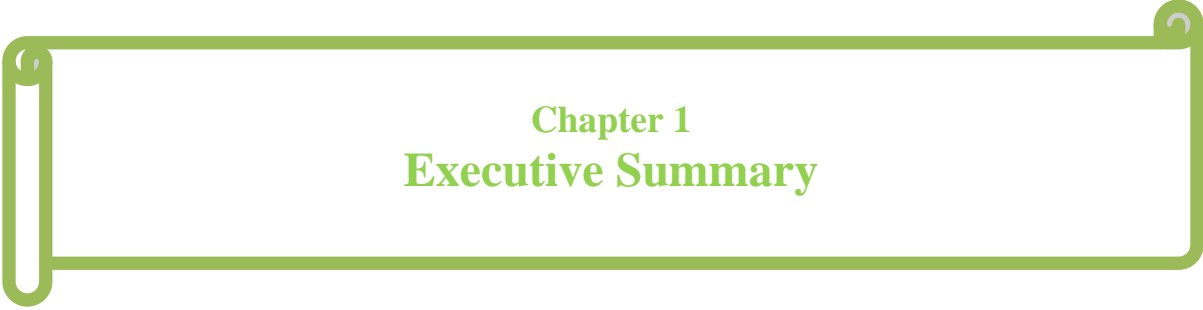
ACKNOWLEDGEMENT

First of all I express my gratitude to supreme Allah for blessings, approval, protection, mental power and wisdom in all aspects of my life. The applauses to Allah to complete this project work. During our Industrial Attachment, many individuals have unselfishly contributed their time, support to make this project possible. I would like to extend our sincere gratitude to those who have provided guidance in every step along the way. I am deeply indebted to my supervisor **Mohamad Abdul Baset**, Sr. Lecturer Department of Textile Engineering, Daffodil International University, whose help, suggestions and encouragement helped me in all the time of research for and writing of this report. His scientific curiosity, encouragement and guidance throughout this work have been necessary for this report. It is a great pleasure in expressing my profound gratefulness and sincere gratitude to my respected teacher, **Prof. Dr. Mahbulul Haque**, Head of the Department of Textile Engineering, Daffodil International University, for his inspiration, prudent advice, affectionate guidance, Daffodil International University, for their encouragement, love & care with great inspiration in all aspects. I would like to give a special thanks to all of my teachers of the Department of Textile Engineering, Daffodil International University. We would like to thank the management of the Esquire Knit Composite Ltd. for giving me the opportunity to do the industrial training successfully and also their valuable suggestions. My deepest appreciation goes **Mr. Ehsanul Karim Kaiser- General Manager, Esquire Knit Composite Ltd.** for his permission to conduct my industrial training without which it would be incomplete. The generous support is greatly appreciated. We would also like to thank executives, senior executives and other officials of Esquire Knit Composite Ltd. for helping me to complete industrial training successfully. My gratitude also goes to all the employees of Esquire Knit Composite Ltd. for their sincere co-operation, support and valuable advices. Last but certainly not least, I am forever indebted to the love and caring of my family. Gratefulness for our family's support, encouragement and understanding cannot be expressed in words.

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Chapter 1 Executive Summary

1.0: Executive Summary

I got opportunity to complete two month long industrial training in ESQUIRE KNIT COMPOSITE LIMITED (EKCL) which is a 100% export oriented composite knit composite industry. It has well planned & equipped yarn dyeing, fabric dyeing, and finishing & garments units in addition to facilitate knitting & knitwear manufacturing. The main reason to select EKCL to complete my industrial attachment as it is a vertically set up composite industry and every operation can be done here. It is a great chance to see these operations visually and gather practical knowledge. Wide range of fabrics likes single Jersey, Rib, Interlock, etc. and Grey Fabric, Spandex, Dyed fabric and Printed fabrics are produced here. All types of knit wears, especially Basic & Fancy T-Shirt for all ranges, Polo Shirt, Night wear, Shorts, KIDS items, Tank Top etc. are maximum time produced here. I have learned the process & technique to maintain quality. Different knitting pattern, GSM ,Inspection, Cutting technique, CAD and pattern making, shade to shade bundling in cutting section, printing method & technique, different types of sewing, sewing machine mechanism ,work study, motion study, method study, inline inspection, measurement taking method, etc. I have learned during our internship period.

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Chapter 2
Information about factory

2.1: Introduction

The term 'Textile' derived from the Latin word 'Textiles' and French 'Texere', meaning 'to weave' and it originally referred only to woven fabrics. It has, however, come to include fabrics produced by other methods. Thus thread, cords, ropes, braids, lace, embroidery, nets and fabrics made by weaving, knitting, bonding, felting or tufting are textiles. Some definitions of the term textile would also include those products obtained by the papermaking principle that have many of the properties associated with conventional fabrics. In addition to clothing and home furnishings, textiles are used for such industrial products as filters to air conditioners, life rafts, conveyor belts, tents, automobile tires, swimming pools, safety helmets and mine ventilations.

From fiber to fabric, EKCL is truly integrated undertaking. EKCL has the capability to offer a complete product range for the export textile markets. The goal of EKCL is to become the preferred partner for sourcing high quality fabrics and clothing from Bangladesh with highly advanced technology and an emphasis on developing local human resources. EKCL has the potential to make an important contribution to the nation's growing readymade garment export sector.

The rationale behind the existing structure and future expansion of EKCL is to capture value-added at each stage of the textile manufacturing process. Despite Bangladesh's lack of indigenous cotton production capability, EKCL has leveraged Bangladesh's labor cost advantage and export competitiveness to the maximum.

2.2: History of the factory

Esquire Knit Composite Ltd has established nearly 13 years. Having the industrial knowledge over 18 years from its sister concern companies namely **Esquire Dyeing Industries, Esquire Knitwear Ltd, Fashion Paradise and Synthia Multi Fiber Ltd.** Esquire knit has focused on its business and successfully established the name as a world class garment manufacturer under one roof having a composite factory of yarn dyeing, knitting and fabric dyeing and finishing; printing up to garments making. Making it a right choice for one stop solution for all kinds of knitting garments. The group currently employs over 6800 people, serving customers in European and American chain stores, fashion brands and super market. Present capacity of production goes over 3 million pieces of garments per month.

EKCL keep improving the quality of products and services and looking forward to introduce a wider range of products to their customers to meet their needs. Given the strength of leading position in the global market, with a comprehensive product portfolio, reputable and strong customer base, the aim is to consolidate factory position as one of the best garments manufacturer in Bangladesh. EKCL will continue to focus on strengthening business foundation to ensure a strong base on which to explore new business opportunities for the development of core business, broaden revenue base, increase the growth potential and thus enhance the customer satisfaction.

2.3: Founder and directors

Esquire Team :

Another major asset to our sophisticated production facilities and technical expertise is our team of experienced and qualified people who are committed to achieve maximum customer satisfaction by delivering superior product value. The team works under the able guidance of our Chairman Mr. Mofazzal Hossain, under whose leadership, the company has reached so far in this business. Our sensor management includes:

- Mr. Mofazzal Hossain- (chairman) Esquire group
- Mr. Ehsanul Habib- Managing Director
- Mr. Ehsanul Karim Kaiser- General Manager
- Dr. Md. Ali Haider- G.M (R&D)
- Mr. A.S.M. Hafizur Rahman-GM (Fabric Dyeing)
- Mr. Nazrul Islam Khan – AGM (Garments)
- Mr. Faroque Rahman- AGM (Yarn Dyeing)

2.4: General information about factory

General Information about the Factory:

Name of Factory	:	Esquire Knit Composite Limited
Type of Industry	:	100% Export Oriented Composite Knitwear
Year of Establishment	:	2001
Status (Legal Structure)	:	Private Limited Company
Factory Location & Address	:	22/58, kanchpur, Sonargaon, Narayangonj, Bangladesh.
Management System	:	Private Limited Industry

Company log:



Banker: Dutch Bangla Bank Limited
1 Dilkusha C/A
Dhaka.
Bangladesh

Fabric range:

Solid and Yarn dyed S/jersey, Pique, Interlock, Rib , Lycra enriched fabric, Engineered striped jersey and pique , All Over Printed , French terry, Fleece. We have in-house facilities for Peaching, Brushing. We do Moisture Management, Wrinkle free, Stain Management and Anti Microbial treatment in fabric.

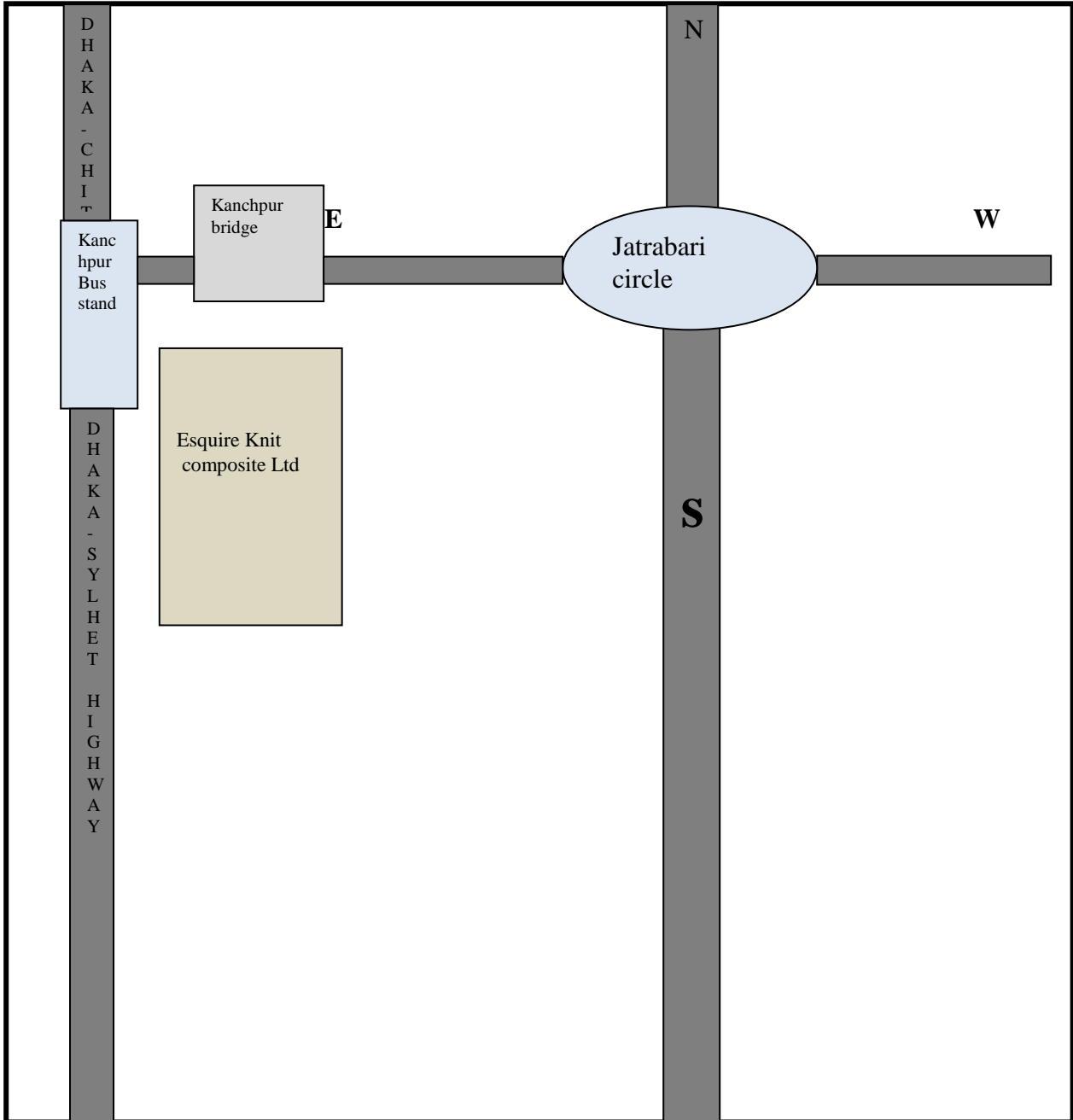
Type of product:

Fancy Dresses, Tops for Girls and Lady. Embellished polo, Rugby shirts,.
Hoody & Sweat shirts. Infant and Baby's Body suit .

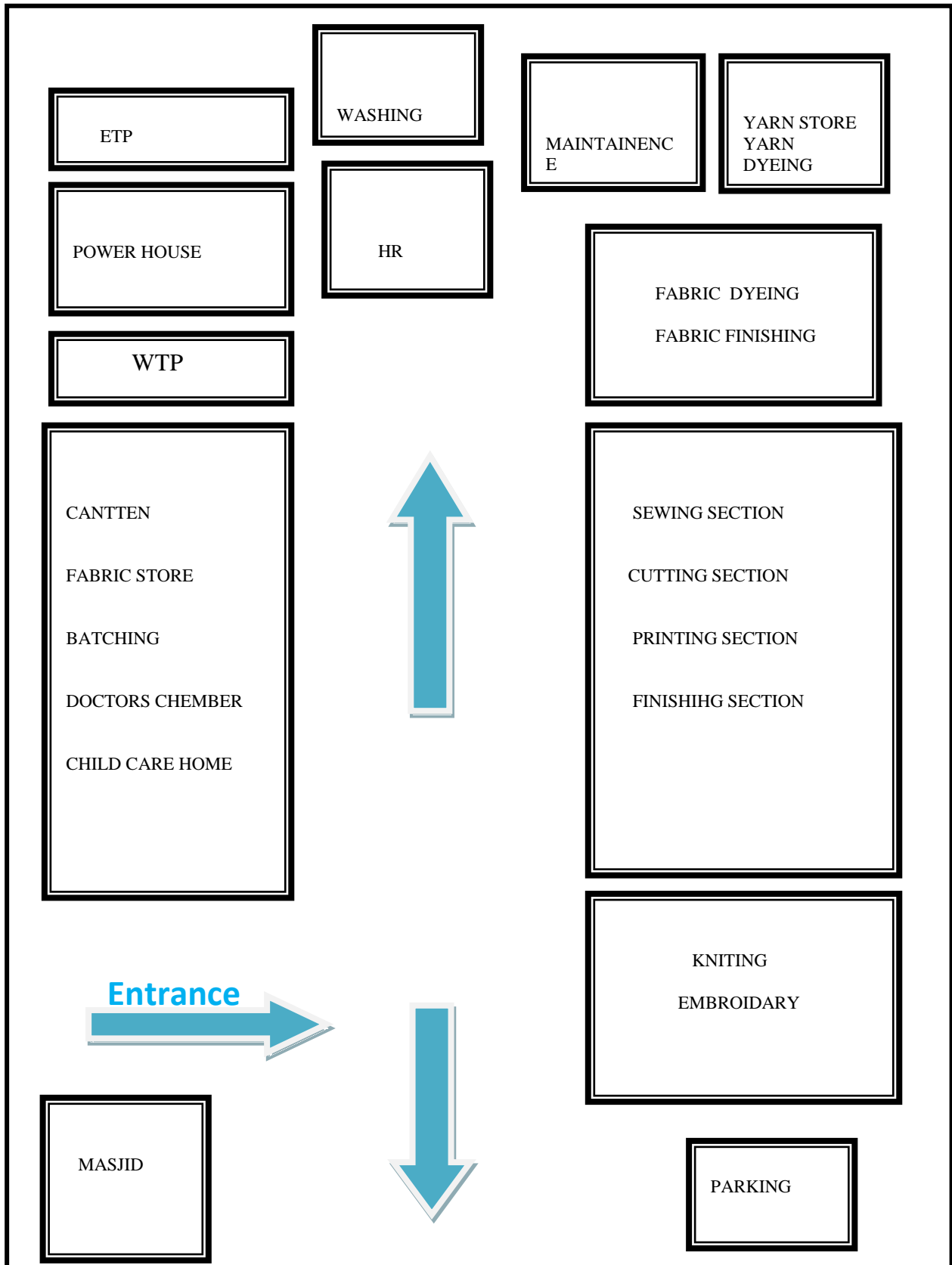
Compliance:

The factory is fully compliant to International requirements and is regularly audited by BSCI, SMETA, SOCAM, CSCC, and SGS, ITS etc. We welcome you to make a visit to in this factory.

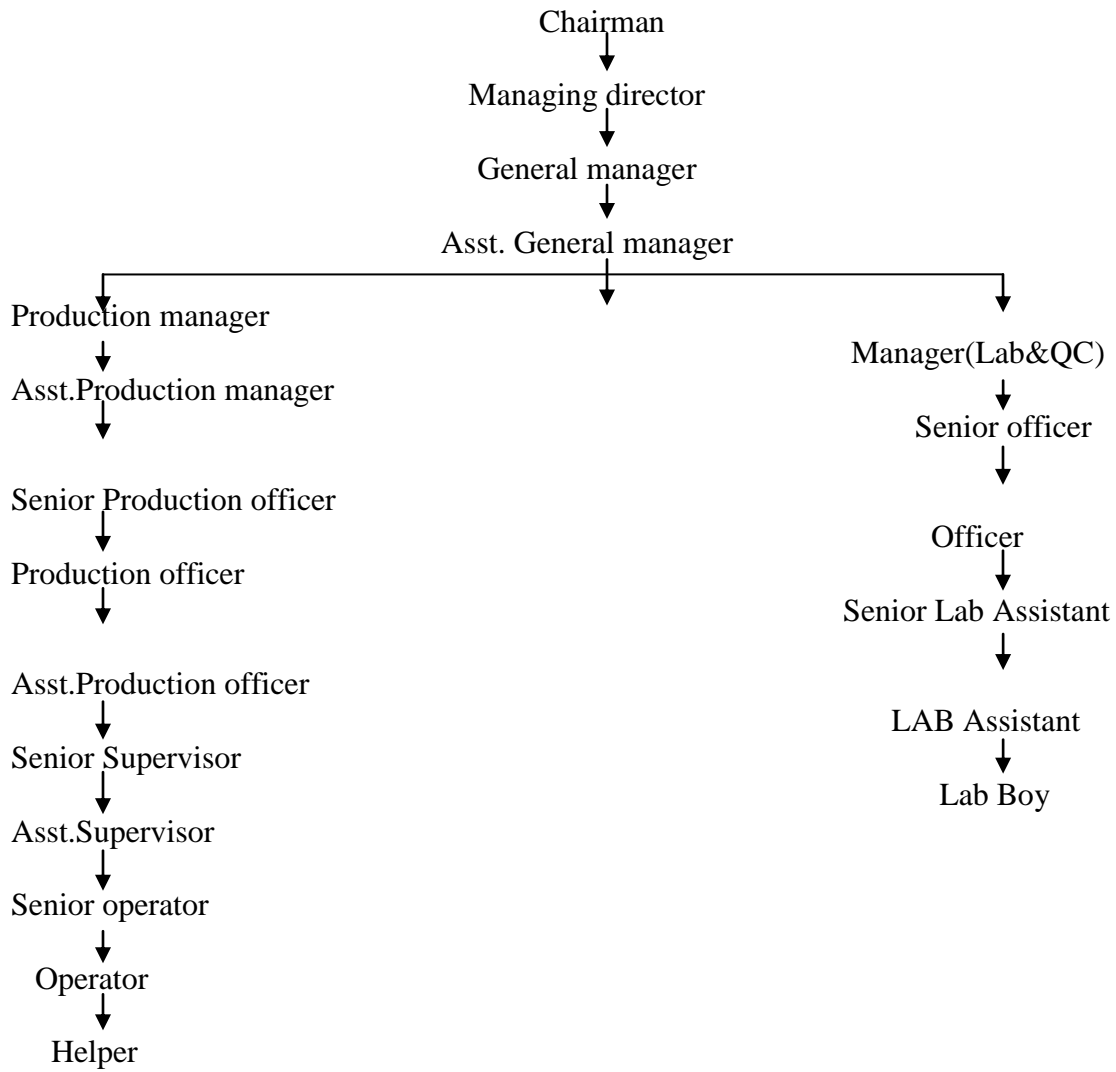
Location of the Factory: Esquire Knit Composite Ltd is located in Kanchpur, Sonargaon about 18.5 kilometer distance from Daffodil international university Of Science & Technology, Dhaka. Communication system is easier by road.



2.5 Layout of the factory



2.6: Organogram



2.7: Sister Concerns

- Esquire knit composite Ltd.
- Esquire knit wear Ltd.
- Esquire dyeing inds Ltd.
- Esquire accessories Ltd.
- MMH Textiles limited.
- Fashion paradise Limited.
- Synthia Multi-fibre Ltd.

2.8: Product mix

- Single jersey
- Lycra single jersey
- Lycra Rib (1*1, 2*2)
- Stripe
- Rib
- Lacoste (single, double)
- Collar, cuff
- T-shirt
- Jacket
- Fleece jacket
- Organic apparel

2.9: Total number of workers, staff &Space

Total number of workers, staff &Space– 6800 as of today.

Fabric dye house:

Daily fabric dyeing capacity -15 ton
Total floor space - 19000 Square feet
Total worker – 350

Yarn dye house:

Daily yarn dyeing capacity - 7 ton on the basis of 100% Cotton
Total floor space - 24000 Square feet
Total worker- 300

Knitting department:

Total number of knitting machines -67 Circular Knit
Daily knitting capacity 18 ton to 20 ton
Daily Auto striper knitting capacity – 1 ton
Total worker - 250
Total floor space 47000 Square feet

Sewing department:

Total floor space 95000 Square feet
Total worker-3000
Total sewing lines- 45
Total number of sewing machines- 2195 Pieces
Daily sewing capacity- 85000 pieces

Sample department:

Total floor space- 17500 Square feet
Total worker- 200
Total sewing lines 2
Total number of sewing machines- 150
Daily sample capacity- 200 Pieces

Embroidery department:

Total floor space-10000 Square feet
Total operator- 16/shift
Total Embroidery machines- 17 for production, 1 Sample

Printing department:

Total floor space- 37500 Square feet
Total worker- 100
Total number of Automatic printing machines 4(16 colors).
Daily printing capacity-30,000-35,000 pieces
Types of print offered- Rubber, Foil, Pigment, Glitter etc

Washing department:

Total floor space- 5000 Square feet
Total worker- 20
Total number of Automatic laundry machines: 4 Production 1 Sample
Machine
Daily laundry capacity- 8000 Pieces
Types of wash offered- Silicon, Enzyme, sand

Auxiliary facilities:

ETP
Water treatment plant
Doctor's room
Child care room

Merchandising department:

Total staff - 43
 Annual turnover in USD- \$50 million
 Total staff for Head office- 135

Shift Change:

EKCL maintain 3 shifts at every day's work except sewing section. So the shifts are changed at every 8 hours. The shifting times are for dyeing and knitting section.

- A Shift: 06:00 am – 02:00 pm
 - B Shift: 02:00 pm – 10:00 pm
 - C Shift: 10:00 pm – 06:00 am
- General shift and office time: 08:00 am – 05:00 pm

2.10: Major buyers with their Logo

Name	Country	Logo
Esprit	Germany	
Marks & Spencer	UK	
C&A	Germany	
Zara	Spain	ZARA
Celio	France	celio*
Jordache	USA	
Mascot	Denmark	

Lead time: 60 days.

