



Faculty of Engineering
Department of Textile Engineering

REPORT ON

Industrial Attachment

At

Impress Newtex Composite Textiles Ltd.
Gorai Industrial Area, Mirzapur, Tangail.

Course Title: Industrial Attachment Sessional, Course Code: Tex-442.

Section : TEX0321-Titas Project Work (13A), Fall 2022

Submitted by

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Academic Supervised

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Coordinator & Lecturer

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

Advance in Apparel Manufacturing Technology

Duration: From 11 October 2021 to 3 December 2021.

Declaration

Here declaring that, this Industrial Attachment at Impress Newtex Composite Textiles Ltd. is done by me under the supervision of Kamrul Hassan Bhuiyan, Coordinator & Lecturer, Department of Textile Engineering, Sonargoan University (SU), Dhaka. Here declaring that, this Industrial Attachment report has not been submitted anywhere for award, degree or diploma. Ensuring that, any part of this attachment has been presented anywhere.

Md. Shakil Ahmed
TEX1801013109



147/I, Green Road, Panthapath, Dhaka
Department of Textile Engineering

SU/Textile/Int. Letter/2021/Fall/11
Date: 03/10/2021

To
HR Admin Manager
Impress Newtex Composite Textile Ltd.
Gorai, Mirzapur, Tangail

Subject: Request for permission to undertake industrial training in your industry.

Dear Sir,

It is for your kind information that, Sonargaon University (SU) is a private University approved by the Ministry of Education (MOE), & UGC of Bangladesh.
The student(s) named below with the Identification Number is very close to complete 4 years B.Sc in Textile Engineering of Sonargaon University (SU).

As industrial training is one of the important core courses of 4 years B.Sc in Textile Engineering program, therefore the university seeks your kind help and cooperation in order to impart practical knowledge to our students. Duration of this program would be 12 weeks and it is advised to accommodate the students at your production unit from 11th October, 2021.

SL No.	Student Name	Specialized	Student ID	Contact No.
01	Md. Sagor Ahmed	Apparel Manufacturing	TEX1801013070	01771327748
02	MD. Shakil Ahmed	Apparel Manufacturing	TEX1801013109	01720105261

Therefore, I am requesting you to provide them with opportunity to conduct the industrial training in your well reputed industry. It will also be highly appreciated if you kindly consider them for training in your Industry.

Your Co-operation will be highly appreciated.
Thanking you

Kamrul Hassan Bhuiyan
Coordinator
Department Of Textile Engineering. Sonargaon
University (SU).
Cell Phone: 01955-529892

Copy to: For necessary information:
1. Dean, Faculty of Engineering, Sonargaon University (SU).
2. Office Copy.

Letter of Approval

This is to certify that Md. Shakil Ahmed, ID TEX1801013109, BSC Engineering Textile program, 13A Batch have successfully completed his Industrial Internship on Apparel Manufacturing Technology under my supervision. I do hereby approve his report. I also recommend accepting his report for partial fulfillment of Bachelor of Science in Textile Engineering (BSCTE) Degree.

.....

Kamrul Hassan Bhuiyan
Coordinator & Lecturer
Department of Textile Engineering, Sonargaon University (SU), Dhaka

ACKNOWLEDGEMENT

All pleasure goes to the Almighty Allah who has given me the ability and strength to complete this project.

I am grateful to Kamrul Hassan Bhuiyan coordinator & Lecturer of Sonargaon University (SU), Dhaka. Textile Engineering my Academic Supervisor. As well as to Md. Rubel Ahmed, senior executive, AOP in Impress Newtex Composite Textiles Ltd.

At first my gratefulness goes to Almighty God to give me strength and ability to complete this industrial attachment. You have made my life more bountiful May you name be exalted, honored and glorified. Now we wish to take this excellent opportunity to thank a lot of people who have assisted and inspired us in the completion of our training period. We would like to thanks Md. AZAD Hosen, R&D Assistant Manager, INCTL for his continuous advice, encouragement and guide. We would like to thank the management of the Impress-Newtex Composite Textiles Ltd. for giving out opportunity to work on the different sections and helping our in every possible way. Our deepest appreciation goes to beloved respectful brother Mejahul Alam, Jr. Executive, Impress-Newtex Composite Textiles Ltd. for his co-operation to conduct our industrial training. We would like to thank our entire course mate in Sonargaon University, who took part in this discuss while completing the course work. Finally, we must acknowledge with due respect the constant support and patients of our parents during my study.