Mode of payment: L/C sight.

2.11: Mission & Vision

Vision

Esquire vision is to work for continuous self-improvement to serve our customers with the best possible products and services and emerge as one of the most admired companies in the textile arena.

Mission

Esquire mission is to ensure quality products and services to the customers within the shortest possible lead-time based on optimum utilization of the resources to achieve sustainable growth. We want to make sure that the overall purpose and scope of the business is meeting stakeholders.

Chapter 3

Description of the Attachment

3.1: Yarn Dyeing Department

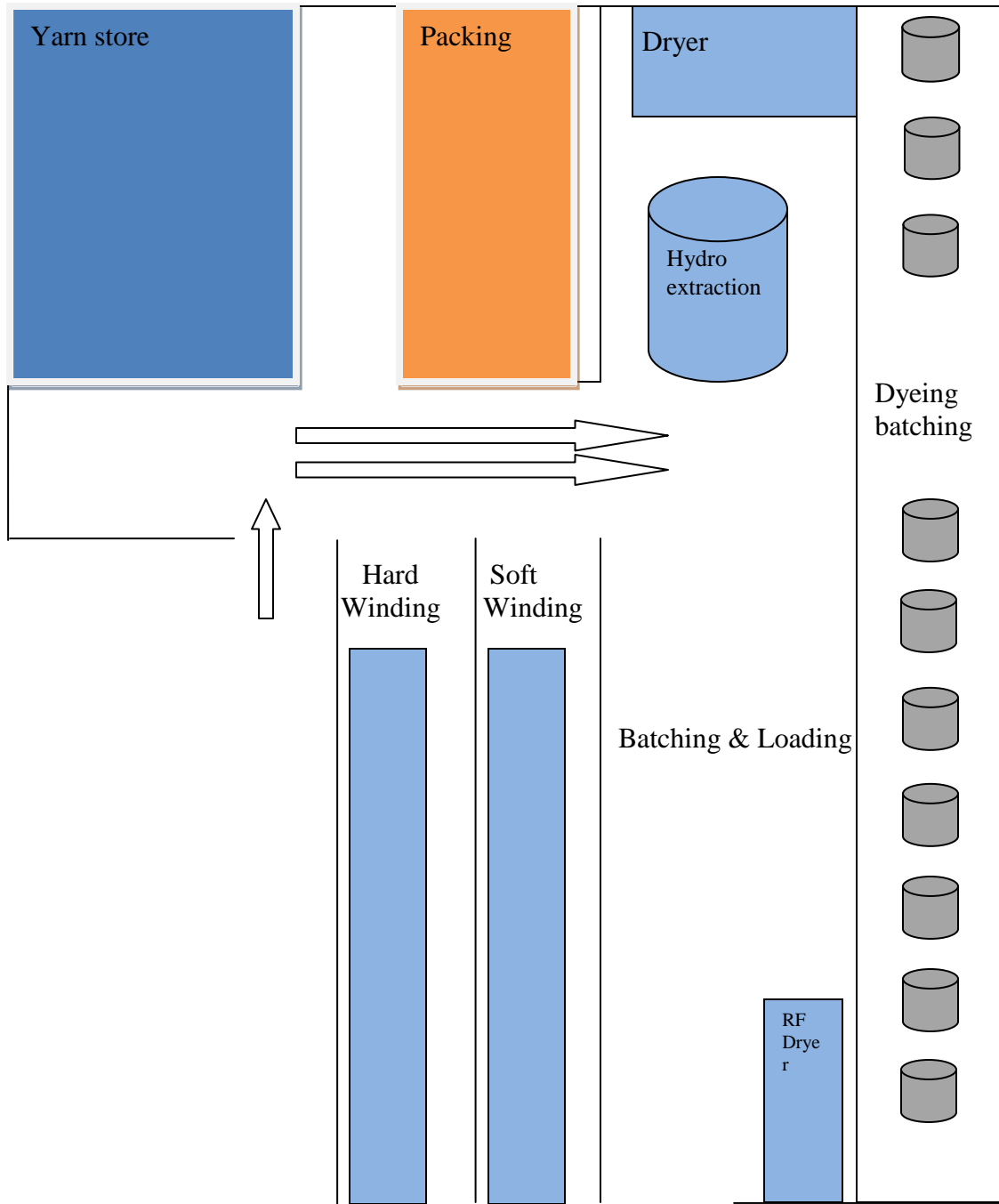
Yarn dyeing is an important factor in case of textile industry. Esquire is a composite factory. Without yarn, they can not go for knitting. Some times, stripe fabric is needed to make garments. To get stripe fabric, at first need to collect dyed yarn. The factory collects grey yarn from different supplier. And then, they have dyed it according to their demand. **Esquire Yarn Dyeing** is located at the south part of the factory area.

Yarn Dyeing

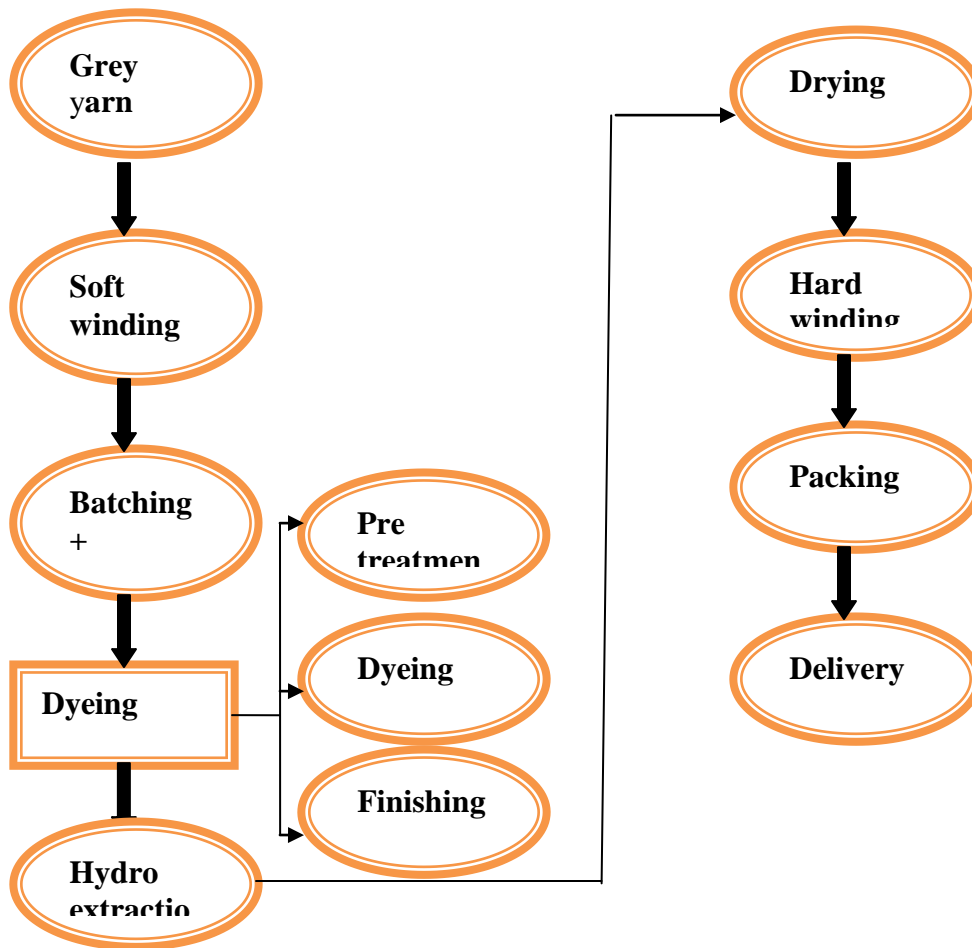
The common dyeing process of cotton yarn at package form is as follows:

- The raw yarn is wound on a spring bobbin to achieve a suitable package for dye penetration.
- These soft packages are loaded on a dyeing carrier's spindle.
- The packages are pressed up to a desired height to achieve suitable density of packing.
- The carrier is loaded on the dyeing machine and the yarn is dyed.
- After dyeing, the packages are unloaded from the carrier into a trolley.
- Now the trolley is taken to hydro extractor where water is removed.
- The packages are hydro extracted to remove the maximum amount of water leaving the desired color into raw yarn.
- Then the packages go for drying.

Layout of Yarn Dyeing Department



Flow Chart of Yarn Dyeing Process



Soft Winding

- To transfer yarn from paper cone or plastic cone to perforated steel bobbin.
- To remove yarn faults like hairiness, neps, slubs and foreign materials.
- To clean the yarn.
- To reduce tension of yarn as if it can be properly dyed.
- In soft winding, yarns are loosely winded at steel bobbin.

No of soft winding machine:

Two types of soft winding machine used here. One is old method and another is SSM method.

No. of old soft winding machine: 16

No. of SSM soft winding machine: 06

Batching and Loading

After getting soft winding cone, yarn comes for batching and loading. Here, some workers loaded the cone on a balance to measure it either it is equal with supplier's order or not. If ok then it goes for loading on a carrier which will be placed in batch.



Figure: Operation of dyeing section

Dyeing

After loading on carrier, it goes for dyeing. Dyeing has take place by following three stages:

- **Pre treatment:** Pretreatment means any treatment which is done before actual process. Natural fibers and synthetic fibers contain primary impurities that are contained naturally and secondary impurities that are added during spinning, knitting and weaving process. Textile pretreatment is the series of cleaning operation. All impurities which causes adverse effect during dyeing and printing is removed in pretreatment process.

Objectives of pretreatment:

- ✓ To convert fabric from hydrophobic to hydrophilic state.
- ✓ To remove dust, dirt etc from the fabric.
- ✓ To achieve the degree of desire whiteness.

Steps in pretreatment process of cotton and natural fibers: Major steps involved in yarn dyeing at Esquire Yarn Dyeing Industries are:

- Scouring.
- Bleaching.

Scouring and bleaching is done at a time in a dyeing batch. Following chemicals are used here:

1. Detergent.
2. Sequestering agent.
3. Stabilizer.
4. Bleaching agent (Hydrogen per oxide)

After doing this operation, per oxide killer is used to kill per oxide as if it would not possible to react in further processing.

- **Dyeing:** After scouring and bleaching, it goes for dyeing. There has total 26 dyeing machine and all are ISO certified. Here 14 dyeing machines are used as sample machine or fewer amounts of yarns are dyed here and rest of them used for bulk production. Maximum capacity of a dyeing machine is 1000 kg in this factory. They are going to add a new yarn dyeing machine which capacity is 1500 kg. Dyeing solutions are made in different tank. According to requirements, these solutions are passed towards the batch. Following chemicals are used with dyes:

1. Leveling agent.
2. Sequestering agent.
3. Wetting agent.
4. Salt.
5. Soda

- **Finishing:** After rinsing the dyeing carried out with warm water until clear soaping is carried out with a liquor containing and nonionic detergent, washed with hot water, acidified with acetic acid and rinsed.

Hydro Extraction

After dyeing the carrier with bobbin comes out and goes for hydro extraction. Hydro extraction means remove excess water from bobbin. Two Galvanin machine is used for hydro extracting and capacity is ten bobbin at a time.

Drying

When bobbin comes out from hydro extraction, it goes for drying. Two types of drying machine is used here. One is Galvanin machine and another machine is RF dryer or Radio Frequency dryer. Galvanin dryer runs with steam and it absorb water from bobbin. One kind of carrier or tray is used here to place bobbin. RF dryer works with radio frequency. It has a convenient belt to carry bobbin.

Hard Winding

After coming out from drying section, these bobbins go for hard winding. Here the loosely winded bobbin is going to wind at a definite tension and length. According to requirements of customer, these are coned in a plastic or paper cone. Sewing threads are also coned here at definite length. There have two types of hard winding machine. One is old version and another is new version of hard winding machine where everything's done automatically. Fourteen old machines are there and two new SSM machine included in this section.

Packing

When hard winding is done, then it comes to packing section. Here they add a sticker where the buyer name, yarn count etc are mentioned. They use poly bag to pack this cone.

Delivery

After packing, yarns go to store and according to order sheet, respective person deliver it.

Different Types of Dyeing Process

At **Esquire Dyeing Industries Ltd**, several types of dyeing processes are used in case of different types of yarn based on their fiber construction. Further description is given below:

- **Drmarine process (For blended yarn)**
- **ISO thermal process (For cotton)**
- **Migration process (For cotton)**
- **Bezective blue (For RSPL):** This process is called new migration process.
- **Turquoise process:**

Faults in Yarn Dyeing

Some of faults due to pretreatment can be listed as under:

- Poor absorbency
- Catalytic damage/poor fluidity

- Stains
- Moire effect
- Shade change from selvedge to selvedge
- Shrinkage/distortion
- Creasing/chafe marks
- Handling
- Inferior brightness/luster
- Cloudy dyeing
- Skitteriness
- Pale areas
- Dark spots
- Rope marks
- Color variation from the inside to the outside of the yarn package
- Incorrectly wound package (uneven tension, too much tension, wrong cross over angles,
- Package too large
- Spindle too dense due to over pressing prior to dyeing
- Pump pressure too low or too high
- Density of pressed packages too high
- Lighter areas of yarn
- Damaged yarn

Most of the above faults could be easily corrected with the following precautions:

- Use of speciality chemicals
- Select suitable heat setting temperatures
- Thorough relaxation of the material
- Controlled tension and uniformity of batching during pretreatment

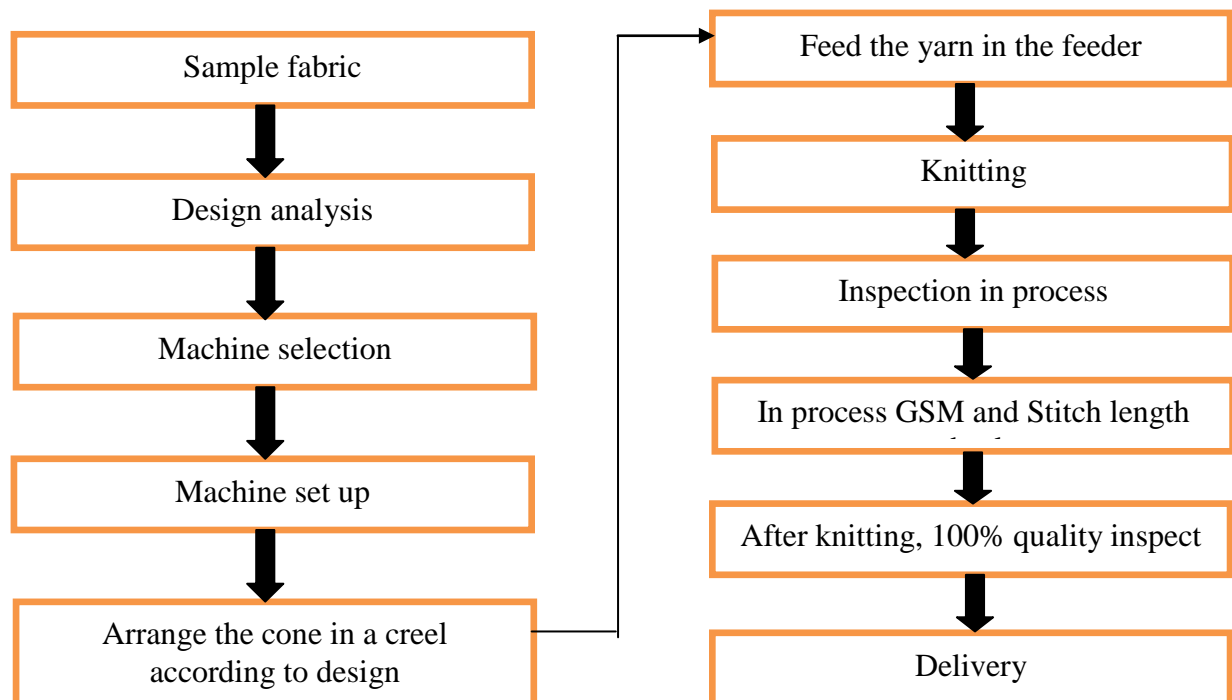
3.2: Knitting Department

Knitting is one of the most important operations in making garments. Without fabric, nobody can go for productions. At **EKCL**, Knitting plays a vital role. This section is located three places of the factory area. The biggest section is placed on 3rd floor of main factory building.

Knitting is the process of producing a fabric by forming a series of loops connecting from a series of yarn. In this method fabrics are produced by intermeshing of loops. There are two types of knitting methods. Such as:

- **Weft knitting:** In the weft knitting technique a yarn presented horizontally is linked into a row of loops. To achieve this, needle can be moved simultaneously and the loops are formed one after another or at the same time, or the needles are moved successively to form the loop. In H.R Textile Mills the weft knitting method is used for knitting fabrics.
- **Warp knitting:** Warp knitting is a method of fabric forming in which the loops made in a vertical way along the length of the fabric from each warp yarn and intermeshing of loops takes place in a flat form of length wise basis.

Process Flow Chart of Knitting



Types of Fabric Produced in EKCL

- Single jersey.
 - ✓ Single jersey (Plain)
 - ✓ Single lacost.
 - ✓ Double lacost.
 - ✓ Polo pique.
 - ✓ Fleece fabric.
 - ✓ Fleece terry.
- Rib or double jersey.
 - ✓ 1x1 rib.
 - ✓ 2x2 rib.
 - ✓ Flat back rib.
 - ✓ Lycra rib.
- Interlock.
 - ✓ Plain interlock.
 - ✓ Drop needle interlock.
- Pique fabric.
- Collar and cuff
 - ✓ Plain collar.
 - ✓ Stripe collar.
 - ✓ Picot collar.
 - ✓ Raising collar.
 - ✓ Folding collar.

Key Accessories for knitting:

Key Accessories used for circular knitting fabric process which are:

- ✓ Cylinder
- ✓ CAM
- ✓ Needle
- ✓ Sinker
- ✓ Positive feed system
- ✓ Motor
- ✓ Inventor
- ✓ Belt
- ✓ VDQ quality pulley
- ✓ Pattern wheel

PARTS OF KNITTING MACHINE

Creel: Creel is used to place the cone.

Feeder: Feeder is used to feed the yarn.

Tensioning device: Tensioning device is used to give proper tension to the yarn.

VDQ pulley: VDQ pulley is used to control the GSM by controlling the stitch length.

Guide: Guide is used to guide the yarn.

Sensor: Sensor is used to see & the machine stops when any problem occurs.

Spreader: Spreader is used to spread the knitted fabric before take up roller.

Take up roller: Take up roller is used to take up the fabric

Fixation feeder: These types of feeder are used in Electrical Auto Striper Knitting Machine to feed the yarn at specific finger.

Rethom: These devise are used in Electrical Auto Striper Knitting machine

Effects of Knitting Parameter in Fabric Production

➤ **Stitch Length**

- GSM decrease with the increase of stitch length
- If stitch length increase then fabric width increase and WPI decrease.
- For deep shade stitch length should be higher and vice-versa.

➤ **GSM**

- Gray GSM should be less than finish GSM
- GSM increase with increase of stitch length and it is adjusted by VDQ pulley
- Enzyme Level
- Color

➤ **Count**

- If count increase then fabric width increase
- GSM depends on yarn count

➤ **Gauge**

- For finer gauge finer count should be use
- If machine gauge increase then fabric width decrease
- If gauge decrease then stitch length increase.

➤ **Feeder**

- Production increase with increase of feeder no.
- Feeder is settled in case of stripe fabric.

➤ **Design**

- Cam setting
- Set of needle
- Size of loop shape.