ABSTRACT

For any technical education, practical experience is almost equal important in association with the theoretical knowledge. By means of practical knowledge it's not possible to apply the theoretical knowledge in the practical field.

Industrial attachment is the first step to professional life of student, especially of technical side. It's an indispensable part of study a practically running processing technology of an industrial unit for a student. University education provides us vast theoretical knowledge as well as more practical attachment, in despite of all these industrial attachment helps us to be familiar with technical support of modern machinery and skills about various processing stages.

This internship provides me sufficient practical knowledge about production management, efficiency, industrial management, pattern, cutting, sampling, washing, Finishing, Costing, purchasing, inventory control, utility and maintenance of machineries and their operation techniques etc. which cannot be achieved successfully by means of theoretical knowledge only.

I am able to study on their different sections and their activities practically. Due to some limitation of the factory, I have found store section, cutting section, sewing section, finishing section and maintenance section, costing section washing section.

Here I have also found the sample section but this section isn't fully operational as here only the Development sample, size set and production samples are produced.

All the activities of this factory are performed according to the central orders of the company.

During my internship I got the opportunity to study on some orders, from order receive to the delivery of the order. With the help of my supervisor I have acquired the knowledge of handling an order, the production procedure and the inspection procedure to maintain the quality of these orders. I have also learnt about the office management of this factory.

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2. Information of the Factory

2.1. Introduction

By means of the practical knowledge it's possible to apply the theoretical knowledge in the practical field. For any technical education practical experience is almost equally important in association with the theoretical knowledge.

The industrial attachment is the process which builds understanding skills and attitude of the performer, which improves his knowledge in boosting productivity and services. University education provides us vast theoretical knowledge as well as more practical attachment, despite all these industrial attachment help us to be familiar with the technical support of modern machinery, stillness about various operation stages.

It also provides us sufficient practical knowledge about production management, productivity evaluation, work study, efficiency, industrial management, production planning and control, production cost analysis, inventory management, purchasing, utility and maintenance of machinery and their operation techniques etc. the above mentioned cannot be achieved successfully by means of theoretical knowledge only. This is why it should be accomplished with practical knowledge in which it is based on industrial attachment makes us reliable to accustomed with the industrial atmosphere & improve courage & inspiration to take self- responsibility.

I have prepared this report as required in completion of my attachment course in regarding guideline given by the university authority which will lead to a strong guideline and milestone for our future carrier.

2.2 Impress-Newtex Composite Textiles Ltd.

Where we completed our Industrial Attachment, is a sister concern of Impress-Newtex Group. It is one of the leading groups of companies in the field of Textile sector of Bangladesh. It has a bunch of organizations under its ownership.

2.3. Impress-Newtex Composite Textiles Ltd.

1. Factory Name : Impress-Newtex Composite Textiles Ltd.
2. Type : Knitting, Dyeing & Garments.
3. Location : Gorai Industrial area, Mirzapur, Tangail
4. Corporate Head office : “Evergreen Plaza” (6th floor) 260/B,
Tejgaon Industrial Area, Dhaka-1208
5. Tel : +880-2-9830329-32
6. Fax : +880-2-9830337
7. Factory : Gorai Industrial area, Mirzapur,
8. Daily Production Capacity: Capable to knit about 5 ton fabrics.

2.4. Vision

1. To be one of the best leading composite mill in Bangladesh
2. To build a true marketing led enterprise with motivated workforce, innovative vision & more value satisfaction & understanding of global market.