List of Knitting Machines

M/C types	M/C dia (inch)	Gauge	No. of Cylinder	Total needle	No.of m/c	sNo.of feeder
S/J	15	24	1	1140	1	45
S/J	17	24	1	1272	1	51
S/J	19	24	1	1440	1	57
S/J	19	24	1	1440	1	57
S/J	20	24	1	1520	1	48
S/J	20	24	1	1500	1	60
S/J	22	24	3	1680	3	60
S/J	24	24	5	1860	5	52
S/J	26	24	1	1920	1	56
S/J	26	24	1,1	1932	1	84
Fleece S/J	26	24	1,1	1960, 1634	1	78
S/J	26	24	2	1640	2	84
S/J	30	20	1	2268	1	84
S/J	30	20	4,6	2640	1	90
S/J JAC	30	24	1	2232,	6	90
S/J or fleece	30	20, 24	2,2	1860, 2288	1	90
S/J	30	24,28	4,2	2640	2	72
S/J	30	24	2	2268	4	90
S/J	34	24	3	2544	2	96
S/J	36	24	2	2712	3	120
Fleece	30	20	2	1872	2	108
Eng. Stripe S/J	30	20	1,2	1872, 2268	2	144
Eng. Stripe S/J	30	24	1	2220	2	96
Eng. Stripe S/J	34	24	1,2	213 2, 544 6,	2	48
RIB	30	18	4	1680X2	4	44
RIB	30	18,22	1,1	1680X2 ,2054X2	1	54
RIB	30	20,22	2,1	1872X2,	2	60

				2054X2		
RIB	30	20	1	1872X2	1	56
RIB	30	20,24	1,1	1884X2	1	60
				,2256X2		
RIB JAC	30	20	1	1872X2	1	72
RIB	32	20	2	1884X2	2	66
RIB	34	20	1	2100X2	1	84
RIB	34	20	1	2136X2	1	60
I/LOCK	34	24	2	2544X2	2	108
RIB	34	20	3	2136X2	3	70
RIB	34	20,24	2,1	2556X2	2	72
RIB	36	18	1	1920X2	1	72
RIB	36	20	1	2256X2	1	72
FLAT	52	14			9	
FLAT	84	14			6	
FLAT	42,68	14,14	6,4		10	

Knitting Faults

- Sinker Fault.
- Line Pin Star.
- Pin Holes.
- Fabric spirality .
- Hole.
- Cutters fly.
- Fluff.
- Filament problem.
- Miss stitch.
- Poly propylene; remove by hot gun.
- Foreign fiber or yarn contamination.
- Oil spot

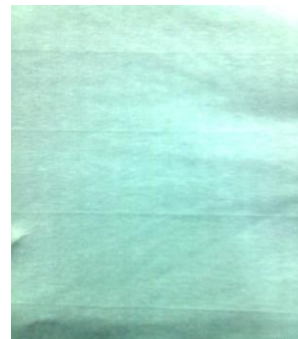
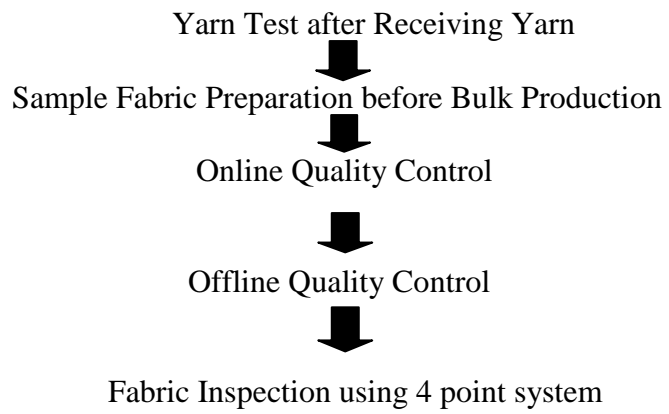


Fig: Some fabric faults

Quality Assurance of knitting Section

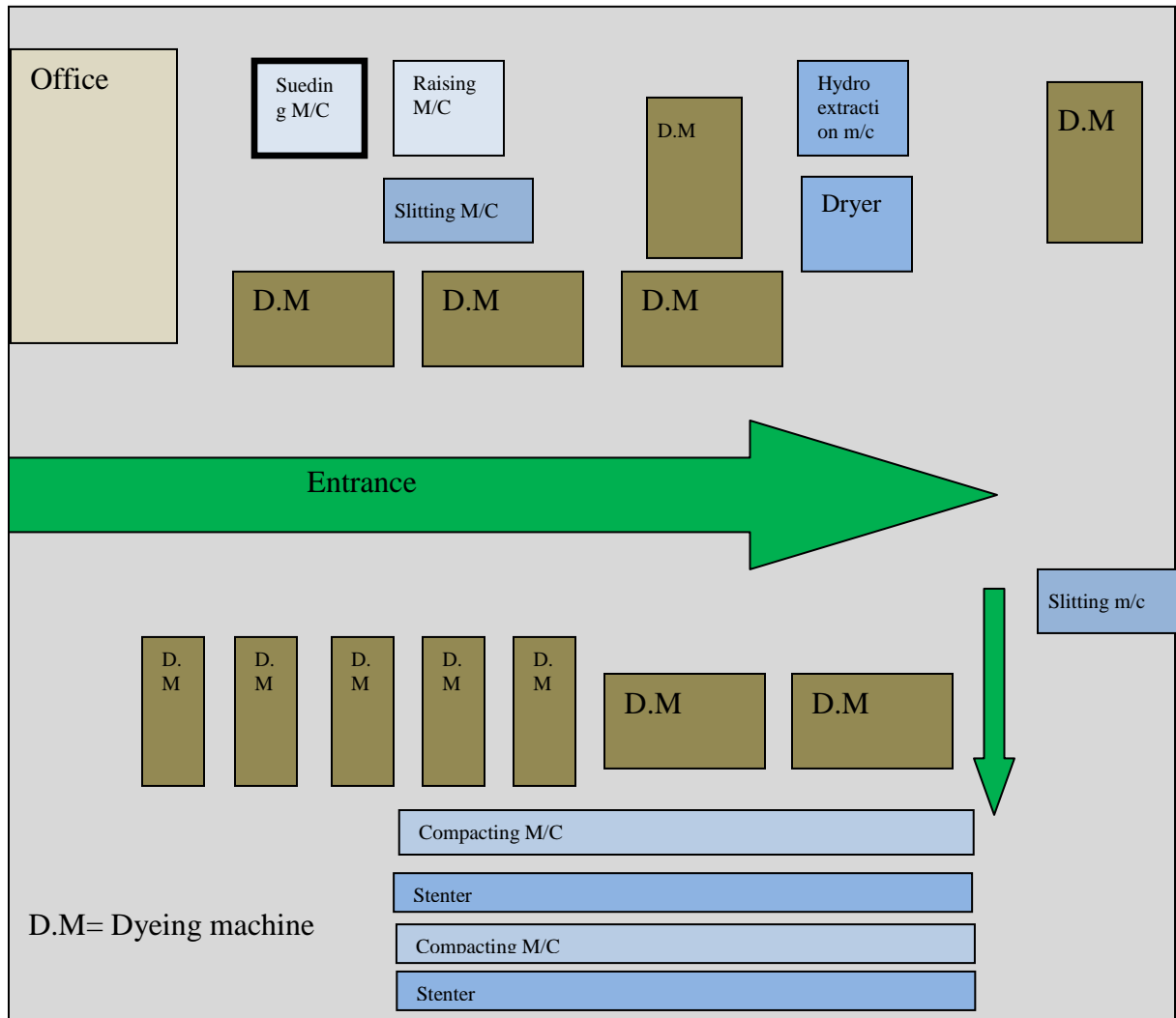


3.3: Fabric Dyeing Department

This is one of the key departments for **EKCL**. It plays a vital role in improving of this company. When grey fabric comes from knitting section, it is almost useless. According to buyer requirements, grey fabric goes for dyeing and gives them different shade of color. EKCL has the capacity of dyeing 16 metric ton per day for a single process but when it goes for double process, it can be reduced up to 50% of their capacity. Several types of fabric are dyed here such as Lycra single jersey, Single jersey, Fleece, CVC, All over printed fabric, Peach, Rib or Interlock. Average capacity of dyeing is 12.5 metric ton per day so that a month capacity is 325 metric ton. They have used software which is called HAQUE TEX to give order entry. Here ETA (expected time arrival), TBA (to be advice), BF (Back forward plan) etc are mentioned.

Fabric dyeing section is located at factory area near main factory building. Total floor space is almost 22,000 square ft and manpower is 350.

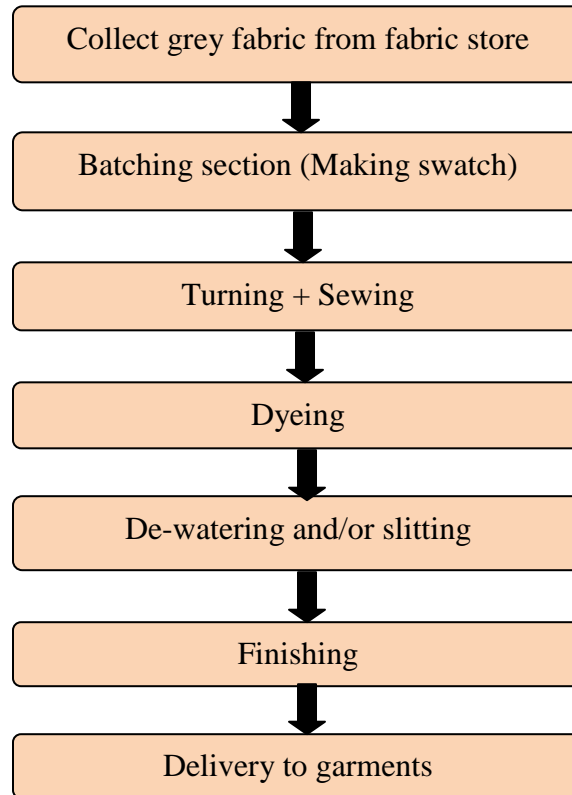
Layout of Fabric Dyeing Department



Fabric Dyeing

Dyeing is the process of adding color to textile products like fibers, yarns, and fabrics. Dyeing is normally done in a special solution containing dyes and particular chemical material. After dyeing, dye molecules have uncut Chemical bond with fiber molecules. The temperature and time controlling are two key factors in dyeing. There are mainly two classes of dye, natural and man-made.

Working Flowchart of Fabric Dyeing



Batching

Batching is done near the fabric dyeing section. Batching is done to complete dyeing easily. Suppose a dyeing machine can dye 200 kg at time but grey fabric are not coming at this weight at the same time. That's why, if we have to meet to 200 kg, small rolls of fabric has to sew together and this is called batching.

Dyeing Process

- **Pretreatment:** At first pretreatment is done during fabric dyeing. Pretreatment means bleach or enzyme wash to remove impurities and hairiness of fabric. Different types of chemical are used here to remove impurities. Another

objectives of pretreatment is increasing absorbency and increasing affinity towards dye. It also develops whitening shade and luster of the fabric.



Figure: Fabric dyeing machine

- **Dyeing:** After pretreatment, dyeing chemical is used to dye. There several types of dyeing procedure is running the way such as:
 - ✓ ISO thermal process.
 - ✓ Turquoise process.
 - ✓ Migration process.
 - ✓ White process.
 - ✓ Viscose
 - ✓ Polyester etc
- **Soaping:** Many dye houses already carry out hot rinsing and omit the use of detergents in rinsing after reactive dyeing. The product quality is not negatively affected. On the contrary, most often the fastness of the goods are better after the hot rinsing than after the traditional rinsing with detergents, complexing agents and neutralization in the first rinse.
- **Finishing:** Overflow or jet dyeing offer all the advantages of rope dyeing such as full volume, pleasant touch, strong density with the corresponding high extensibility, no risk of moiré, and in addition to that a much lower risk of running creases compared to winch beck dyeing. For quality reasons, dyeing times and temperatures should be restricted as much as possible, i.e. the

maximum working temperature is 98–100°C. The most appropriate softening agents for warp-knits are those creating a soft, supple touch and a pleasant, smooth surface. The commonly applied softening agents, such as PERSOFTAL@SWA01, PERSOFTAL ASN 01, PERSOFTAL U or PERSOFTAL OE, are well suited to meet the standard expectations with regard to fabric handle. Silicone rubber or silicone water repellent products are the right softening agents to meet particularly strict requirements with regard to smoothness and suppleness of the final fabric. Excessive smoothness, however, impairs safety in the manufacture of ready-to wear apparels.

After dyeing, fabrics go for further processing.

Fabric Finishing Section

This term define so many things together like fabric de-watering, drying, and slitting calendaring to remove excess water, passing through stenter machine, compacting machine, sueding or raising machine.

List of Machine at Finishing Section

Name of m/c	No. of m/c
Hydro extraction m/c	02
Slitting m/c	02
Dreyer	01
Calender m/c	01
Stenter m/c	03
Compacting m/c	03
Sueding m/c	01
Raising m/c	01

- **Hydro extraction machine:** To remove excess water from fabric. After doing this, fabric will take less time to dry.
- **Slitting machine:** If fabric is dyed in tubular form, then it needs to open before going to production. Slitting machine is used to open the fabric from tube to open. One of the slitting machines is made by EKCL.
- **Dryer:** One dryer used here to dry fabric.
- **Calender machine:** To remove excessive water from fabric. It is now used hardly.
- **Stenter machine:** The main function of stenter machine is to control shrinkage and GSM.
- **Compacting machine:** Compacting machine is also used to control shrinkage and GSM of fabric and fixed it permanently.
- **Sueding machine:** It is used to make smooth surface of fabric. It is done on one side of the fabric.

- **Raising machine:** Raising machine is used to brush on fabric to convert into fleece fabric.

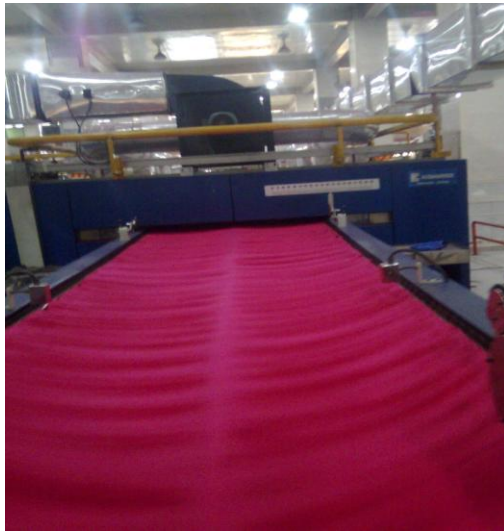


Fig: Stenter machine



Fig: Dryer machine



Fig: Sueding machine



Fig: Raising machine

Faults in Fabric Dyeing

- **Side to side variation**

Uneven heat setting, where one side of the fabric reaches a higher temperature than the other side. Uneven padder pressures causing a greater pick up on one side to the other. Poor preparation can also result in uneven dyeing due to poor wet ability and the presence of size that has not been removed.

➤ **End to end Variation**

- Variation in concentrations of chemicals or dye in dye trough during padding.
- Variation in temperature or concentrations of chemicals in developing, rinsing, soaping baths, particularly for vat dyes.
- Temperature variation during heat setting
- Drying out after cold pad batch dyeing

➤ **Uneven streaks**

- Insufficient dye or chemical in padding troughs
- Poor preparation.
- Incorrect setting during oxidizing.

➤ **Dye stains**

- Badly dissolved dye or chemicals.
- Poor machine cleaning.

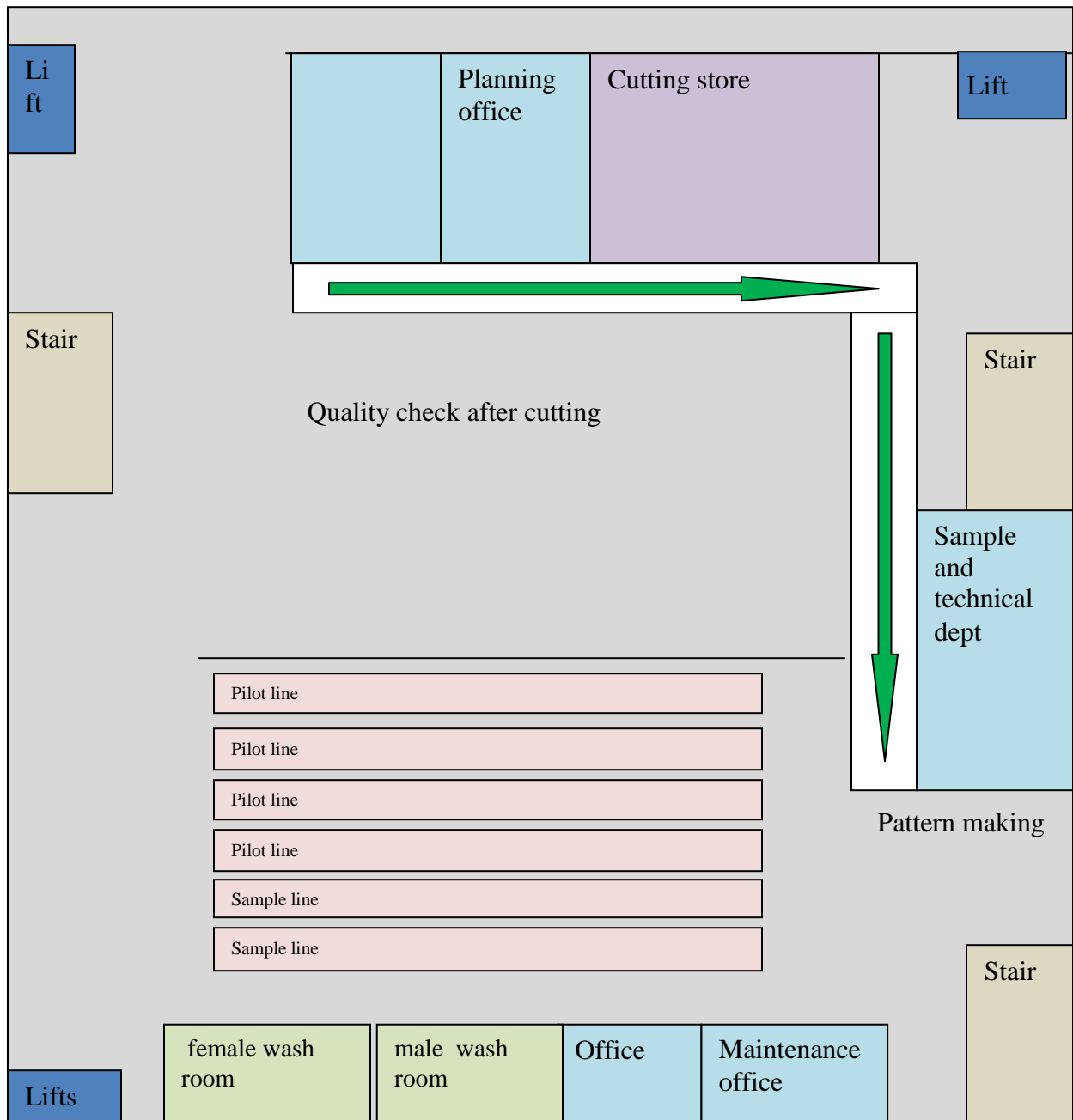


Fig: Example of dye specks on cotton

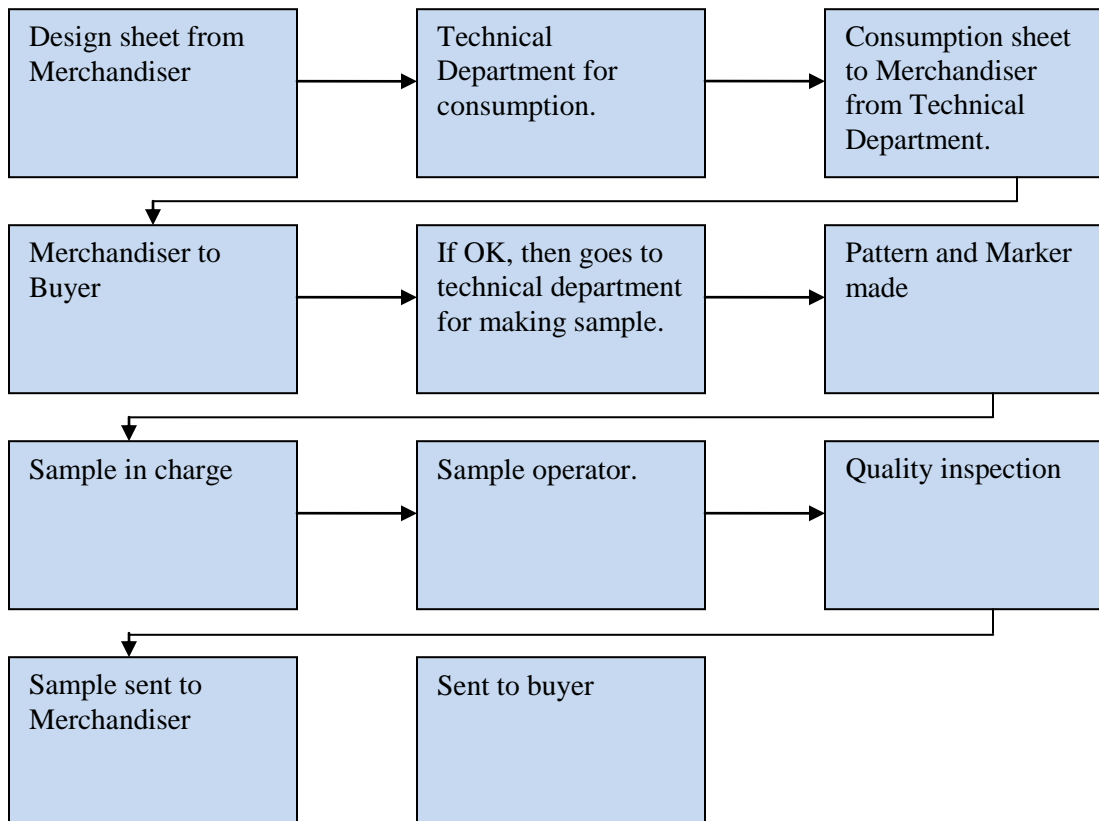
3.4: Technical and Sample Development Department

Esquire Knit Composite Ltd has separate sample section which is located in 7th floor in the 12 storied building. This is one of the most important departments in this industry. It plays a vital role to get order. Several sections are included in this department such as pattern making, marker making, fabric consumption, and thread and accessories consumption etc.

Layout of Technical and Sample Department



Working Flowchart of Sample Department



Types of Sample

- Fit sample done on only one size.
- Red seal sample; it is made by jumping size and also called tag sample.
- Pre production sample.
- Gold seal sample; this sample is for bulk production.
- Proto sample.
- Reference sample or approval sample.
- Photo sample.
- Shipment sample.

Different Types of Sample Buyer Wise

C & A (Germany)

- Development sample.
- Fit sample or pre production sample.
- Tag sample.
- Production sample.

- Shipment sample.

Celio (France)

- Color proto sample.
- Extra proto sample or fit sample.
- Size set sample.
- Pre production sample.

Esprit

- Proto sample.
- Salesman sample.
- Size set sample.
- Pre production sample.
- Shipment sample.

Zara (Europe – Spain)

- Offer sample.
- Side set sample.
- Color way sample.
- Pre production sample.
- Production sample.
- Shipment sample.

Tchibo (Germany)

- Offer sample or development sample.
- Side set sample.
- Photo sample.
- Institute sample.
- Decoration sample.

Mascot (Denmark)

- Development sample.
- Size set sample.
- Pre production sample.
- Salesman sample.

Fabric and Thread Consumption

In the garments trade, consumption means quantity of raw materials with a view to determine the price of a garment. In order to calculate the above quantity how much fabric, sewing thread, button, breads and other accessories are required to produce a garment up to exporting is called consumption.

Basic Information Relevant to Consumption

1. Measurement with technical specification.
2. Style description.
3. Fabric description.
4. Fabric GSM.
5. Washing shrinkage if any

Fabric Consumption Calculation System

The quantity of fabric which is required to produce a garment is called consumption. Consumption is done by following two systems:

➤ Manual system

Consumption calculation for a basic short sleeve T-shirt:

Body length	= 47 cm
Sleeve length	= 19 cm
Chest width	= 35 cm
Bottom width	= 35 cm

If bottom width is higher than chest width, then bottom width has to be calculated in consumption instead of chest width.

$$\text{Body length} + \text{Sleeve length} \times \text{Chest width} \times 2 \times 12 \times \text{GSM} / 10000000 + \text{wastage\%} \\ = \text{Kg/ dzn}$$

$$47 + 19 \times 35 \times 2 \times 12 \times 180 / 10000000 + 10 \% = \text{Kg/dzn} \\ 1.0972 \text{ Kg/dzn fabric is required.}$$

➤ Computerized system

It is done by using marker length and marker piece. Marker piece means how many sets of garments are going to place in a marker at a time. This is done by using the following formula:

$$\frac{\text{Marker length}}{\text{Marker pieces}} \times \text{Dia} \times \text{GSM} / 1000 / 1550 + \text{Wastage} = \text{Fabric consumption}$$

Machine Wise Sewing Thread Consumption/ inches:

Machine Name	No. of Needle	Thread consumption/inch
Plain machine	1	2.5 “
Over lock machine	3	18”
Over lock machine	4	20.5”
Flat lock machine	3	15”
Button stitch	2 hole	8”
	4 hole	16”
Button attach machine		8”
Bar tack machine		8”
Kansai stitching	1	4”
Back tape stitching		8”
Zigzag machine	4	22”
Zigzag machine	5	24.5”
Latush machine		48”
Pico ting machine		24”

Sewing Threads Consumption

The amount of threads need to produce a garments is called thread consumption of that garment. Generally, it is expressed in length. The following are the factors which are related with the thread consumption:

- Thickness of fabrics.
- Plies of fabric to be sewn.
- Stitch type.
- Stitch density.
- Width of seam.
- Garment size.
- Design of the garment.
- Automatic thread trimmer of that machine.
- Working skill of the operator.
- Quality and type of thread.

Sample Making Procedure

Sample making process is completed by several processes. Details are given below:

- Studying measurement sheet, sketch and construction details.
- Material selection and making the first pattern by using two types of software. **Diamino for marker and Modaris for pattern making respectively.** It is also done by manually.
- Cutting the sample fabric.

- Solving constructions problems according to buyer recommendation; measurements or design can be changed.
- Making pattern based on correction.
- Sewing the sample and fitting this body on a dummy and send it to buyer.
- If sample is OK, then goes to pilot production; if not OK, then necessary change done.
- Once the pre production sample is approved by the buyer, the sample must be sent to the bulk production with graded pattern **CAD** marker.
- Embroidery or printing position should be marked on cutting parts and approved design should follow strictly.
- Specification sheet is a record of finished garment measurements for all the sizes in which the garment will be made. It is used by pattern master, supervisor, sample operator and quality controller to ensure that the garment meets company standards.

Pattern Making

An ornamental design or decorative element in a fabric. Pattern is produced either by manually or by **CAD**. It is a hard paper which is made by following all the specifications of each and individual components. After making it manually, it's going for digitalization. There is seven pattern masters to make this. They are assigned for individual buyer and style.

Pattern Production Terms

- **First patterns:**

The original pattern developed for each design. This pattern usually requires fitting and adjustments. Half a pattern is developed unless the design is asymmetrical.

- **Production patterns:**

The production pattern is a pattern set that has been corrected and perfected and contains every pattern piece require to complete the garment. It is used by the grader for grading sizes, and by the marker maker for a fabric layout.

- **Pattern grader:**

The grader proportionately increases and decreases the size of an original pattern with in a size range. The grade is in the length, width and circumference.

Grading is done by using the Modaris.

Responsibility of Sample Staff

Sample room in charge is one of the most responsible people. The job of sample room in charge is:

- Receive buyer measurement sheet form technical department.
- Follow the instruction of buyer.
- Understanding work planning made by supervisor.
- Check sample room machineries before starting work.
- Make sure the better facility for sample man in sample room.
- In charge will be responsible for failure of sample.
- He has to ensure that all sample man is well trained.



Figure: Pattern making

3.5: Industrial Engineering Department

Industrial engineers determine the most effective ways to use the basic factors of production -- people, machines, materials, information, and energy -- to make a product or to provide a service. They are the bridge between management goals and operational performance. They are more concerned with increasing productivity through the management of people, methods of business organization, and technology than are engineers in other specialties, who generally work more with products or processes. Although most industrial engineers work in manufacturing industries, they may also work in consulting services, healthcare, and communications.

This department helps the planning department to know the time required for the production of that particular style of the garment by calculating the SMV value for it and they also help in knowing the capacity of factory based on which the planning department takes a decision if they have to proceed with the item or not.

Activities of IE Department

- Collect style details.
- SMV makes.
- Making operation breakdown for a particular style.
- Lay out make.
- Line balancing.
- Line feeding.
- Method study by taking video for every operation.
- Time study.
- Find out line capacity.
- Calculating customer demand efficiency and actual efficiency.

Purpose of Industrial Engineering

- It is concerned with the development, improvement, implementation and evaluation of integrated systems of people, money, knowledge, information, equipment, energy, materials, analysis and synthesis, as well as the mathematical, physical and social sciences together with the principles and methods of engineering design to specify, predict, and evaluate the results to be obtained from such systems or processes.
- Its underlying concepts overlap considerably with certain business-oriented disciplines such as operations management, but the engineering side tends to emphasize extensive *mathematical* proficiency and usage of quantitative methods.
- It helps to maintain optimum use of plant, equipment, manpower and material.
- Established the standard of performance.
- It helps to evaluate the human work.
- Increasing productivity.

Work Study

Work study aims at examining the way an activity is being carried out simplifying or modifying the method of operation to reduce unnecessary or excess work or the wasteful use of resources and setting up a time standard for performing that activity. If the work study results in cutting down the time of a task by 20 %, as a result of a simplified method without additional expenditure then productivity will go up by a corresponding value.

Importance of work study

- To reduce unnecessary work or excessive work.
- Maximum use of resources.
- Reduced additional expenditures.
- Time reduce.
- Productivity increases.
- To find the best method.

The Total Time of Job:-

- The time taken by a worker or a machine to carry out an operation or a job may be considered as made up with-
 - ✓ The basic work content of the operation or a job.
 - ✓ Excess work content.

The basic work content of the operation:-

- It is the time required to perform the operation.
- If the design or specifications of the product may be perfect.
- If the process or method of operation were perfectly carried out.
- If there were no loss of working time from any cause whatever during the period of operation.

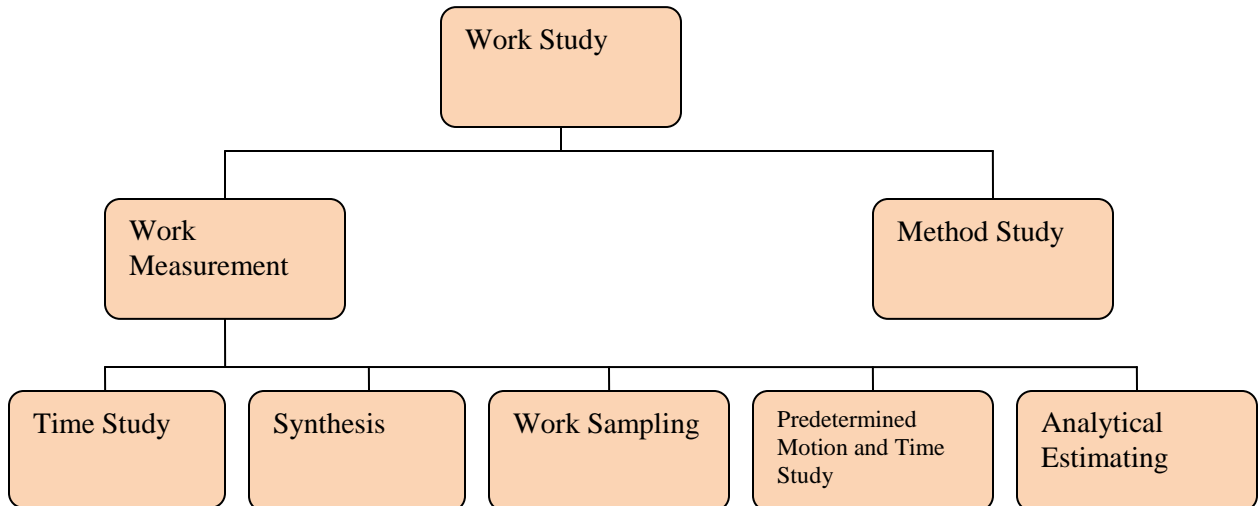
This is obviously a perfect condition which never occurs in practices.

Excess work content:-

- Work content added by poor design or specification of product or improper utilization of materials.
- Poor design and frequent design changes.
- Lack of standardization of products or their parts may mean that work has to be produced in small batches.
- Certain designs may require excessive amount of materials to be removed to bring them to their final shape resulting an increase in work content and it causes waste of materials.
- Unnecessary tight tolerances process and either care in operations or extra.

- Machining and a corresponding waste of material. Setting tolerances too loose may result in a large no of rejects.

Flowchart of Industrial Engineering



Time Study

Time study is a technique for determining as accurately as possible, the time required to carry out a specified task by a qualified worker at a defined level of performance.

Time Study Documentation

Time studies must:

- Be supported by time records that are completed contemporaneously;
- Report activity on a daily basis;
- Be sufficiently detailed to reflect all mandated activities and/or programs performed during a specific time period; and
- Coincide with one or more pay periods.

Time records must be signed by the employee and be supported by documentation that validates that the work was actually performed. As with actual time reporting, budget estimates or other distribution percentages determined before services are performed do not qualify as valid time studies.

Time Study Results

- Claimants must summarize time study results to show how the time study supports the costs claimed for each activity.
- Any variations from the procedures identified in the original time study plan must be documented and explained. Current-year costs must be used to prepare a time study.
- Claimants may project time study results to no more than two subsequent fiscal years. A claimant also may apply time study results retroactively to initial claims, current-year claims, and late-filed claims.
- When projecting time study results, the claimant must certify that no significant changes have occurred between years in either (1) the requirements of each mandated program activity; or (2) the processes and procedures used to accomplish the activity.

Basic Time

This is the time taken by a qualified worker to do a piece of work at the standard rate of performance.

$$\text{Basic Time} = \frac{\text{Observed Time} \times \text{Performance Rating}}{100}$$

Performance Rating

- Rating is a technique used to assess the speed and effectiveness of an operator performing an activity or group of activities.
- Rating of an operation is carried out by a trained observer who is experienced in assessing the effectiveness of an operator at normal speed.

Person	Observed Time	Rating (%)	Basic Time
A	0.20	100	0.20
B	0.16	125	0.20
C	0.25	80	0.20

From the above table,

A is standard worker, B is a fast worker and C is a slow worker.

Standard Time

It is the total time in which a job should be completed at standard performance.

$$\text{Standard Time} = \text{Basic Time} + \text{Basic Time} \times \text{Allowance}$$

Allowances

- **Relaxation Allowances:** Relaxation allowance may be of two types:

- ✓ **Personal needs allowance-** this is for attending personal needs like drinking water, smoking, going to wash room etc. A common personal allowance is about 5% of basic time.
 - ✓ **Fatigue allowance-** this allowance is given to compensate for energy expended during working. Fatigue allowance is generally considered as 4% of basic time.
- **Process Allowances:** A process allowance is an allowance of time given to compensate for enforced idleness of an operator due to the character of the process or operation on which he or she is employed. For example- an operator may not be able to work because he has to wait for a machine to complete its own part or he may be the member of an unbalanced line. These are all unavoidable delay for which the operator is not responsible. Process allowance is generally considered as 5% of the basic time.
- **Special Allowances:** Contingency allowance should not exceed 5%. Such type of allowance may fall into following three categories:
- ✓ **Periodic activity allowances-** Allowance for activities carried out at definite intervals of time e.g. cleaning machines, resetting machines etc.
 - ✓ **Interference allowance-** This is the allowance to compensate the unavoidable loss of production due to simultaneous stoppage of one or more machines being operated by single operator.
 - ✓ **Contingency allowance-** This is a small allowance of time given to compensate such delay as tool breakage involving removal of tool from the holder or power failures for small duration.

Lean Setup in EKCL

- Lean manufacturing defines the value of a product or a service with the customer point of view. Customers do not mind how hard you work or what is the technology you used to create the product or service you are selling to them. They will evaluate your product or the service by looking at how well this is going to fulfill their requirements.

Following are these waste categories.

- Transport
- Inventory
- Motion
- Waiting
- Over process
- Over process
- Defect

- Disconnectivity

5S

- S-Short
- S-Shine
- S-Set in order
- S-standardized
- S-Sustain

Line Balancing in Sewing Line

The manufacturer is trying to develop their current systems or looking for new production techniques in order to keep pace with the rapid changes in the fashion industry. In apparel enterprises a raw material is processed in different departments before becoming garment. There is no doubt that the sewing department is the most important department in the whole firm. The things which should be done during the installation of an assembly line are as follows;

- To define a standard time for each
- To balance the production line for each order,
- To keep the utilization rate at a maximum for each operator,
- To complete all these steps in one week before production begins.

Operation Breakdown of a Ladies Placket Tank Top

Seq No	Operation Description	Types of M/C	SMV	Target
01	Placket Interlining attach & mark	HEL	0.25	240
02	1 st shoulder join with mobbing tape	4 thread over lock m/c	0.2	300
03	Neck loop join	Single needle plain m/c	0.25	240
04	Neck binding	Flat lock m/c	0.4	150
05	Placket ruling	Single needle plain m/c	0.28	214
06	Body mark for placket	HEL	0.3	200
07	Placket join	Single needle plain m/c	0.28	214
08	Nose tack	”	0.25	240
09	Placket upper top stitch	”	0.3	200
10	Placket lower top stitch	”	0.3	200
11	Placket upper top stitch (side)	”	0.3	200
12	Placket lower top stitch (side)	”	0.3	200

13	Placket bar tack	”	0.3	200
14	Placket box	”	0.5	120
15	Placket box	”	0.5	120
16	Placket two point false stitch	”	0.3	200
17	Back part mark for label	HEL	0.2	300
18	Back label join	Single needle plain m/c	0.5	120
19	”	”	0.5	120
20	Arm hole binding	Flat lock m/c	0.5	120
21	”	”	0.5	120
22	Care label join	Single needle plain m/c	0.25	240
23	Arm hole inside tack	”	0.25	240
24	Side seam	4 thread over lock m/c	0.45	133
25	”	”	0.45	133
26	Body turning	HEL	0.15	400
27	Bottom hem	Flat lock m/c	0.25	240
28	Arm hole outside tack	Single needle plain m/c	0.25	240
29	Mark for button	HEL	0.2	300
30	Button attach	Button attach m/c	0.4	150
31	Thread cut	HEL	0.6	100
32	”	HEL	0.6	100
33	Shoulder mobbing join	Single needle plain m/c	0.5	120
34	”	”	0.5	120

3.6: Planning Department

This industry have two planning section. One is fabric planning and another one is garments planning.

➤ **Fabric Planning:**

According to requirements of merchandiser, fabric planning section goes for production. Merchandiser gives his demand to knitting section and they plan for production as per specification.

Fabric planning department **ERP and MRP** software to give or pass order sheet for further process.

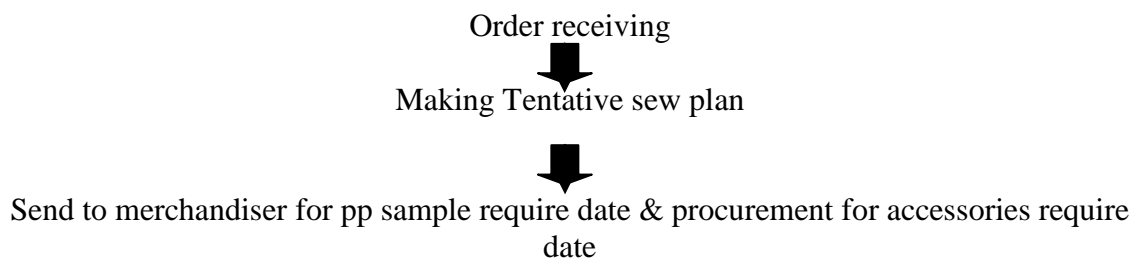
➤ **Garments Planning:**

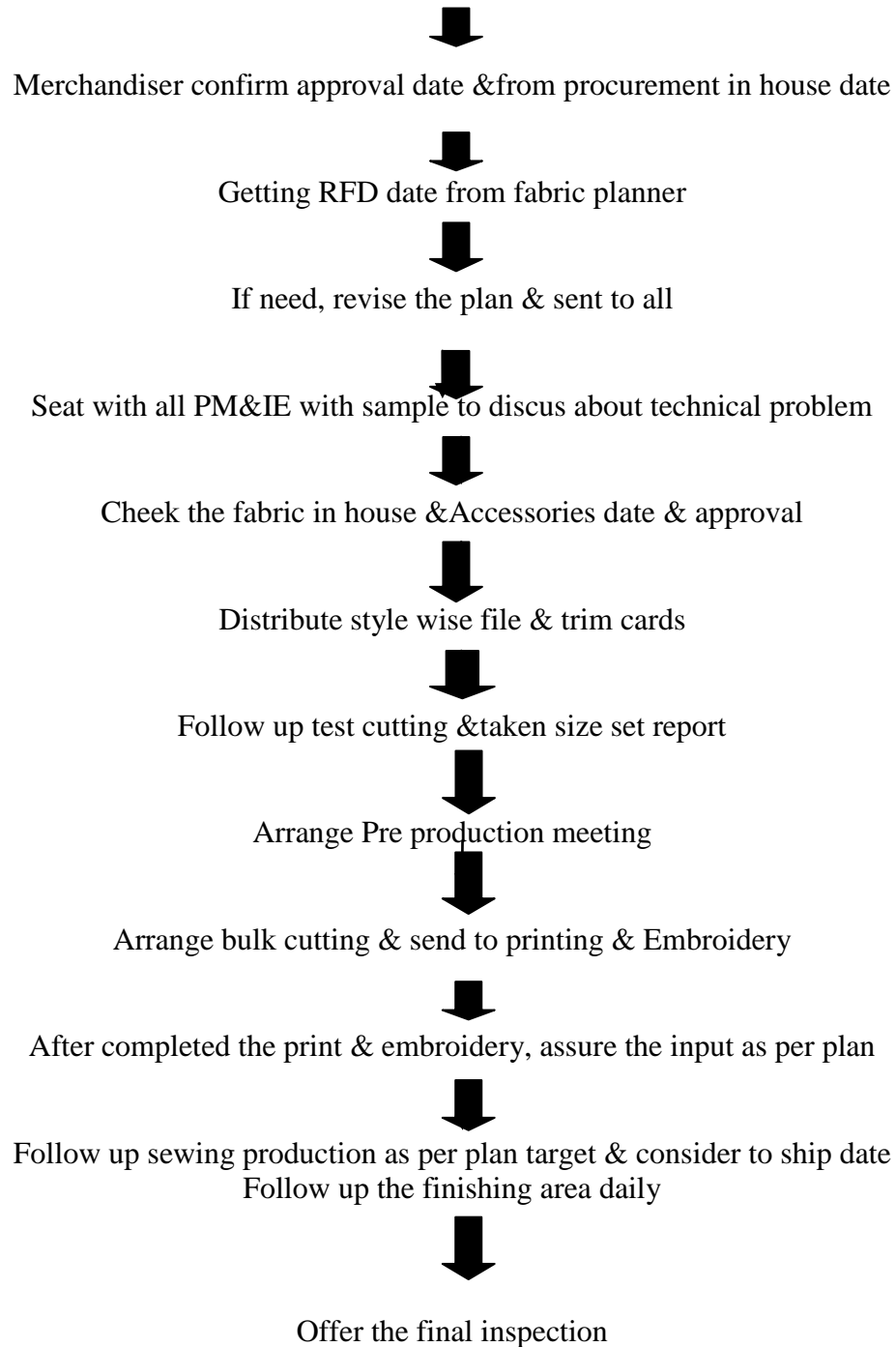
This department is doing their job based on some factors. They used **Fast React Software** for planning. Before going to plan, they must have to check following things and the most importantly, these all are doing based on shipment date.

- ✓ Check accessories.
- ✓ Plan follow- up.
- ✓ Check fabric storage.
- ✓ Embroidery and printing done on fabric.

Planning department follows the shipment date and put their plan of different types of style of different buyers on several units. They must have to check it out that, when a style going for cutting, input in line, output from line, going for finishing, packaging etc because if they have done any mistake about wrong placement or wrong scheduling for planning it will cause huge problem for the industry. It might be caused of missing shipment. So planning department should always be aware of their job and they always have to update the present stage of any goods because if there occur any inconvenience, it will be easy to resolve it with proper step.

Flow chart for planning

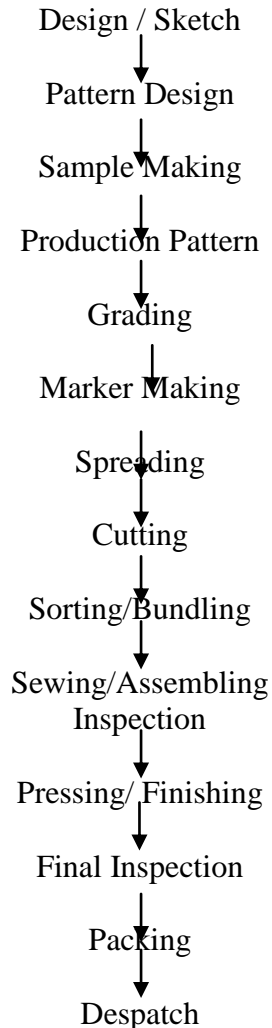




3.7: Garments Production

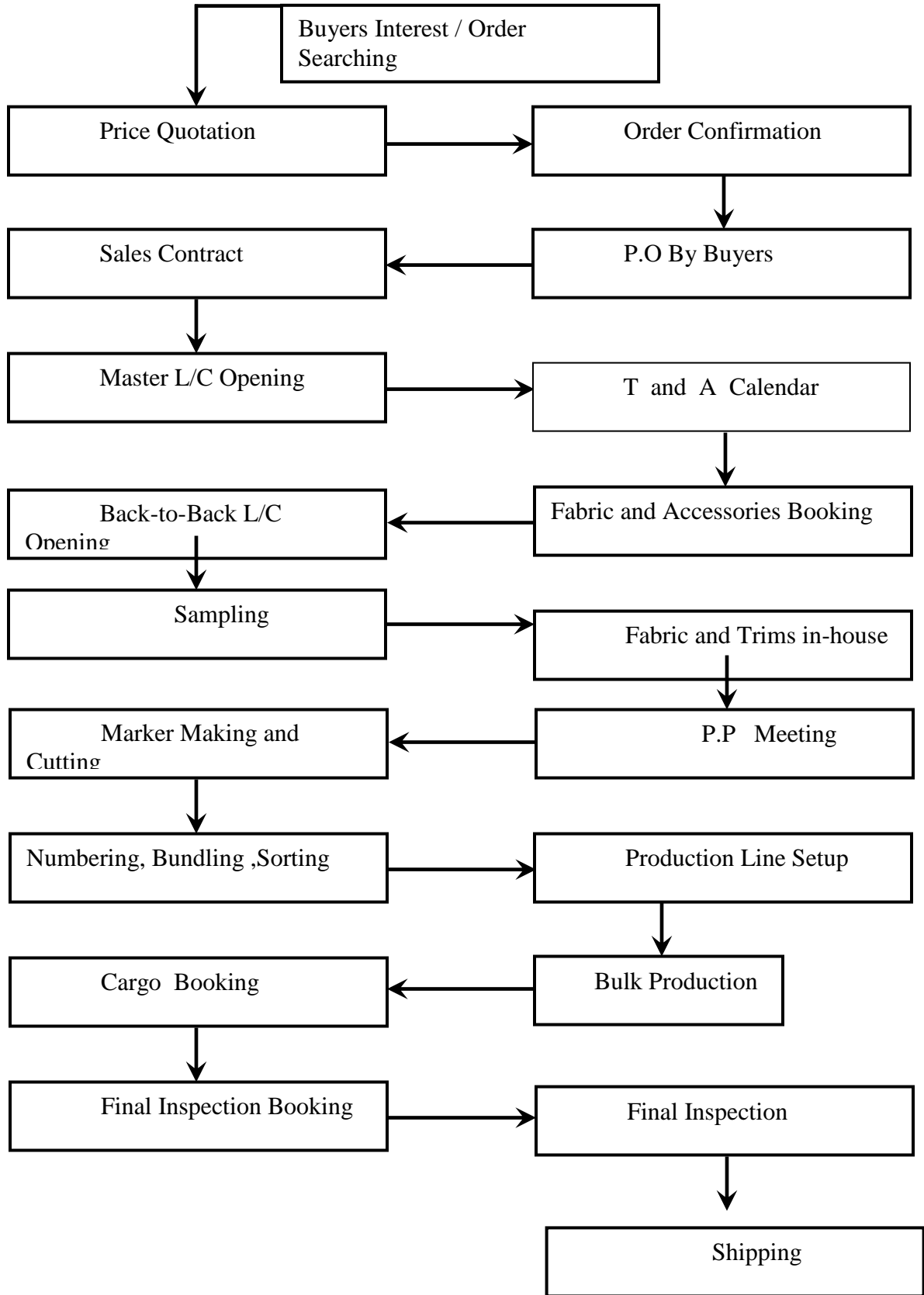
Garment: The **garment production processing** steps and techniques involved in the manufacturing garments for the large scale of production in industrial basis for business purposes is called garments manufacturing technology.