2.5. Mission

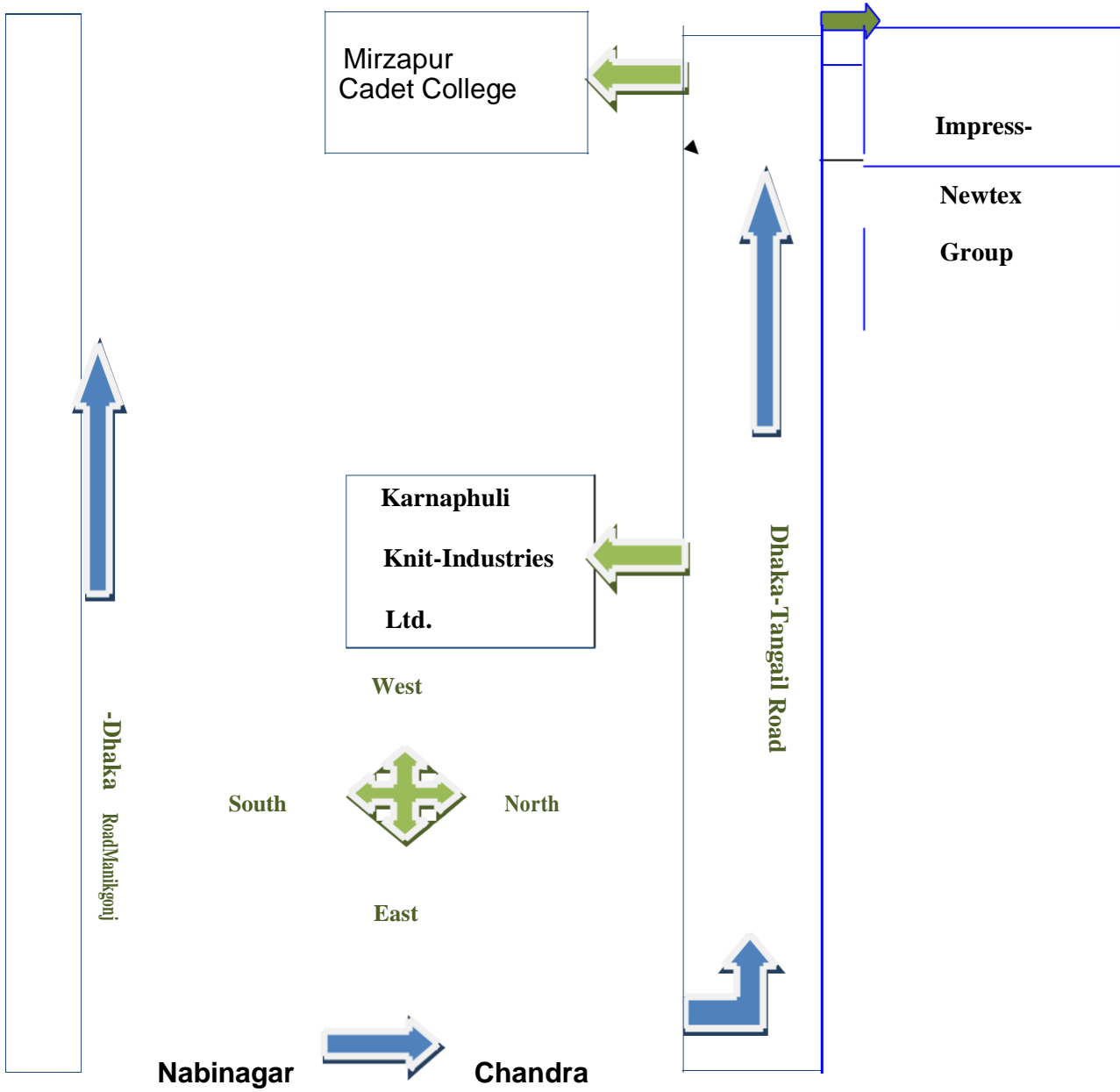
Each of our activities must benefit and add value to the common wealth of our society. We firmly believe that, in the final analysis we are accountable to each of the constituents with whom we interact; namely, our employees, our customers, our business associates, our fellow, citizens.

2.5. Certification & Award: ISO 9001:2008 certified Company



Logo of ISO 9001:2008 Certification Company

2.6 Site Location



2.7. Sister concern of Impress- Newtex Group:



2.8. Major buyer:

1. H&M
2. C&A
3. LIDL
4. COTTON ON
5. NEXT

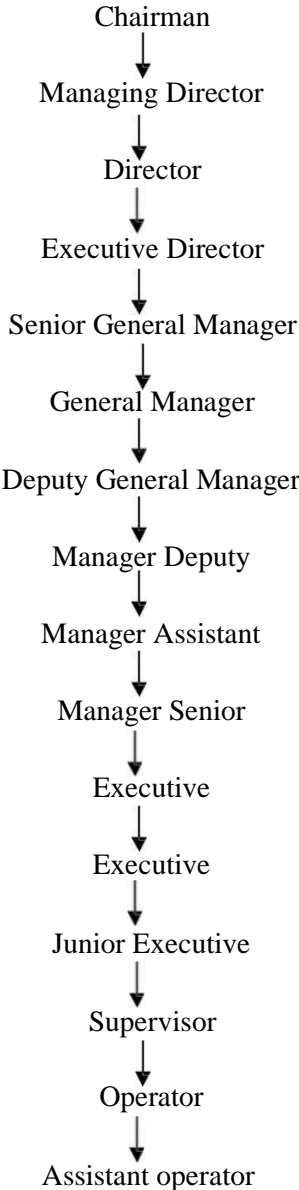
2.9. Logo:



3. Details of the Attachment

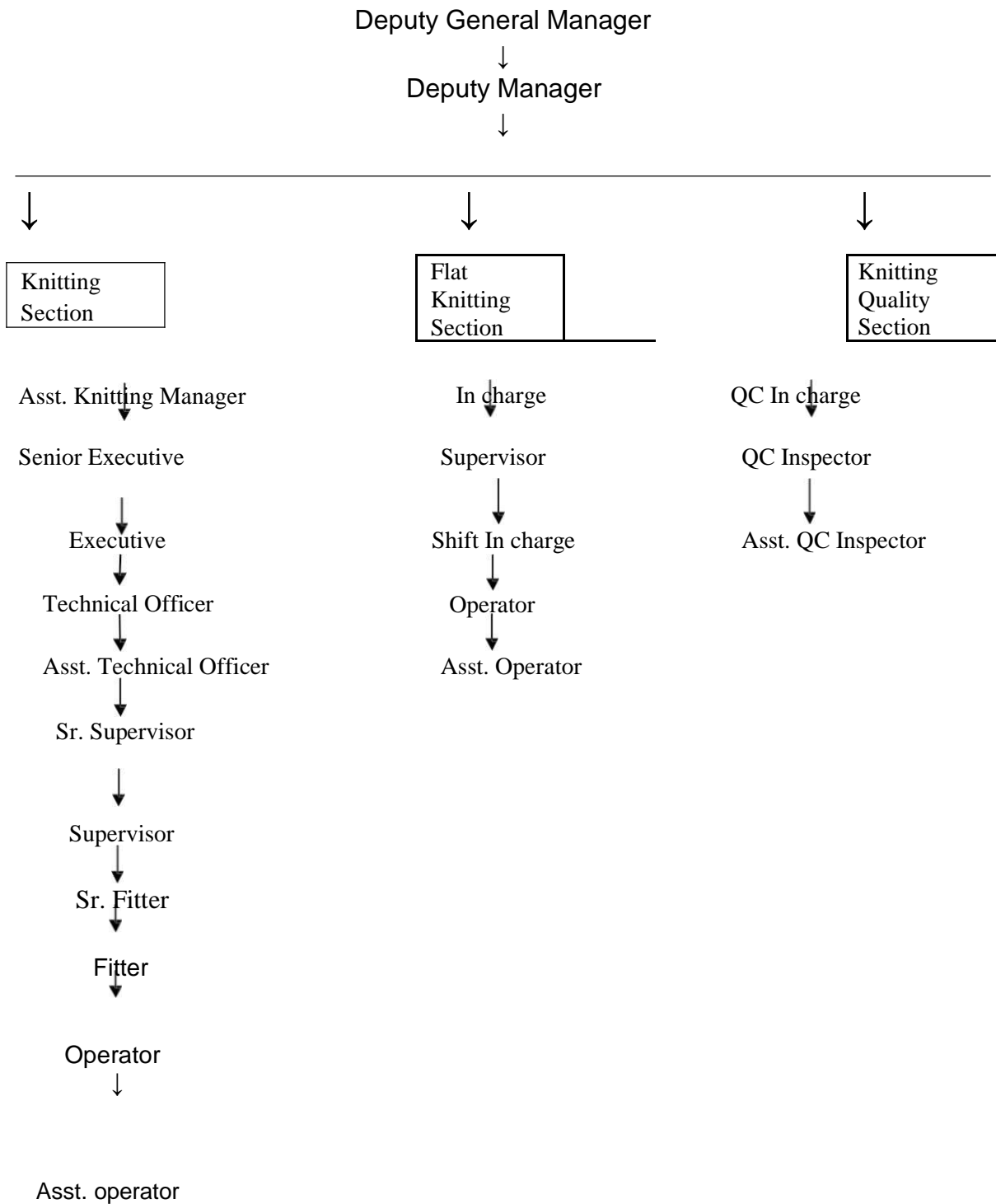
3.1. Organogram of Impress-New-Tex Composite Textiles Ltd.:

Impress-Newtex Composite Textiles Ltd. is well equipped with highly efficient team of management, which is very essential for smooth running of a factory.