Garments Manufacturing Process: Stepwise garments manufacturing sequence on EKCL is given below:



This is the Basic Production Flowchart of a Garment. In advance some of the process can be added or removed.

Garments Export Procedure:



3.8: Merchandising Department

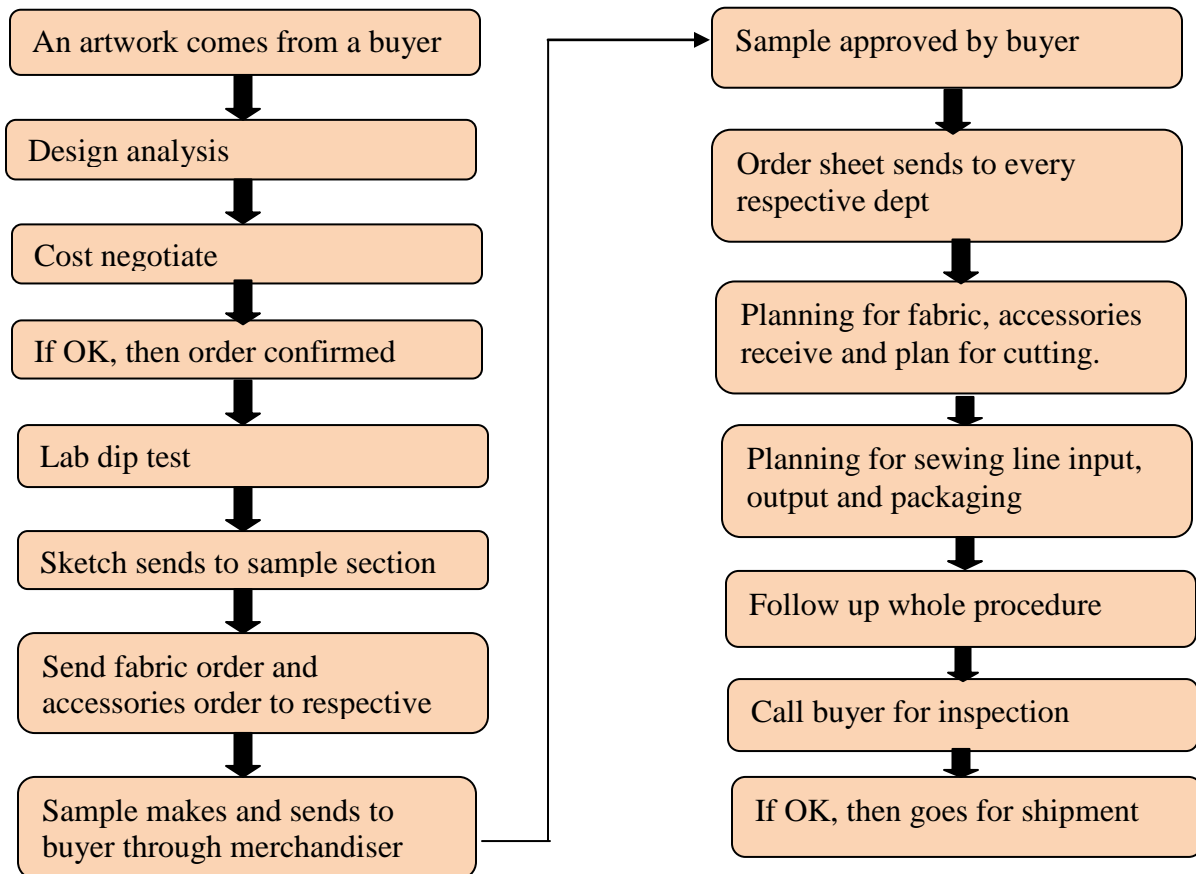
An apparel merchandiser, also known as a fashion merchandiser, is the person who conceives and implements merchandising displays in retail environments focused on the sales of clothing and accessories.

Being leading apparel manufacturing industry Esquire Knit Composite Ltd have its own merchandising department. This department as a buying house for the company. They have some definite buyers around the world for dealing with them. Collection order is the main function of this department. Following up production, fabric order, trims and accessories, costing of production, determining profit of the company are also the jobs of this department. This dept works as a bridge between the buyer and the company. They have around forty merchandiser in this department and they worked as a team. Ten teams are available in this dept.

Location of the Department

This dept is located at the main factory area. For better communication and other facilities this dept is now located at the factory area.

Working Procedure of Merchandising Department



Basic Working Procedure of the Department

- Order Collection
- Sample Making and Costing
- Negotiation and Order Confirmation
- Fabric and Trims Booking
- Pre-production Meeting
- Follow up Production

A Merchandiser should have

- Good knowledge of raw materials (fiber, yarn, fabric, garments and accessories required)
- Clear concept of the usually potential quality problems in the garments manufacturing.
- Sufficient knowledge of dyeing printing finishing washing embroidery garments manufacturing.
- To procure or collect a garments export order.
- To estimate time schedule for the export of those garments as per L/C
- Adequate knowledge about color fastness of fabrics, garments & accessories.
- Adequate knowledge of quality control and management.
- Good knowledge of exporting and importing countries.
- Knowledge of duty rates and customer regulations.
- Knowledge of shipping and banking documentation and regulations.
- Order procures of international buyers.
- Good knowledge of mathematics.
- Excellent power of motivation to improve public relations.
- Knowledge of computer literacy and internet.
- To monitor garments packing instructions.
- To maintain continuous liaison with the buyer or his representative if needed.
- To follow up payment collection against garments export as per time schedule
- To earn profit through garments export execution.

Execution of the Garments Export Order

After receiving the garment export order, without wasting any time, it is essential to prepare a time schedule for the jobs to be done for safe execution of the export order .the main jobs for execution of an export order are as follows.

- Details analysis of export L/C
- Preparation of a time schedule for the export L/C
- Procurement of fabric and accessories for garments to be exported

- Distribution of the responsibilities for the jobs and duties
- Production plan
- formalities
- Continuous follow up of progress
- Others

First Job from Confirm Order

File No:	BHS-199(8225)
Order quantity	3500 pieces
Contract received	23rd December
Design sheet received	23rd December
File sent to sample	1st January
Color swatch received	Black-app 15/1
Lab dips/yarn dips	9th January
FO/SFO issued	FOO 19th December issued: 9.01 app 14.01. SFOO30.12 app 14.1
LOF received	Received 6th January to supplier TBA
Size breakdown	Done 15th January
Trim list	
Fit	
Red seal	
RFD	
Test fabric revd date	
Gold seal	
GMT test	
EX-fty	25th march

When the export order is conformed to a merchandiser, than he/she has to schedule the following main function to execute the export order perfectly on time:

- Fabric requirement calculation
- Accessories requirement calculation(thread, button, interlining, label, poly bag, carton etc)
- Sourcing of accessories.
- Possible date of arrival of the fabric & accessories in the garments factory.
- Costing
- Garments production planning
- Pre-shipment inspection schedule
- Shipping document

Things to Know for a Merchandiser

A merchandiser should have knowledge about the following things

- International transaction.
- Shipment of goods.
- Sound concept about garment production.
- Sound concept about fabric and trims.
- Sound concept about costing and consumption.

TRIM LIST

FILE NO : BHS-159
STYLE REF : 8151
ITEM : Girls S/Slv T-shirt
FABRIC : 100% ctn, s/jersey (Solid) 140 gsm
ORDER NO : 38572, 38573 & 38574
O.Qty : 6,163
SHIP DATE : 15.11.14

S L	ITEM	CODE:/Ref	CNSMPTN/gm ts	QTY :	SUPPLIE R	REMARK S
1	CARE LABEL		1 Pcs	6,163	TBA	
2	Sewing Thread	Filament+Pol yester			ESQ	
3	Mobilon tape	Local			Local	
4	Price Tag		1 Pcs	6,163	Local	
5	Tag Pin		1 Pcs	6,163		
6	Hanger (RW136 & 141)		1 Pcs	6,163		
7	Hanger Stricker	Local			EAL	
8	Poly Bag				Local	
9	Scostape				Local	
10	Gum Tape				EAL	
11	Carton					

Pre-shipment inspection report guidelines

1. All shipments for Liam David Ltd should be subject to a final AQL inspection, this can be carried out by a dedicated final inspector within the factory or a representative from the supplier, AQL reports are to be emailed to the relevant technologist prior to shipment.
2. The inspection should be carried out on sealed boxed items once the order is 80% complete and boxed.
3. 20% of total no of cartons should be selected at random and samples taken for inspection from these.
4. Inspection quantities should be as per the following table:

Order Qty	Inspection Qty (Sample Size)	Measurement Minimum Inspection quantity	Max, acceptable faults		
			Critical	Minor	Major
0-150	20	2gmts per size	0	1	2
151-280	32	3gmts per size	0	2	3
281 – 500	50	4gmts per size	0	3	5
501-1200	80	5gmts per size	0	5	7
1201-3200	125	6gmts per size	0	7	10
3201-10000	200	7gmts per size	0	10	14
10001-above	315	8gmts per size	0	14	21

5. The following inspection criteria should be followed:

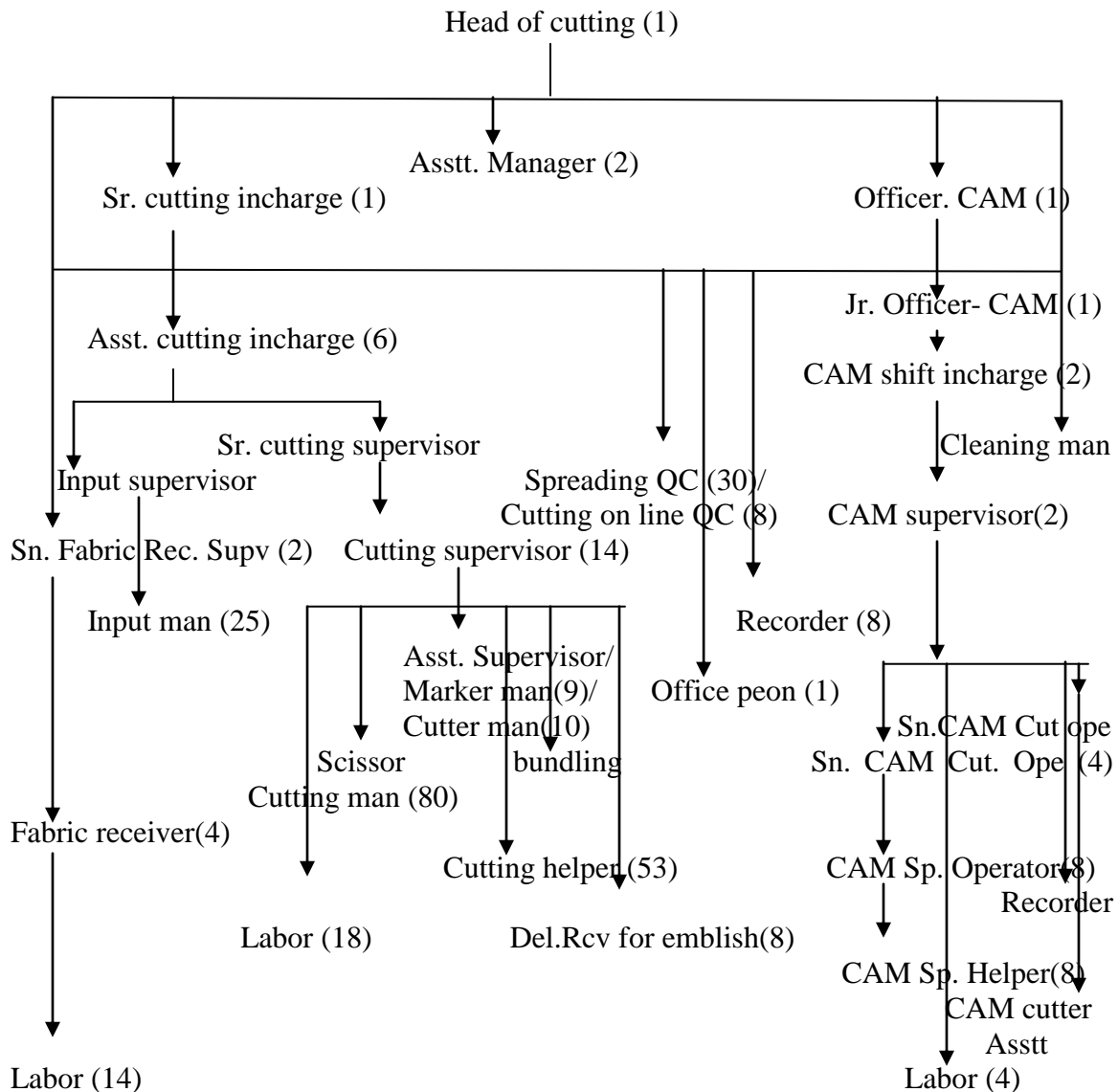
- a. All packing and labelling is correct according to the contract and customers requirements- this is to include carton marking labels – if there are any discrepencies to requirements the goods should be repacked correctly.
- b. All components of the garments i.e fabric, yarn, thread, buttons are approved or specified by the buyer- if there are any discrepancies, shipment should be held pending discussion with the buyer.
- c. The above table list the minimum number of garments per size should be measured, if all measurements are within tolerance on these samples no further measurements are required.
- d. The styling details and method of make should be checked against the sealed sample. If any discrepancies, shipment should be held pending discussion with the buyer.
- e. Item should be examined for any manufacturing faults i.e fabric faults, stitching flaws, stepping at seam where not part of design etc, please classification descriptions as per the next page to complete the report.

3.9: Cutting Department

Fabric cutting means to cut out the garment pieces from the lays of fabric with the help of cutting template or marker. In other word, cutting is the process of separating garment parts from the fabric lay in precise size and shape.

Esquire Knit Composite Ltd has established a well oriented cutting department located at 6th floor of the main factory building. Cutting is done here in two categories; test cutting and bulk cutting. Test cutting is done for pilot project which takes place before bulk production.

Cutting Department Organogram



Total man power: 400
Cutting

Cutting is the operation by which fabric lay is cut with accuracy and properly to be used as different parts of garments. In this factory, cutting is done by two ways- **Manually by Straight knife cutting machine and by Auto cutter machine.**

Objectives of Cutting

- To convert fabric into suitable size and shape.
- Separate fabric parts from the spread of lay according to the dimension of the marker for the purpose of garments making according to the pattern pieces.

List of Machines

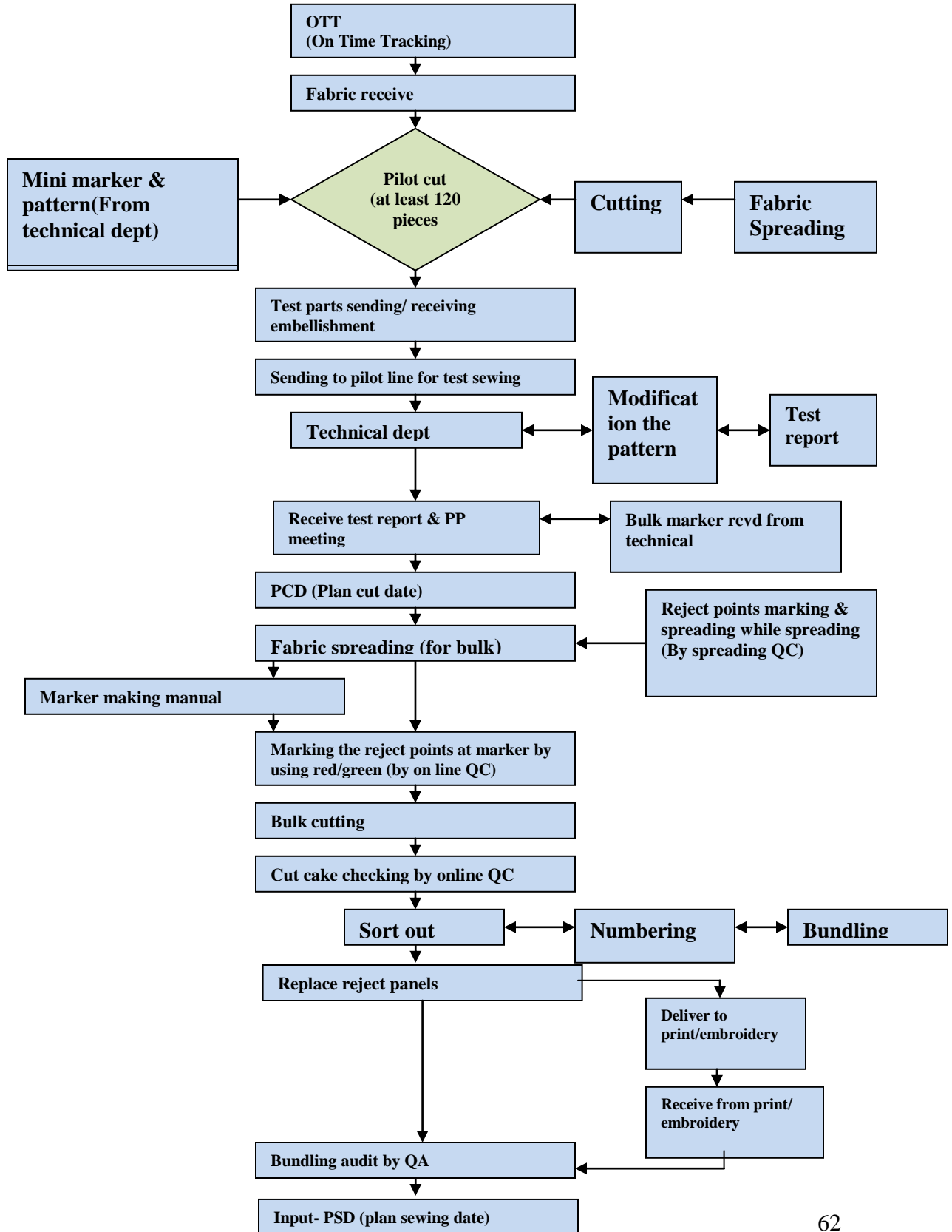
Name of Machines	No. of M/C
Straight Knife Cutting M/C	10
Auto Cutter M/C	02
Auto spreading M/C	05
Marker printer	03
Cutting target/ day = 65000 kg of fabric	

Cutting Table Specification

- Length of the spreading table : 25 yards 4"
- Width of the spreading table : 94"
- Table type : Wood table
- No of clamps :16
- No. of operator : 02
- No. of helper : 10

No. of manual cutting table: 05

Operational Flowchart of Cutting Department



Requirements of Fabric Cutting

- Precision of cut.
- Clean edges.
- Unfused edges.
- Support of the lay.
- Consistent cutting.

Spreading

Spreading is a process by which plies of fabric is spreaded in order to get required length and width as per marker dimension. This preparatory operation for cutting and consists of laying.

In other words, spreading is the process of stacking of layers of fabric to allow simultaneous cutting. The marker is laid on the top most of the layers.

Factors Considered for the Ply Height Determination

➤ Thickness of the fabric:

When thickness of the fabric is more than numbers of plies should be less and numbers of plies may be higher in case of thin fabric.

➤ Cutting knife height:

Lay height should maximum be 70% of cutting knife height or auto cutter machine's width.

➤ Volume of production:

If volume of production requires, numbers of ply may be higher, i.e. height of the lay should be higher.

➤ Nature of fabric:

Ply height is determined by the nature of fabric type. In case of same numbers of ply, single jersey may be cut but rib fabric or lacost may not be cut for same GSM.

Methods of Fabric Spreading

Esquire Knit Composite Ltd has well developed spreading process. They have both **Manual and Mechanical Method** available.

Manual method:

In this method, fabric is laid completely by hand. This method is widely used in our country. A roll of fabric is taken and its edge is fixed on one end of the table and then

spread on the table without using any device, completely by hand. A large number of workers are required to carry out this process.

Mechanical method:

There is an auto spreader machine which has a ply cutting device with a automatic catcher to hold the end of the ply in place. In this method, spreading machine is running with the help of electrical and mechanical speed. It has some disadvantages among versatile advantages. Such as:

- High maintenance cost.
- Initial cost is high.
- It required high skilled operator.



Fig: Auto fabric spreading machine

Features of Straight Knife Cutting Machine

- Possible to cut pattern pieces directly from the fabric lies.
- Could be used to cut for higher depth of fabric.
- High cutting speed.
- Sharp and heavy corners can be cut.
- Blade could be sharpened by attached grinding facilities.
- Blade height 8 to 10”.

Advantages of Straight Knife

- Comparatively cheap and can be transferred easily from one place to another.

- Higher lay of height can be cut very easily.
- Round corners can be cut more precisely.
- Production speed is very good as up to 10 heights can be cut at a time.
- Garment components can be directly separated from fabric lays.
- Fabric can be cut from any angle.

Disadvantages of Straight Knife

- Sometimes deflection may occur due to the weight of the motor.
- Knife deflection is high in risk, when lay height is too high.
- Sometimes accident may happen.

Features of Computer Control Knife Cutting

- This method provides the most accurate possible cutting at high speed.
- Marker is not necessary to put over the fabric lays during cutting.
- Cutting knife is oval shaped and very hard. Sharpness is also very high and blade is made of stainless steel.
- Cutting knife itself moves according to the direction of computer memory.
- This machine is CAM system machine and works through CAD system.

CAM system includes:

- a) **Auto spreader.**
- b) **Auto cutter.**

CAD system includes:

- a) **Pattern making.**
- b) **Pattern grading.**
- c) **Marker making.**

Advantages of Computer Control Knife Cutting

- Very fast cutting operation.
- Very active cutting by computer controlled system.
- Suitable for very large scale production.
- Speed of cutting can be controlled.
- Cutting defects are less than others.
- Cutting knife can be driven at any direction.
- Can be compressed in lays which assist during fabric cutting.
- Intensity of accident is low.
- No need of marker.
- Fabric can be cut 6-8 times than manual method.
- Less labor cost.

Disadvantages of Computer Control Knife Cutting:

- Very expensive machine.
- Higher maintenance cost.
- Skilled manpower is required.
- If correct disc is not loaded in the computer, error will be indicated.

Numbering

After cutting the fabric, cut pieces are sorted out size and shade wise. All the components of same size are brought together and workers numbered with **Numbering Machine**. This is one of the most important operation in cutting section to prevent mixture.

Bundling

When numbering is completed then it goes for bundling according to size. The size of the bundle depends on requirement of the plan. A sticker is added on every bundle which gives an idea about the order.

Bundle specification sticker contains:

Quality Inspection and Replacement

After bundling, the cut pieces go to quality inspection room. Cut pieces are 100 % checked here. Rejected pieces are replaced by a new one. This inspection is done by Quality Assurance. After inspecting these pieces, it goes for sewing floor. Some fabric faults are found in this section which is given below:

- i. Hole.
- ii. Slub
- iii. Yarn contamination.
- iv. Spot.
- v. Dirt mark.
- vi. Crease mark.
- vii. Miss stitch.
- viii. Needle mark.
- ix. Shinker mark.
- x. Naps.
- xi. Oil spots.
- xii. Crumple.
- xiii. Edge mar.
- xiv. Hairiness.
- xv. Patchy.
- xvi. Shrinkage.

- xvii. Lycra out.
- xviii. Compacting.
- xix. Arm hole.
- xx. Neck fault.
- xxi. Barree
- xxii. Thick/ thin place.
- xxiii. Bowing bias.

Marker Making

It is a thin paper which contains all the necessary pattern pieces for all sizes for a particular style of garments. It gives special instructions for cutting. It is done by computerized method. Plotter machine is used as marker printer.

- In computerized method all information's are stored in the pre-fashioned data file and an operator helps the computer to make the best choice.
- Marker width is taken according to the fabric width. Fabric spreading is done by taking the guideline from marker length.

Computerized marker making method:

- This is the best method of marker making as it generally gives higher efficiency.
- In this method every components of the patterns are kept in the memory of the computer and grade rule is also mentioned.
- Then the compute makes the marker by its pre-fashioned programming technique.
- The information of patterns can be stored by Digitizing system.
 - ✓ In this process patterns are placed in the digitizing board.
 - ✓ Every portion of the components is send to the memory of the computer by clicking special mouse around the pieces.

Marker Efficiency

The marker planner measures his success by the efficiency of the marker plan. The following formula is used to measure the efficiency:

$$\text{Marker efficiency} = \frac{\text{Area of the pattern in the marker plan}}{\text{Total area of the marker plan}} \%$$

Interlining

Interlining is one kind of accessories which is used between two layers of fabric in garments to support, re-enforce and control areas of garments and to retain actual shape. It may be applied on base fabric by sewing and bonding.

There has three table on cutting section to cut interlining and every table has two man powers to spread and cut this. One fusing machine is placed on every sewing floor. Paper lining, tricot lining or cotton lining etc are used as lining paper in this factory.

Types of Interlining

There are two types of interlining are as follows:

- Sewn interlining or non fusible interlining.
- Fusible interlining.

Fusible interlining:

The interlining which could e fixed with the garments components by applying heat and pressure for certain time is called fusible interlining.

For fusing;

Recommended fusing temp : 165-170⁰ C
 Fusing time : 20 seconds
 Pressure : Depends on fusing technique.

Advantages of fusible interlining:

- Appearance, shape and quality are same as other.
- Available in market.
- Cheap.
- Fusing time is less.
- Labor cost is low.
- Production is high.
- Overall performance is better than fusible interlining.
- Easy technique and no need of especially skilled operator.
- Fusible interlining is used as work aid.

Disadvantages of fusible interlining:

- High temperature is required.
- Special care is needed during attaching interlining.

3.10: Printing Department

Printing is an important section for any knit composite factory which is based on kids and girls items.. Printing is done by two ways: one is manual and another is by automatic printing machine. There has six number of table and four auto machines are available here. Per day production from a table is 10000 pieces and 20000 pieces from four auto machines. Total production per day is 30000 to 35000 pieces.

Printing is a process for reproducing text and images, typically with ink on paper using a printing press. It is often carried out as a large-scale industrial process, and is an essential part of publishing and transaction printing.

Specification of a Table

There has total six printing table. Among these some are made from glass.

Table length is: 80 feet

Table width is: 6 feet.

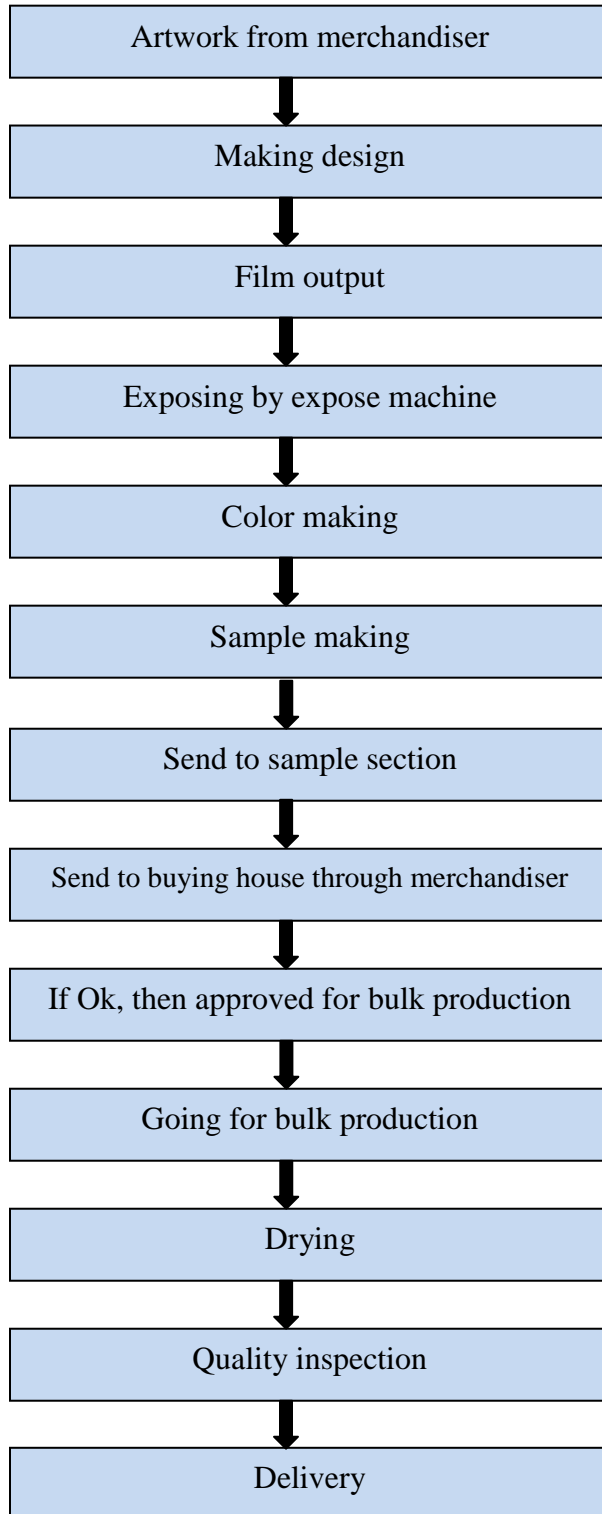
Types of Printing is Done at EKCL

- Rubber printing.
- Pigment or normal printing.
- Foil printing.
- Flock printing.
- Puff or emboss printing.
- Discharge printing.
- Glitter printing.

Major Defects in Printing

- Color bleeding; cause due to low viscosity of print paste.
- Crocking.
- Flushing or wicking; cause due to low viscosity of print paste.
- Misfits; cause due to improper alignment of the screens.
- Scrimps; because when the fabric creases underneath one of the screens during the printing process.
- Banding; defects created by the print's head movement over the substrate.
- Color out.
- Mottled.
- Shade variation.
- Color overlapping.
- Print spot on garments part.
- Color track.

Working Procedure of Printing Section



List of Machines

Name of Machines	No. of machines
Auto screen printing m/c	4
Auto dryer machine	4
Dryer m/c	3
Heat press m/c	12
Automatic hot fixing m/c (Ultrasonic waves system)	6
Auto stone motif m/c	1
Expose m/c	02

Auto Dryer Machine

There has total four auto dryer machine which is used on the printing table. When printing is done on a table, a dryer moves on the printing to give heat to the garments parts. It helps to reduce time for a particular operation.

Used Chemical in Printing Section

- TUBVINYL 235 MC
- PRINTPERFEKT LAC 110 NEU.
- PRINTPERFEKT BLANC 600.
- Binder



Fig: Operation of printing section

3.11: Embroidery Department

Embroidery is one of the most important departments in this factory. It plays a prominent role in developing of this factory. This department is located at 2nd floor of the main factory building. Production capacity of this department is 25,000-30,000 per day. Usually, 50/2 s count is used for embroidery.

Embroidery is the art or handicraft of decorating fabric or other materials with needle and thread or yarn. Embroidery may also incorporate other materials such as metal strips, pearls, beads, quills, and sequins. Embroidery is most often recommended for caps, hats, coats, blankets, dress shirts, denim, stockings, and golf shirts. Embroidery is available with a wide variety of thread or yarn color.

Overview of This Department

Total operator	: 16/shift
Supervisor	: 03/shift
Total no. of employee	: 180
No. of machine	: 16

Types of Embroidery

- Normal embroidery.
- Sequence embroidery.
- Applic embroidery.
- Tapping embroidery.
- Boring embroidery.
- Flower bow.

List of Machine

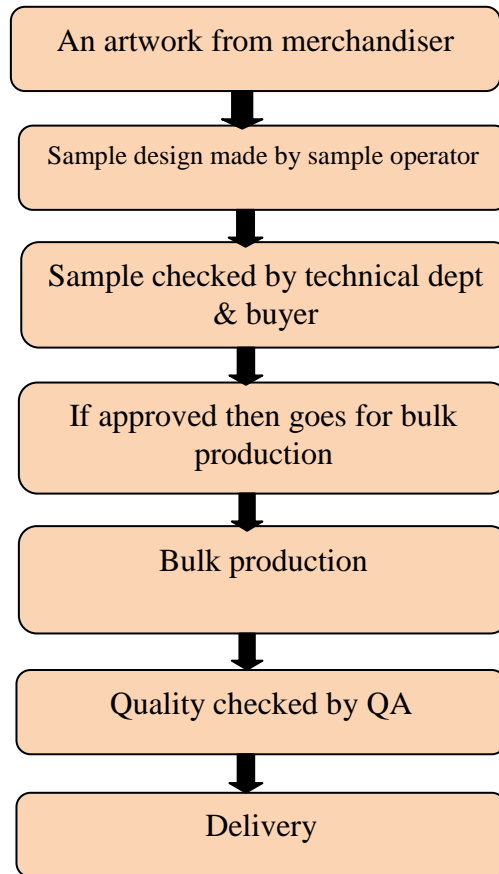
Name of m/c	No. of m/c
Normal embroidery	7
Sequence embroidery	7
Applic embroidery	Can be done by any m/c
Tapping embroidery	1
Boring embroidery	2
Flower embroidery	Can be done by any m/c
Laser cut m/c	2

Embroidery Machine Specification

Electronic multithread automatic Embroidery M/C
Brand: Tajima

Country: Japan
Model: TFGn-920
No. of head: 20
No. of Needle per head: 9
No. of Embroidery M/C: 7 M/C of 12 head

Working Procedure of Embroidery



Embroidery Stitching Type

- Shirting stitch
- Tatami stitch
- Run stitch
- Motif run stitch

Embroidery Faults

- Poor stabilizer; incorrect stabilizer will cause all kinds of problems in T-shirt embroidery.

- Wrong design; the right embroidery design is very important to T-shirt embroidery, because your T-shirt may not stitch out correctly. You will experience puckering, wrinkling, and tearing in the fabric with incorrect designs.
- Stitch gap
- Bobbin out
- Oil spot
- Miss thread
- Measurement up-down
- Needle hole



Fig: Embroidery machine

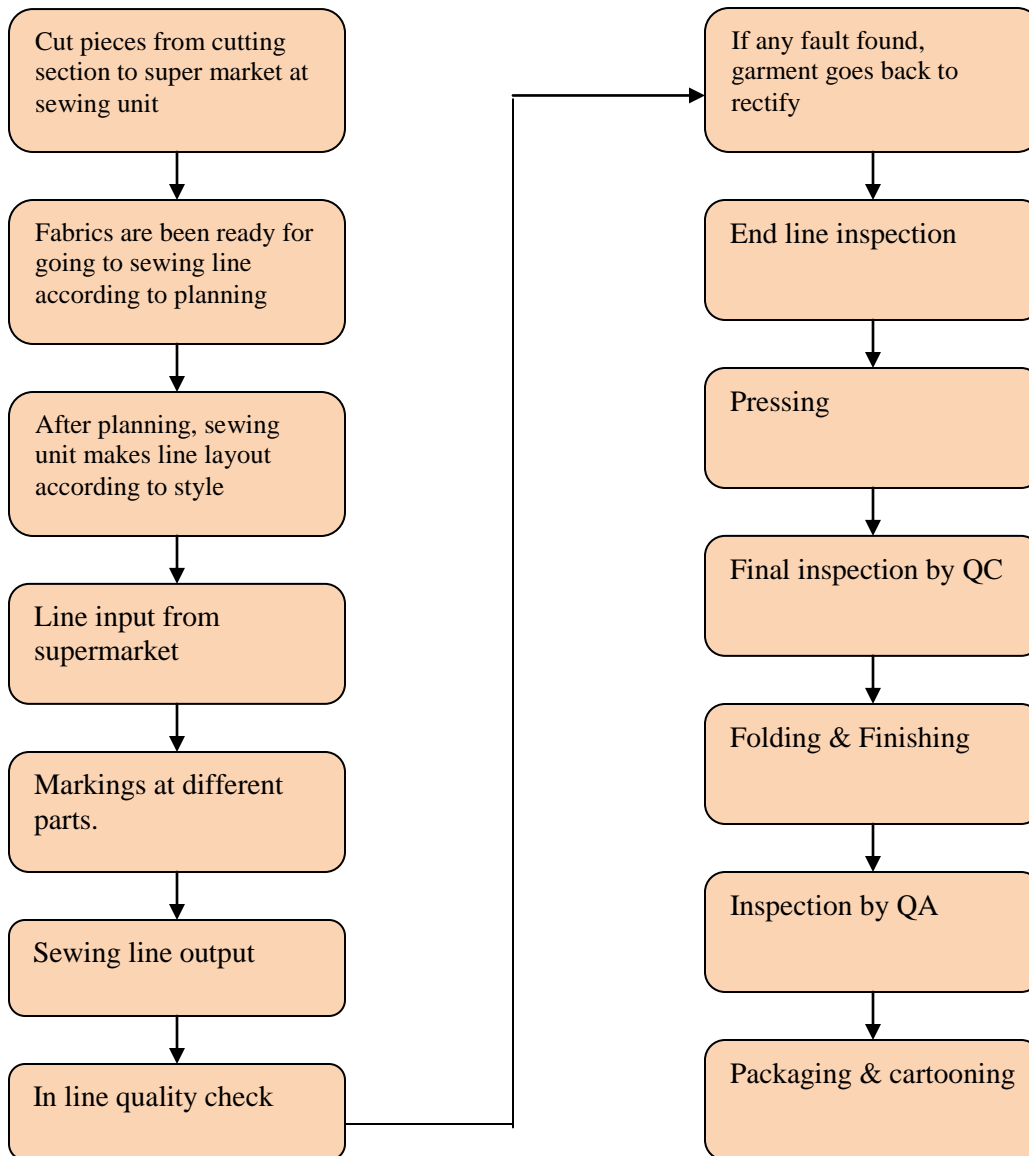


Fig: Head of embroidery machine

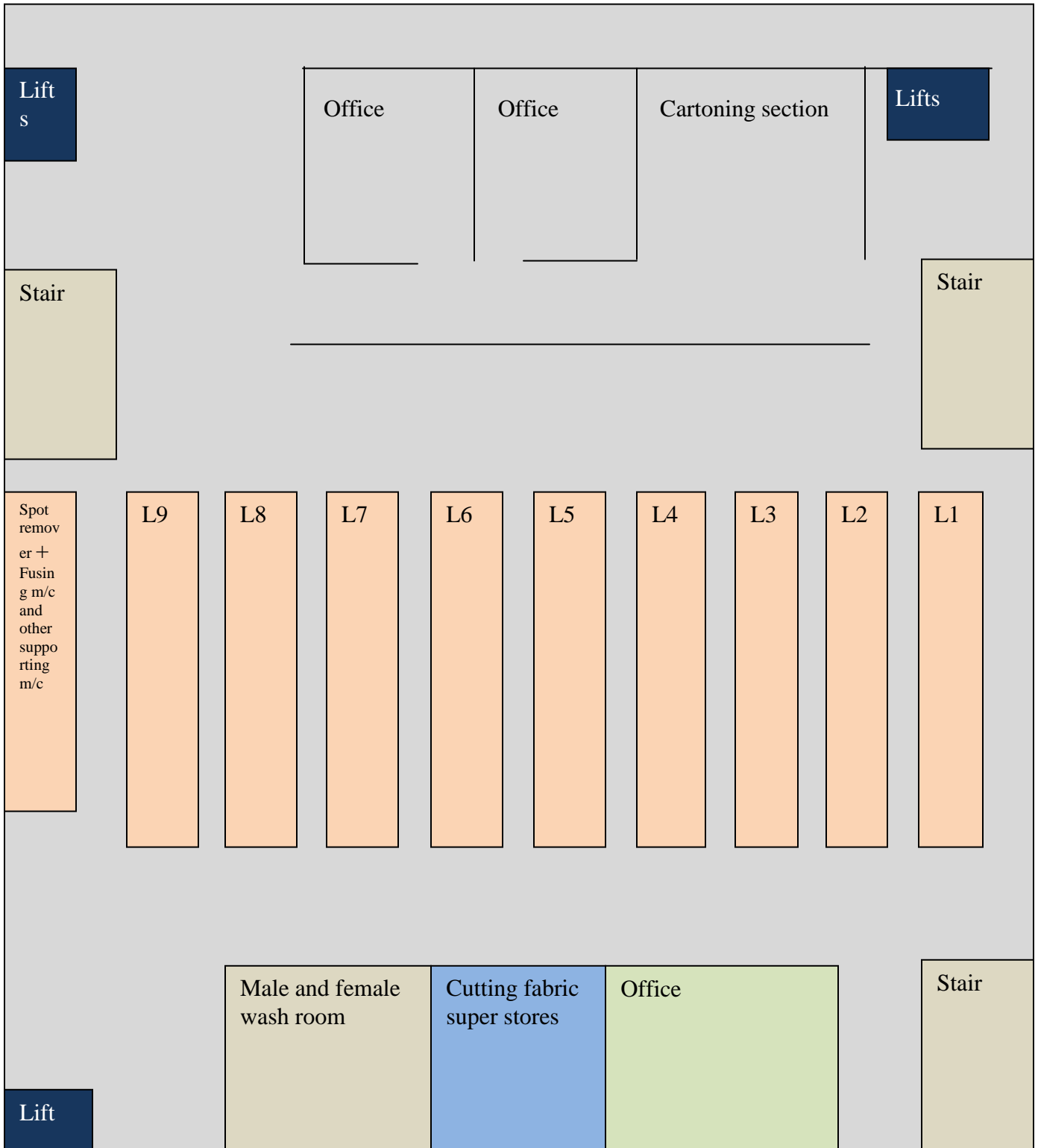
3.12: Sewing Department

A sewing machine is a textile machine used to stitch fabric or other material together with thread. **Esquire Knit Composite Ltd** has a well organized sewing section. Sewing section of this garments are divided into six units. Five floor of main factory building is allocated for sewing section and another unit is placed out of the main factory area. Every sewing floor consists of nine sewing line and one QA table for every three sewing line

Working Flowchart of Sewing Section



Layout of Sewing Floor



Sewing Machines of Esquire Knit Composite Ltd

The list of sewing machines is given below:

Daily in house machine status

SL	Machine type	Total EKCL M/C
1	Single needle lock stitch M/C	870
	Single needle edge cutter M/C	43
2	Over lock machine 4 thread	517
	Over lock machine 3 thread	1
	Over lock latush	39
	Over lock machine cutter	27
	Over lock 5 thread	14
3	Flat bed piping F/L	78
	Flat bed top stitch F/L	32
	Cylinder bed top stitch F/L	169
	Cylinder bed piping folder F/L	10
	Cylinder bed vacuum cleaner	76
	Cylinder bed small F/L	42
4	Button hole	30
5	Button stitch	32
6	Bar tack	19
7	Multi needle	11
8	Back tape	14
9	Feed off the arm	10
10	2 needle lock stitch	8
11	2 needle chain stitch	10
12	1 needle chain stitch	10
13	Smoking machine	12
14	Thread trimming m/c	27
15	Snap button	11
16	Thread sucking	06
17	Zigzag machine	03
18	Spot removing machine	06
19	Skilapp machine	12
20	Riv cutter	18
21	Pico ting	16
	Total	2195

Sewing Productions

Before starting the sewing, related person checks about the materials that are required to sew. For an example, to sew we need cut pieces, sewing machine, thread, label, button, work force etc. When all are in house, and then organize the floor on the basis of efficiency.

Features of Basic Sewing Machine

- In garment industry, basic sewing machines are used for numerous applications.
- Generally they are available in three versions: (i) Sewing with light material, (ii) Sewing with medium material and (iii) Sewing with heavy material.
- Speed up to 10,000 rpm with electronic controls for acceleration and deceleration.
- Electronically control thread cutting, needle poisoning, back tacking mechanism through the foot pedal, foot lifting system available in the machine.
- Programmable sewing sequence via micro process for repetitive operation.
- A great variety of feed systems, attachments and apparatus are available to make the machine more flexible.

Manpower per Sewing Floor

Positions	Requirement /line	Requirement for 9 lines	Remarks
Operator	32	288	<ul style="list-style-type: none"> • Centralized position. • Directly under PM. • Supermarket stuff- 03. • Spot remover- 02. • Carton packing- 06. • M/C- 07 (1 in charge, 3 m/c, 1 mechanical helper & 2 electrician). • Jumping operator- 10. • Cleaners- 06. • Sweeper- 02
Helper	10	90	
Checkers	06	54	
Iron man	02	18	
Folding/Packing	04	36	
Supervisor	01	9	
Line chief	01	9	
Floor in charge	01		
Finishing in charge	01	9	
Welfare officer	01		
Pay roll assistant	02		

Sewing Machine

The joining of the fabric with needle and thread is called sewing. Sewing machine is very essential part of the garment industry.

A sewing machine consists with the following parts:

1. Sewing head
2. Presser bar
3. Presser bar lifter
4. Horizontal arm
5. Arm shaft
6. Spool pin.
7. Machine pulley.
8. Upright arm
9. Upright arm shaft
10. Connecting rods
11. Bed shafts
12. Loop taker
13. Bobbin case
14. Feed dog
15. Presser foot
16. Face plate
17. Thread take up lever
18. Needle
19. Needle bar

• **Feed system:** There are many types of feed mechanism. These are given below:

- Drop feed mechanism.
- Differential bottom feed mechanism.
- Adjustable top feed system.
- Needle feed mechanism.
- Unison feed mechanism.
- Puller feed mechanism.