3.2. Knitting section

3.2.1. Organogram of knitting section at INTCL:



3.2.2. Man-power Status

Designation	No. of Employees
Deputy General Manager	01
General Manager	01
Asst. Manager	02
Senior Executive	01
Executive	01

3.2.3. Shift Change:

There are three shifts per day in INCTL so each shift contain eight hour.

Shift	Start	End
A	6:00 A.M.	2.00 P.M.
B	2.00 P.M.	10:00 P.M.
C	10:00 P.M.	6:00 A.M.
General	8.00 AM	6.00 PM

3.2.4. Process Definition (Knitting):

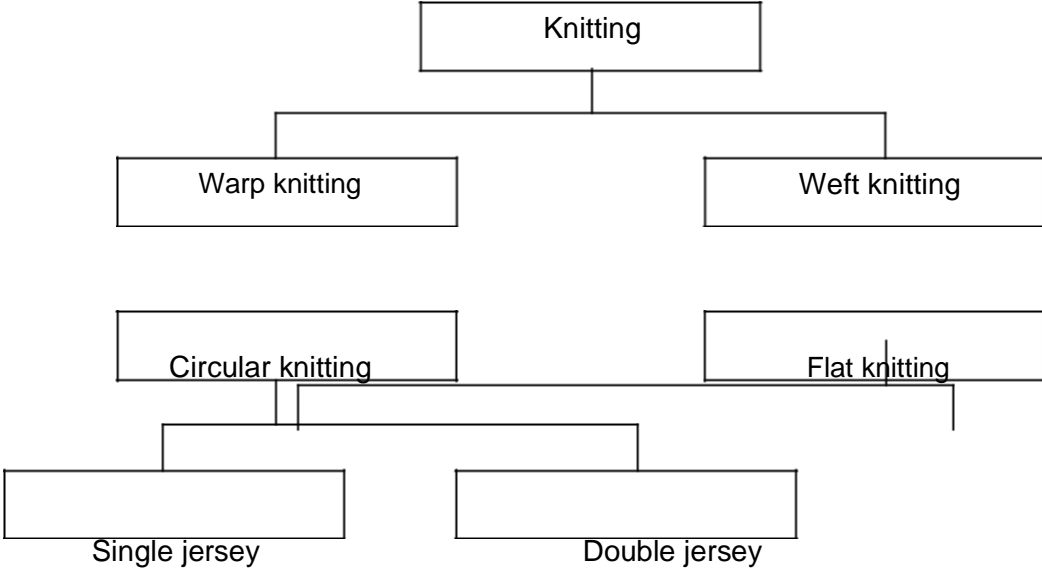
Knitting is considered to be the second most frequently used method of fabric construction, after weaving. It is one of the several ways to turn thread or yarn into cloth. It is similar to crochet in the sense that it consists of loops pulled through other loops. In other words, knitting is the process of construction of a fabric made of interlocking loops of yarn by means of needles. The loops may be either loosely or closely constructed, according to the purpose of the fabric. The loops or stitches are interlocked using a needle which holds the existing loop and a new loop is formed in

front of the old loop. The old loop is then brought over the new loop to form the knitted fabric. Knitting is different from weaving in the sense that a single piece of yarn can be used to create fabric. The knitted fabric consists of horizontal rows known as **courses** and vertical columns of loops known as **Wales**.