Slide plate: Slide plate is situated near the feed dog.

Sewing Accessories:

Sl no.	Name & Detail	Function	Use / Example
01	Sewing Thread	To stitch different parts and Accessories	All Types of Garments

02	Interlining: Types Woven/No-oven, Fusible/No fusible	Give strength the Garments as requiremen	Shirts, Pants
03	Lining: Support fabric	To support the shell or main fabric	In coat, Jacket
04	Elastic: Made of Lycra (Spandex)	To support the garments to keep with body	Babies wear, kids wear, waistband of jacket, Vest or Pullover, Underwear
05	Zipper: Contain Tape, Teeth, Stopper & Slider	Opening and closing of a particular part of a garment	Pants, Sweater, Jacket, Shirt
06	Labels: 3 Types Main, Size and Care Label	To express the company, brand, country name, to express care instructions	All types of garment

Points to be considered Before Sewing

- Machine should be cleaned everyday.
- Essential parts of the machine should be lubricated or oiled regularly.
- Needle should be adjusted carefully.
- Needle thread, bobbin guide or looper thread should be threaded correctly and their tension should be adjusted.
- The pressure of the pressure foot should be adjusted.
- Stitch density should be adjusted.
- Switching (on/off) should be proper.
- Machine should be handled according to the instructions.
- The hand wheel should always be rotated towards the operator.
- Bobbin thread should be wound in uniform tension.

How to Use a Sewing Machine

The followings are the steps of using a sewing machine:

- Set up a work area
- Install a needle securely
- Wind and insert bobbin
- Thread the sewing machine
- Raise the bobbin thread
- Plug the machine in
- Practice on some scrap material first

- Pin two pieces of fabric, right sides together, near the edge
- Use the hand wheel
- Select a straight stitch and a medium stitch length
- Line up the fabric under the needle
- Lower the pressure foot onto the fabric
- Hold the loose ends of both threads
- .Press the foot pedal
- Find the reverse button or lever
- Use the hand wheel to move the needle to its highest position
- Trim the thread
- Try a simple project

Stitch Quality is measured with

- Stitch size.
- Stitch tension.
- Stitch sequence.
- Elongation.
- Elasticity.
- Resilience.
- Fabric distortion.
- Yarn severance.
- Abrasive strength.



Comparative Studies between Different Types of Stitches

Stitch type	Formation	Characteristics	Application
Single thread chain stitches	One needle thread interlocking with itself	Elastic, easy to unravel	Basting, button sewing, label sewing, bag closing, tacking and so on.
Lock stitches	Interlacing of needle thread and bobbin thread.	Reversible, strong, versatile, secure, neat, flat but not stretchable.	Top stitching, common seam sewing.
Over edge stitches	One needle thread interlocking itself warps and protects the edge.	Elastic, allow the seam to break open easily unraveled.	Break open seaming
Cover stitch	Similar to 406 but it has a covering thread on the top surface	Provide excellent top & bottom cover & flat seam	Attaching knit collar on knit garments.
Combination Stitches	Combines stitch types 401 & 504	% threads safety over edging, surging & seaming	Side seaming of shirting.

Sewing Machine Feed Mechanism

The means for moving the materials or fabrics being stitched from one stitch position to the next is called feed mechanism. This is a very important part of the sewing machine. The following are the function of a sewing machine depends on the feed mechanism:

- Proper seam appearance.
- Proper stitching as required.
- Controlling of SPI (Stitch per inch)
- Move forward and backward of sewn fabric.
- Sometimes crease effect is formed according to the design.

Different parts of a feed mechanism:

- ✓ Throat plate/ needle plate/ feed plate.
- ✓ Feed dog
- ✓ Pressure foot.

Sewing Needle

A sewing needle is long slender tool with a pointed tip. The first needles were made of bone or wood; modern ones are manufactured from high carbon steel wire, nickel or gold plated for corrosion resistance. The highest quality embroidery needles are made of platinum. Traditionally, needles have been kept in needle books or needle cases which have become an object of adornment.

Function of a sewing needle

- Making of hole through the fabrics without damaging the fabrics which is the path of passing needle with sewing thread.
- After penetrating the needle with thread through the fabrics, make a loop of needle thread which will pick up by the hook of bobbin case.
- Without lock stitch machine, passing of needle thread through the loop made by looper.

Different parts of sewing machine needle

The following are parts of a sewing needle shown in figure and introduced by their position and activities:

- Butt
- Shank
- Shoulder
- Blade
- Long groove
- Short groove
- Needle eye
- Scarf
- Point
- Tip

Effect of wrong needle selection

1. If the needle is finer than sewing thread:

- The thread can not move easily through the needle eye.
- The thread will not take position perfectly at needle log groove.

- More heat will generate on needle for more friction.
 - The result is more thread breakage and production loss.
- 2. If the thread is finer than needle:**
- May produce slipped stitch as the needle can not create perfect size of loop.
- 3. If the needle is coarser than required fabric:**
- Fabric will be looked odd due to bigger hole.
 - Seam pucker may produce on woven fabric.
- 4. If the needle is finer than required fabric:**
- During sewing needle will deflect and become curve with the action of throat plate.
 - Curve needle will produce slip stitch as the looper may not catch the loop needle thread.

Sewing Thread

Sewing threads are the main trimming of a garment. Sewing threads are directly related to the quality of seam, e.g. appearance, loop/ seam strength. Quality of garments are depends on sewing thread. But the quality of sewing thread depends on types of fibers, material used during finishing and methods of sewing thread preparation.

Sewing threads are classified in following ways which is accepted internationally:

- 1) Fiber types.
- 2) Thread construction &
- 3) Finishing

1) Fiber types:

Sewing threads are classified according to the entire fibers used to make it such as: natural fibers, synthetic fibers and mixed or blended of them.

- **Cotton thread:** This type of thread is widely used and productive, among the threads made from natural fibers. Generally, made from better quality cotton fibers. This is easy to sew fabrics by cotton thread but has less frictional resistance compared to the synthetic threads. This type of thread is generally three types. Such as:
 - Soft cotton thread.
 - Mercerized cotton thread.
 - Glazed cotton thread.
- 2) **Thread construction:** According to the end uses, the sewing are manufactured from staple fibers and continuous filament. The single threads are spun from the staple fiber with S-twist and then more than one single thread is gathered together

by Z-twist According to the construction of yarn, sewing threads are following categories:

- Mono filament
- Multi- filament
- Textured thread
- Core spun thread

- 3) **Thread finishing:** There are varieties finishing materials which are applied on the sewing thread for smoothing the surface result in running at a higher speed during sewing of garments in the sewing machine. In this process special properties are gathered to the sewing threads. Lubricant is one, among the finishing materials. It reduces friction and heat formation to the needle.

Sewing Problem

Sewing defect can be classified in three different groups:

A. Problems of stitch formation:

1. Slipped stitch:

Stitches in the seam are present in a regular wise. If the interloping or interlacing between top and bottom thread of stitch is not take place or missed is known as slipped stitch or skipped stitch. This is more harmful in case of chain stitch than lock stitch. The following are the causes and remedies of slipped stitch formation given by a table:

No	Causes	Remedies
01	If hook or looper and needle are not inserted in loop of thread in time.	<ul style="list-style-type: none"> ➤ Examine the setting and timing between needle and hook or looper. ➤ Placing of needle properly. ➤
02	Irregular thread tension on upper or lower loop.	<ul style="list-style-type: none"> ➤ The tension of thread should again be adjusted.
03	Due to needle deflection.	<ul style="list-style-type: none"> ➤ Needle to be changed.

2. Staggered stitch:

If the stitches produced by needle are not parallel or become curvy to sewing line is known as staggered stitch. The following are the causes and remedies of staggered stitch formation given by a table:

No	Causes	Remedies
01	Needle deflection	<ul style="list-style-type: none"> ➤ Increase the needle size. ➤ Tapered needle should be used.
02	Due to wrong or blunt	<ul style="list-style-type: none"> ➤ Needle to be changed.

	needle point.	
03	Wrong adjustment of needle and thread size.	➤ Needle size and thread size to be changed.

3. Unbalance stitch:

This type of defect is found in lock stitch machine. If the interlacement of threads are not taken place in the middle of two layers of fabrics then it is known as unbalance stitch. The following are the cause and remedies of unbalanced stitch formation given by a table:

No	Causes	Remedies
01	Wrong tension of sewing thread.	<ul style="list-style-type: none"> ➤ Setting of proper tension to the sewing threads. ➤ Proper care to the twisting of thread during sewing.
02	Used wrong thread path.	➤ Use of right thread path.
03	Wrong adjustment of needle thread path.	➤ Use of right thread path.

3. Variable stitch density:

It must need to be the same amount of stitches per unit length. If it is not, then it is called variable stitch density. The following are the cause and remedies of variable stitch density formation given by a table:

No	Causes	Remedies
01	Improper unwinding of thread from package during sewing.	<ul style="list-style-type: none"> ➤ The position of thread guide must be 2.5 times higher than the position of thread package. Also proper care should be kept to the thread package not to be tilling.
02	Twisting of needle thread the bottom of thread guide.	➤ Foam pad must be used to the bottom of thread package.

4 .Frequent thread breakages:

This is the breakage of thread again and again during sewing. And also, there needs more time and which is harmful for production. Specially, when there needs to open out of sewing to solve the problem. The following are the causes and remedies of frequent thread breakage formation given are a table:

No	Causes	Remedies
01	Wrong winding of threads on to the bobbin.	<ul style="list-style-type: none"> ➤ Proper winding of threads on to the bobbin. ➤ Pre-wound bobbin may be used.
02	More tension to the bobbin threads or more rotating of bobbin.	<ul style="list-style-type: none"> ➤ The tension must be adjusted to the bobbin threads. ➤ Use of washer to prevent the more rotating of bobbin.

B. Problem of puckers:

Unwanted waviness of the fabric along the seam line is called seam pucker. This may be apparent immediately after sewing or it may develop in later in use. Most of the times, sewing threads are referred as the responsible for seam pucker. There is a great possibility of seeing seam pucker in case of more plies of fabrics sewing together. The following are the main reasons of occurring seam pucker:

- Variable or uneven stretch on fabric plies
- Fabric dimensional instability
- Extension of sewing thread
- Sewing thread shrinkage
- Mismatched patterns

C. Damage of fabrics on seam line:

A garment can be rejected due to damage of fabrics or yarn of fabrics in the seam line. This is happened due to wrong needle selection or needle damaging. The fabrics are damaged due to sew with deflected needle.. There are two types of fabrics damaging are available given below:

1. Mechanical damage:

- By using perfect size and shape of needle and needle point without any defect.
- By reducing the speed of sewing machine.
- By using lubricant in the fabrics to the sewing line near about before sewing.
- By testing sew ability before sewing fabrics.

2. Needle heating damage:

- By reducing sewing speed so that there is less generating of heat to the needle. But it also harmful for large production, that is why, sometimes it may not be granted.

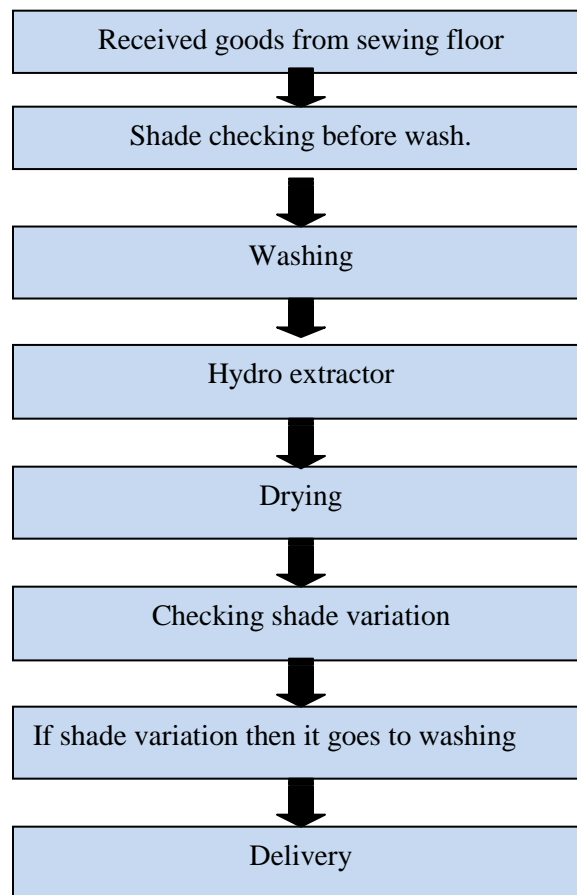
- By changing needle size and shape so that there is less generating of heat to the needle.
- By sewing smaller length at higher speed

3.13: Washing Department

Washing is a less important department in this industry. Because this factory based on knit garments and most of the cases, buyer does not require washing in case of knit garments. If somebody requires washing after producing fabric or finished product then the factory takes necessary steps to complete this process. Several types of washing process done here, such as:

- Normal wash.
- Enzyme wash.
- Silicone wash.
- Bleach wash which is not done here yet.
- Acid wash which is also obsolete.

Working Flowchart of Washing Department



List of Machines

Names of M/C	No. of M/C	Capacity
Washing machine	02	340 lb/ mc
Drying machine/Trample	02	300 lb/mc
Sample washing machine	01	30 kg
Sample drying machine	01	30 kg
Per day production capacity= 10000 pieces		

Washing Process of Normal Wash

The normal washing process for a sample of 05 kg knit fabrics or garments.

1st Step:

- Lot size :05 kg
- Add water (R:L= 1:8) :40 liters.
- Machine running
- Add softener : 1.8 gm/l.
- Add silicon : 1.3 gm/l
- Temperature : 45⁰ C
- Time : 15 minutes
- Drain liquor.
- Cold wash.

2nd Step:

Hydro extraction to remove water from fabric.

3rd Step:

Garments are placed in steam dryer .

Washing Process of Enzyme Wash:

The enzyme washing process for a sample of 05 kg knit fabrics or garments

3.14: Finishing Section

This is one of the most important sections in this factory. Finishing section is located in every sewing floor. One finishing table is placed against every sewing line. The term garments finishing mainly pressing, folding and packing of garments. According to buyer requirements, garments are folded. A finishing process in which a desired quality or qualities are imparted to fabric in order to improve the appearance.

Responsibilities of Finishing Room in this Factory

- Implement instruction of buyer given for production.
- Distribute the work load.
- Ensure finishing and packing as per target.
- Report to production director everyday.
- Record individual efficiency and performance of finishing table.
- Find the weak point in this section and take necessary step.
- Ensure working environment in this section.
- Ensure quality of product as per buyer's requirement.

The Activities of Finishing Section

- Pressing
- Trimming.
- Inspection.
- Buttons.
- Buttonholes.
- Button and button positions.
- Ticketing and bar coding.
- Tagging.
- Folding.
- Poly.
- Needle and metal detection.
- Packaging.
- Cartooning.
- Arranging final inspection and shipment.

Pressing

This is a finishing process done by subjecting a cloth to heat and pressure with or without steam to remove unintended creases and to impart a flat appearance to the cloth or garments. In garments industry, pressing is called ironing.

If any garment needs washing, before going to finishing section, it goes for washing.

Objects of pressing

- Removal of unwanted creases and crinkles
- To apply creases where necessary
- Shaping.
- Under pressing
- Final pressing:

Categories of pressing

The garments may be different in types; especially different in design and materials. The pressing garments is categorized into five according to the garments types, designs and materials are given below:

1. No pressing:

Some garments are available, which have not the need of pressing. Such as, swimwear. These types of garments are made by knit fabric.

2. Minimum pressing:

Some garments are available, which need finishing done by applying heat but no need of pressure. Such as, night gowns, T- shirts, leisure wear and so on. These types of garments are pressed by steaming and by flowing dry air to the garments and called minimum pressing.

3. Final pressing:

The final pressing is done by applying heat and pressure to the garments. This is done after making of garments. This is generally done in jacket, trouser, skirt and so on. Special type of pressing machine is used for final pressing.

4. Permanent pressing:

This is a special type of pressing, when it is given to retain the shape of garments or special conditions. Such as, dart and pleat. This type of pressing is done by applying high temperature and seam; sometimes, pressure is needed here.

Trimming: Trimming is done on finishing table again. Here trimming means cut excess thread from garment body (if have). This is done in sewing line and quality inspection table. But if any time, some threads could be invisible to the respective person. So that, rest of the threads is cut on finishing table.

Label: Label is a tag that gives a description of the performance inherent in a fabric for the purpose of aiding the consumer in selection. Fiber content, how the fabric is made, how it will perform in use, and areas covered by an informative label.



Fig: Garments folding

International Care Labeling Code: Garments become dirty during end-use and it is a natural truth. These dirty garments are re-used by cleaning and ironing. For perfect caring of garments, some instructions are expressed by symbols which are called care code. The label in which, the care codes of a garment are placed is called care label code. There are generally five types of instructions used in a care label which are internationally recognized, called international care labeling code.

- **Washing instructions:** Washing is any cleaning operation done in water or water containing detergents, alkalis or builders.
- **Ironing instructions:** Ironing is a manual method of pressing fabrics and garments with a heated hand iron, sometimes with moisture.
- **Bleaching instructions:** Bleaching is a process of whitening the fabrics by removing the natural coloring matters.
- **Dry cleaning instructions:** It is the process of cleaning fabrics with organic solvents to remove dirt and some types of stains. In commercial dry cleaning some water is included with the organic solvents.

- **Drying condition instructions:** The conditions on which fabrics or garments are dried are called drying condition. There are so many drying condition instructions are done depends on the fabric and garments.

Button and button holes: Buttons have to place on right position. In finishing section, these are checked properly. If any fault comes such as: wrong placement of button, broken button, shade variation etc, and then the fabric goes for rectifying. In case of button hole, finishing in charge has to check it properly. Hole direction, hole length, stitch formation everything has to check.

Folding: Two types of folding methods:

- Flat pack folding.
- Hanger packs folding.

Packing

Merchandising packing: A merchandising packing must be designed to meet the needs of the retailer and the desires of the consumer.

Shipment packing: The shipment packing performs the distribution function. It should be in a position to protect and preserve the quality of the product.

Specification of poly- bag:

Poly- bag size	: Length and width 120-200 GAUGE or, 30-50 micron.
Thickness	: 100 micron = 1 mm.
Type	: Flop, self seal tub etc.
Print	: Warning for suffocation.

Metal Detection: After packing, all garments go to cartooning section through metal detective machine. Every unit contains one or two machine for this operation. If any kind of metal comes with the pack, this machine will identify it and will send it back to the operator.



Fig: Metal detection machine

Cartooning and packaging: For the overseas shipments the unbagged garments are placed in a large poly bag before being placed in a cartoon. There are three types of pre – pack:

- Single.
- Multiply.
- Assorted.

Single: A pre consisting of garments of solid color and size.

Ex: A single pre pack of T-shirt could be 6 sizes small, color is red, packed together as a bundle.

Multiple: A pre pack consists of garments of solid color but multiple sizes.

Ex: A multiple pack of T-shirts could be 2 sizes small, 2 size medium and 2 sizes large, together as a bundle.

Assorted: A pre pack consists of garments of multiple colors and multiple sizes.

Ex: An assorted pre pack of T-shirts could be as follows:

	<u>S</u>	<u>M</u>	<u>L</u>	<u>Total</u>
Yellow	1	1	1	03
Red	1	1	1	03
	<hr/>			06

Garments on hangers: There are two ways of shipping a garment on a hanger

Flat pack: Garments on a hanger laid flat in cartoon.

GOH/Loose: Garments on a hanger and hung on ropes inside a crate and placed in a shipping container.

Carton specifications

- Carton dimensions.
- Carton material.
- Carton marking and labeling.

Carton marking labeling: Complete carton content, information to be located on slides in the carton.

Main mark on a carton:

- Address information.
- Carton number.
- Style/size/quantity.
- Country of origin.
- Carton measurement.

Side mark on a carton:

- Color names.
- Gross weight.
- Net weight.
- Carton dimensions.

Inspection:

- Inspection is the function to judge the quality product.
- Inspect the quantity and quality of a product or service in terms of established standards.
- When buyer's representative comes to inspect then he selects some cartoon randomly

3.15: Quality Assurance Department

Quality is the most important department for any organization. **EKCL** has established a strong quality assurance . This department is covering full garments section including raw materials like fabric, trimmings and accessories and also sewing department. They have ensured optimum quality of materials. Because factory reputation, buyer expectation, order placement in the factory etc are depending on quality. So that, they are always alert about this.

According to ISO, “Quality is the fulfillment of specified requirements of the product or service”.

Another definition of ISO, “The totality of features and characteristics of a product or service that bear on its ability to satisfy stated or implied needs”. A relative term used to indicate the perceived merits of similar products for same end use.

- Quality is the reflection of customers.
- Quality varies from customer to customer.

Quality Assurance

To carry out all those planned and systematic actions necessary to provide adequate confidence that a product or service will satisfy given requirements for quality is called quality assurance. **Esquire Knit Composite Ltd** believes, this is a system to assure that products and services meet customer requirements.

Quality Control

Quality control is the operational techniques and activities that are used to fulfill requirements for quality. On the other words, a system applied to manufacturing operations to monitor and regulate production process continually so that products meet specification.

To control the quality of garments or products two techniques are followed, such as:

- Testing and
- Inspection.

Function of the Department

Quality is major criteria for any product and the same rule applied even to garment industries also. In order to maintain quality, the quality assurance department has spilt up

their job into different stages of manufacturing and there is classified into four stages which are as follows:

Fabric Inspection: In these stages, when fabrics are reached after dyeing, it goes for inspection. 100 % inspection is done at **Esquire Knit Composite Ltd.** They have followed **4- point system** to inspect fabric. Fabric inspection is done by following two ways:

- ✓ **Table inspection:** This is done by manually. Fabric roll is spreaded on table and two or three person inspects this. One in charge noted how many faults they have found and then calculate it base on 4- point system.
- ✓ **Machine inspection:** This type of inspection is done by machine. Fabric roll is placed on machine. It passes away and faults can be easily identified in this machine because of strong lightening.

No. of Table	02
No. of Machine	02

4- Point System: It is also called the American Apparel Manufacturers Association (AAMA) point grading system for determining fabric quality. Inspection is done about 10 % of the products in the shipment. This system assigns penalty points to each defects as per the following guideline:



For either length or width:

<u>Size of defects</u>	<u>Penalty</u>
3 inch or less	1 point
Over 3 inch, but not over 6 inch	2 points
Over 6 inch, but not over 9 inch	3 points
Over 9 inch	4 points

For holes or openings:

1 inch or less	2 points
Over 1 inch	4 points

Calculate points per 100 square yards fabric:

$$\frac{\text{Total points faults X 36}''}{\text{X 100}} = \text{Points/100 sq. yards}$$

Roll length (yards) X Useable width (inches)

Acceptable faults rate should not be higher than 28 points at **Esquire Knit Composite Ltd.**

Pre – production Inspection: In this section, all pre production requirements which are need for going to production is checked in this section. Following are inspected in this section:

- ✓ **Accessories inspection:** When accessories reached in house, then QA department have to check it either it is alright or not. The quality of trims is checked here.
- ✓ **Printing inspection:** Before going to production, if any printing requirement has on garments body, then it goes for printing. QA member presents here to check quality.
- ✓ **Embroidery inspection:** Embroidery section requires more attention to fulfill quality. To check it properly, the length, width, design, and sketch everything has to check in this section by QA member.
- ✓ **Cutting inspection:** Cutting is a most important department for every industry. To spread fabric on the table properly and to cut this according to required way, QA department has to ensure this in this section.

Quality control in spreading and cutting:

- Table marking.
- Machine tension.
- Fabric GSM.
- Count.
- Marker planning.
- Ply height.
- Marker check.
- Pattern check.
- Miss cut.
- Notches.
- Matching plies.
- Direction

After cutting, it goes for quality checking. Here several types of faults are found which are given below:

- a. Holes.
- b. Slub.
- c. Yarn contamination.
- d. Spot.
- e. Dirt mark.
- f. Crease mark.
- g. Miss stitch.

- h.** Needle mark.
- i.** Naps.
- j.** Oil spots.
- k.** Crumple.
- l.** Edge mark.
- m.** Hairiness.
- n.** Patchy.
- o.** Lycra out.
- p.** Miss stitch.
- q.** Neck fault.
- r.** Barre/ Patta.
- s.** Thick/Thin place.
- t.** Bowing bias.

Production Inspection (EKCL -1): Sample section is the most important department of this industry. Quality plays a very prominent role in this section. QA department expand their hand in this section. To reach ultimate point of quality, they are working day and night. All test and quality inspection is done here properly. **EKCL -1** also takes care of garments unit 1 and unit 2.

Production Inspection (EKCL- 2): 4 garments unit included in this section. Every section has 3 quality auditors. They have checked the production round the day. Internal auditor and external auditor have done their job by the direction of QA auditor. They have to check every piece of garment. In sewing section, several times, garments quality is to be checked. Its done by following:

- In line quality check.
- End line quality check.
- Finishing table quality check.
- Final quality check by QA auditor.

When respected person checks the quality of a body, he has to inspect:

- ✓ Each part of the body.
- ✓ Activities of the operation.
- ✓ Stitches of the body.
- ✓ Design of the garments body.

If any problem identified, then take the following steps:

- ✓ Identify the problem.
- ✓ Find the reason.
- ✓ Check out the process.
- ✓ Stop this process.
- ✓ Take necessary step to recover this fault.

Finishing Quality Control:

This is one of the most important stages in case of quality control. Because, after passing finishing table, it goes for cartoning or shipment. All trimming and accessories and moreover, excess threads are checked here very carefully. Remaining thread is cut here permanently. The final control must include:

- ✓ Overall appearance and general quality.
- ✓ Check measurement.
- ✓ Size label, hang tag, price tag, care label etc.
- ✓ Packed it as per buyer requirements.
- ✓ If any buyer required the garments have to be metal free, then metal detection machine is used to perform 100 % quality.



Figure: Auditing by QA

Three quality assurance auditors for every sewing floor which is consist of nine sewing line. So that, one auditor for every three sewing line. **Esquire Knit Composite Ltd** has followed the following AQL chart to meet quality.

JC Penney Sampling Plan – Supplier Final Audit

Lot size or Quantity being audited	Acceptable Quality Labels							
	1.5		2.5		4		6.5	
	Inspec tion	Acce ptabl e	Inspec tion	Accept able	Inspec tion	Acce ptabl e	Insp ectio n	Acce ptabl e
Less than 151	8	0	5	0	13	1	8	1
151-280	8	0	20	1	13	1	13	2
281-500	32	1	20	1	20	2	20	3
501-1,000	32	1	32	2	32	3	32	5
1,001-3,200	50	2	50	3	50	5	50	7
3,201-10,000	80	3	80	5	80	7	80	10
10,001- 35,000	125	5	125	7	125	10	125	14
35,001- 1, 50,000	200	7	200	10	200	14	200	21
1,50,001-5,00,000	315	10	315	14	315	21	200	21

5,00,001 and over	500	14	500	21	315	21	200	21
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3.16: Compliance Department

Compliance means an act or process of complying with official requirements and recommendations. In all aspects of life we find rules telling us what are right and wrong - this also goes for the financial world. The rules regulating financial information are much stricter than those applicable to traditional consumer products.

Rules have been adopted in the financial world to ensure that you receive the necessary information to allow you to choose the investment that matches your profile best. Not all investments are equally suited to all investors. Also, the rules must ensure that we as a bank can obtain the necessary information to offer you the best advisory service. Moreover, the rules must prevent money laundering and the financing of terrorism. Therefore compliance excellence is a standard, not a goal for us.

This Transforms Into

- Using common sense.
- Knowing our customers.
- Knowing what we are dealing with.
- Giving clear, fair and not misleading advice.
- Balancing our communication.
- Creating informed basis for your decision-taking.
- Preventing money laundering and the financing of terrorism.

Activities of Compliance Section

- **Compensation and benefits:** Employee benefit organizations provide the human resources professional with valuable insight into the compensation provided by other companies. This knowledge improves employee retention, satisfaction and the company's profits.

Before you join an employee benefits association, it is important to choose an organization that is a good fit. Because most associations charge a membership fee, it makes sense to select the organization that will offer you the most value.

- **Maternity benefits:** This factory always tries to take care of their employees. They give their female employee leave permission for 112 days in their pregnancy period.
- **First aid and medical facilities:** In the event of injury or sudden illness, failure to provide first aid could result in a casualty's death. The employer should ensure that an employee who is injured or taken ill at work receives immediate attention. In EKCL, they have first aid box on every floor with trained person.

- **Fire freighting facilities:** Fire freighting equipment such as hat, rope, technical cloth and other necessary equipments are placed on every floor at definite place which is marked properly.
- **Chemical handling:** Factory has provided all necessary equipment to handle chemical. Because, chemical can be caused of danger for an employee. Without proper protection, it can be harmful for any one.
- **Neat and clean:** They have given proper importance to keep factory floor neat and clean. It's very important to provide clean environment to workers because without this a factory cannot achieved buyer satisfaction.
- **Pure drinking water:** Factory provides pure drinking water to whole factory area to ensure workers health.
- **Welfare:** A welfare officer always presents in sewing floor to keep in touch with workers. Workers can easily share their problems with welfare officer and they try their best to solve it.

3.17: Human Resources Department

Human factor is a vital element in manufacturing industry. It is one of the key factors which drive the company's business towards profitability and growth. In order to ensure the maximum output of the people involved in the business, companies formulate "Human Resources" policies.

Every organization or industry is not only made by brick, cement or wood but it builds by 4 m's i.e.

- **Men.**
- **Machines.**
- **Material.**
- **Money.**

The man is ultimate resources of the organization because they think, speak, so that utilization of this resources is very critical. Every success of organization is depending on efficient and effective manpower. Human resources start when a man enters in the organization and its end, when he leaves the organization. Human resource deals with the human dimension. **EKCL** understands the value of Human Resource. They are conscious about their human resources that are why they maintain an organized **Human Resource Department**.

Location of Department

Esquire Knit Composite Ltd has its human resource department at a n another building which is located at south east part of the factory area.

Contribution Human Resource Management to EKCL

- Helping the organization to search its goal.
- Employing the skills and the activities of the work force efficiently.
- Providing the organization with well trained and well motivated employee.
- Increasing the fullest the employee's job satisfaction.
- Developing and maintaining quality of work life communication.
- Helping to other department and function.

Activities of HR

- **Manpower planning:** Manpower Planning which is also called as Human Resource Planning consists of putting right number of people, right kind of

people at the right place, right time, doing the right things for which they are suited for the achievement of goals of the organization. Human Resource Planning has got an important place in the arena of industrialization. Human Resource Planning has to be a systems approach and is carried out in a set procedure. The procedure is as follows:

- Analyzing the current manpower inventory.
- Making future manpower forecasts.
- Developing employment programmers.
- Design training programs.

- **Recruitment:** The recruitment process is usually the second most expensive HR Process. Just the Training and Development is more expensive than the recruitment and staffing. Human Resources pay for hiring new qualified employees, the visibility on the job market and recruitment surveys. The recruitment process has to be planned, and the expenses have to be monitored closely. The **recruitment planning** is about having a clear outlook of the recruitment agenda for the whole year.
- **Payroll management:** In today's competitive business environment, the payroll professional's role is becoming increasingly more complex. The responsibilities range from payroll management to accounting, legislative and employment standards compliance, employee benefits administration, human resources functions, and more.
- **Training and Development:** Understanding the phenomenon of employee training and development requires understanding of all the changes that take place as a result of learning. As the generator of new knowledge, employee training and development is placed within a broader strategic context of human resources management, i.e. global organizational management, as a planned staff education and development, both individual and group, with the goal to benefit both the organization and employees.
- **Security:** Security is one of the most important jobs for human resource department. EKCL's human resource department has established a strong security system.
- **Earn leave:** If any employee completes one year at EKCL, then he or she will earn money of one day for every 18 days.

3.18: Maintenance Department

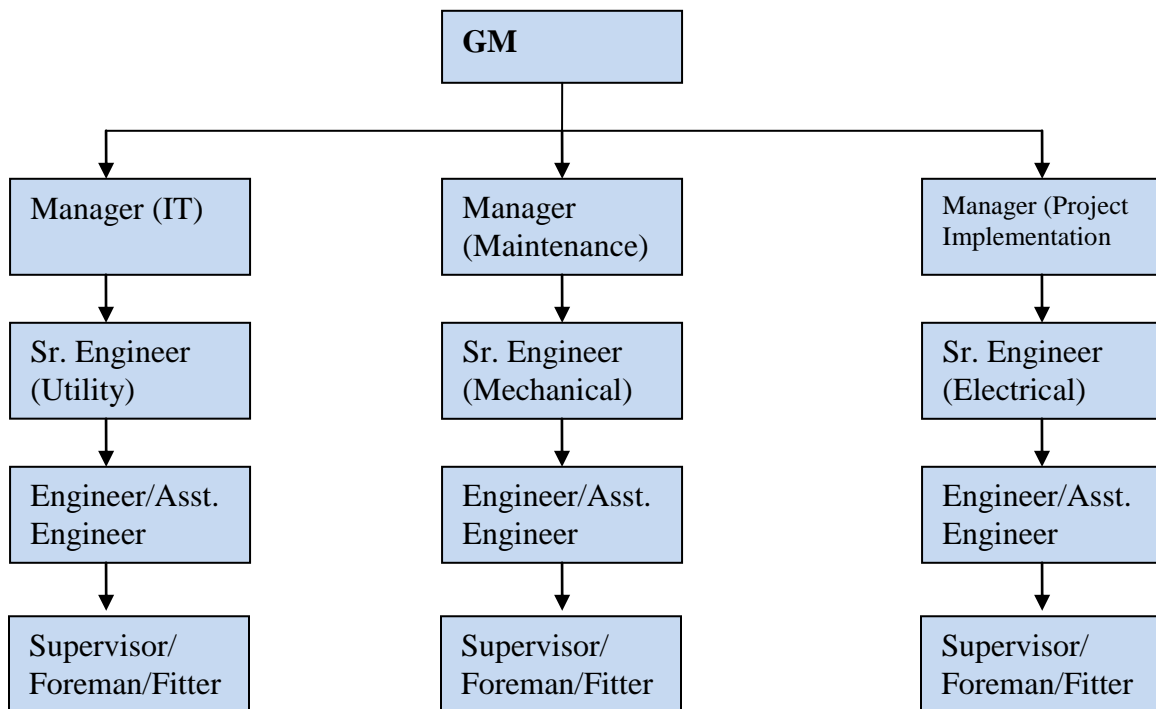
Maintenance plays a very important role for any industry. They have conducted every mechanical operation of this factory. Mechanical service to power supply, everything depends on this department.

Maintenance types :

Generally speaking, there are three types of maintenance in use

- Preventive maintenance
- Corrective maintenance
- Reliability centered maintenance

Organogram of Maintenance Department is given below



Functions of Utility

- To monitor boiler.
- To monitor generator.
- To maintain ETP
- To maintain WTP
- To do project works.

Functions of Mechanical

- Maintain all machines in the factory.
- Do project works.

Effluent Treatment Plant (ETP)

Treatment methods:

The effluent is treated in a number of different levels. These levels are known as preliminary, primary, secondary, and tertiary. The mechanisms for treatment can be divided into three broad categories: physical, chemical, and biological which all include a number of different processes.

Table: Waste water treatment levels and process.

Treatment level	Description	Process
Preliminary	Removal of large solids as rags, sticks, etc	Physical
Primary	Removal of floating and settle able materials such as suspended solids and organic matter.	Physical & chemical.
Secondary	Removal of bio- degradable organic matter and suspended solids.	Biological & chemical
Tertiary	Removal of residual suspended solids/ dissolved solids.	Physical, chemical & biological

Screening:

Screening is a mechanical process that separates particles on the basis of size. There are two types of screening, one is static and another is rotating screens.

Equalization unit:

The process of Equalization unit is to collect and store the waste and allow the waste to mix with air to become less variable in composition and also reduce oxygen demand by oxidizing before pumped to the treatment units at a constant rate.

Ultra high rated solid content clarified (UHRSCC):

Due to use of lime powder, ferrous sulphate and polymer in the UHRSCC there would be some sludge formation in the bottom of the clarifier.

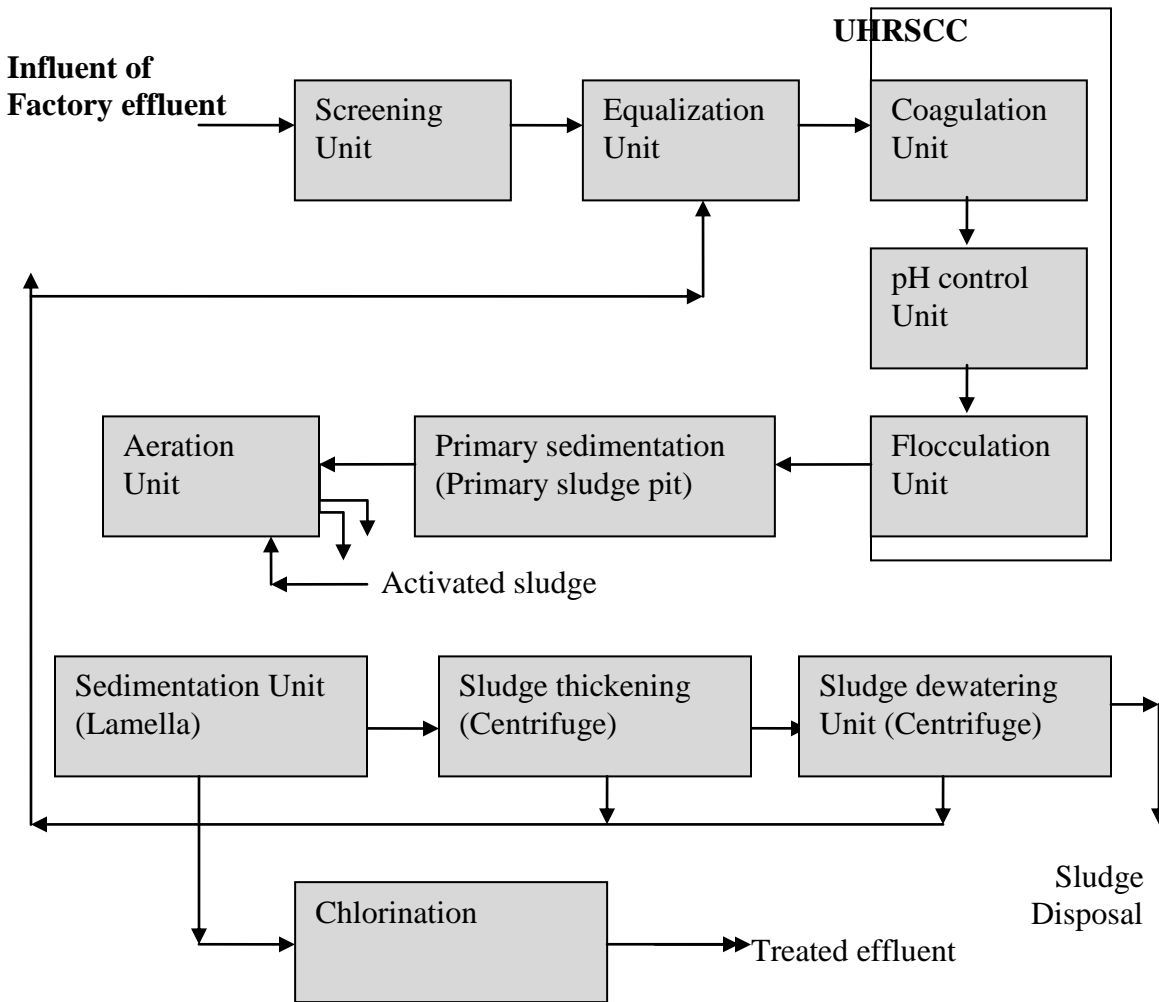
Aeration unit: Aeration is required in biological treatment processes to provide oxygen to microorganisms that breakdown the organic waste.

Lamella clarifier: In lamella clarifier biological sludge settle down and goes to secondary sludge pit. This sludge would recycle to the aeration tank as activated sludge.

Chlorination tank: The purpose of chlorination is to destroy disease-causing microorganism. If the factory waste would have any significant number of pathogens and would release of unchlorinated effluent is unlikely to represent a significant additional health risk.

Sludge treatment: After treatment the raw effluent, sludge come from the primary clarifier and secondary clarifier then the sludge goes to treatment in centrifuge for making solid cake.

Typical flow diagram of a Physio-Chemical and Biological treatment plant n Esquire Knit Composite Ltd and Esquire Dyeing Industries Ltd:



Water Treatment Plant (WTP)

Water treatment plant is placed in front of human resource building. There has several plants in this factory. Almost 12 water treatment plant is available in this industry. Water demand of whole factory supplied from here. They have total twelve tanks which is divided into four plant. Each plant has three tanks.

- 1st tank is called multi grade filter. Rocks are placed in this tank. Different sizes of rocks are given here. Water comes from 450 ft depth of surface and goes to multi grade tank.
- Then it goes to carbon tank. Here, carbonated is done to remove water hardness.
- From carbon filters, water goes to softener tank where resin is applied. From this tank, pure water is supplied to the whole area.

Generator

They have total six generators in their factory. Four is gas generator and two generators are run by diesel.

Boiler

Total number of boiler available in this factory is six. From these six boilers, whole factory area fulfills their requirement.

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Chapter 04

Impact of Internship

4.1: Yarn Dyeing Department

From yarn dyeing department I learn:

- How the yarn is soft wending.
- How the yarn is prepare for batching.
- What type of dyes is used for yarn dyeing?
- How to maintain the temperature and time.
- What types of dryer machine used in yarn dyeing department.

4.2: Knitting Department

From knitting department I learn:

- How many types of knitting machine use?
- What types of fabric are produced?
- Parts of knitting machine.
- Key Accessories used for circular knitting
- Effects of Knitting Parameter in Fabric Production
- Knitting faults.

4.3: Fabric Dyeing Department

From fabric dyeing department I learn:

- Flow chart of fabric dyeing
- Fabric dyeing process
- How to finishing the dyed fabric
- Name of chemical used in fabric dyeing.
- What types of machine used in fabrics finish section
- After dyeing fabric fault.

4.4: Technical and Sample Development Department

From sample development department I learn:

- Flow chart of sample making
- Sample making procedure
- Pattern making procedure
- Marker making procedure
- Types of sample used.

4.5: Industrial Engineering Department

From IE department I learn:

- Objects of IE

- Purpose of IE
- Importance Work study, motion study, time study.
- Lean system,5s
- Operation breakdown.

4.6: Cutting Department

From Cutting department I learn:

- Objects of cutting
- Requirements of Fabric Cutting
- Method of fabric Spreading
- About ply Height
- About cutting machine
- How to numbering & bundling the cutting parts.

4.7: Printing Department

From printing section I learn:

- Different types of printing name
- Flow chart of printing
- Lists of machine used in printing
- Chemical used in printing

4.8: Embroidery Department

From embroidery section I learn:

- What is embroidery?
- Machine name of embroidery.
- Different types of embroidery.
- Working process of embroidery

4.9: Sewing Department

From sewing department I learn:

- Working flow chart of sewing section.
- Different types of sewing machine name.

- Function of sewing machine.
- Different parts of sewing machine.
- Different types of stitch.
- Know about different sewing fault.

4.10: Washing Department

From washing department I learn:

- Flow chart of washing section
- Different machine name used for washing
- Know about types of washing process
- Different types of washing fault

4.11: Finishing Department

From finishing section I learn:

- Responsibilities of finishing room
- Measurement checking garments
- Shade variation checking method
- Oil spot removal
- Get up table
- Label attaching process
- Ironing process
- Packaging process of different types of garments.
- Introducing how to control fabric GSM
- Pre-final inspection
- Final inspection
- Method of packing, cartooning
- Garments inspection system.

4.12: Maintenance Department

From finishing department I learn:

- How to maintenance the factory
- Treatment method of ETP
- Treatment method of WTP
- Electricity, Steam supply procedure.

A large, light green decorative frame with rounded corners and a vertical bar on the left side, resembling a scroll or a callout box.

Chapter 05

Conclusion

Conclusion

EKCL is one of the leading organization in garments exporting field. It is well-organized knit composite factory. They have initiated new projects with new technology round the year. EKCL us determined to ensure worker's right and this a promising company who tries their best to give maximum facility to their workers. They have an organized canteen for labor and a day care centre. They also provide medical facilities and a training school used for training.

The factory transfers their file and other documents by using software and they have taken proper step to train their employee properly. Health and safety issue is very important factor. They have provided pure drinking water for worker and secure sanitation system.

The field promises to continue growing as the research advances and as firms continue to apply new knowledge in their global networks. The time and action plan is very essential for effective management system. Using software is very helpful to utilize daily work for any department.

Workers motivation is very important for IE department at present days. Workers are highly plasticized with negative thoughts. EKCL recently starts a new project for betterment of production and workers which is called Lean set-up. It's known this; every new system takes some time to install it perfectly. So that it also takes time, at the same time, develop the mentality of the worker towards for good and increase productivity by this project should be the ultimate goal of this project. With the increasing of technology, it is very important to increase productivity. Merchandiser is the controller of the specific order. So merchandiser monitors the working progress and other responsibility in accurate time. For effective merchandising management, we need very skill human resource. Today the world market is changing rapidly with strong competition among the suppliers. So merchandising should concentrate on global market to compete with current trade.

Supply chain management is very important in growing market area. Getting materials in right time in right hand is very essential for factory to go for production. They have own supply chain system and they tried their best to reach their goal on time. EKCL can give emphasize on their store management. It is an old trend to keep goods randomly, although they used different shelves for different buyers. But this is not enough to maintain an international standard.