Today, knitting is practiced manually, or with the help of machines. Knitted fabric has certain special characteristics that make it suitable for creating a wide range of garments and accessories like tights, gloves, underwear and other close-fitting garments. The structure of the loop of knitted fabric stretches and molds to fit body shapes. The air trapped by the interlocking loops keeps the wearer warm. The popularity of knitting has grown a lot within the recent years owing to the adaptability of various man-made fibers, the increased versatility of knitting techniques and the growth in demand for wrinkle-resistant, stretchable, snug-fitting fabrics (particularly in the range of sportswear and other casual apparels). Today, knitted fabrics form an integral part of hosiery, underwear, slacks, sweaters, suits and coats, rugs and other home furnishing items. Knitting industry has two main divisions:

- One division produces knitted goods for apparel manufacturers, for sewing centers, for consumers and for others.
- Other division produces completed apparel like hosiery and underwear, sweater etc

3.2.5. Classification of knitting section:



3.2.7.1 Types:

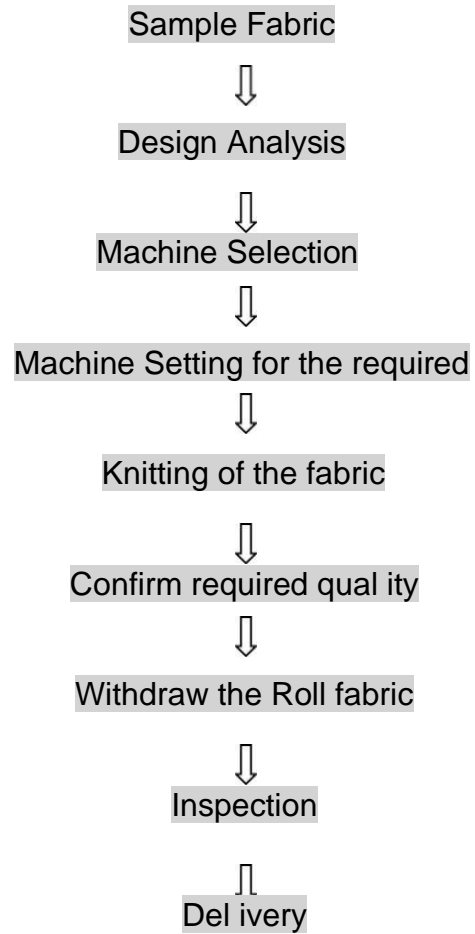
Natural and synthetic, Cellulosic and non-cellulosic all kind of yarn are used as raw materials in this mill. Generally, Cotton, Polyester, Viscose and Nylon are mostly used in knitting departments.

3.2.7.2. Raw materials used:

Fiber composition	Count	Yarn type
Cotton	7, 10, 12, 13, 16, 20, 30	Carded
	16, 20, 30, 40, 50, 60, 80, 100/2, 80/2, 20/2, 30/2, 40/2,	Combed
PC	16, 20, 30, 45	Carded or Combed
CVC	12.5, 20, 30, 38, 40, 45, 26/2	Combed
Viscose	16, 20, 30, 40	Combed
Spandex	20D, 40D	
Polyester	70D, 75D, 100D, 120D,150D	

Table 3.2.7.2. Raw Materials Used

3.2.8. Process flow chart of circular knitting section of INCTL:



3.2.9. Machineries used in Knitting Section

- ✓ Circular knitting machine.
- ✓ Fabric Inspection machine.
- ✓ GSM cutter.
- ✓ Electric balance

3.2.10. Circular Knitting Machine

Total circular knitting machine in this factory 70 pieces.



Picture: 3.2.10.1. Circular knitting machine

3.2.11. Specifications of circular knitting machines of INCTL:

- Origin: Japan
 - Brand: Fukuhara
 - Model: JLS-2
 - Machine No: 081103
 - Needles: 2400
 - Diameter: 32''
 - Feeder: 96
 - Gauge: 24

- Origin: Taiwan
 - Brand: Goang -Lih
 - Model: JOHN/C
 - Machine No: 1026585
 - Needles: 1844
 - Diameter: 25''
 - Feeder: 96
 - Gauge: 24

- Origin: Japan
- Brand: Fukuhara
- Model: JLS-2
- Machine No: 081104
- Needles: 2544
- Diameter: 34''
- Feeder: 102
- Gauge: 24

- Origin: Taiwan
- Brand : Goang -Lih
- Model: JOHN/C
- Machine No: 102043
- Needles: 1656
- Diameter: 22''
- Feeder: 96
- Gauge: 24

- Origin: Japan
- Brand: Fukuhara
- Model: JLS-2
- Machine No: 081105
- Needles: 2544
- Diameter: 34''
- Feeder: 102
- Gauge: 24

- **Origin: Taiwan**
- Brand : Goang -Lih
- Model: JOHN/C
- Machine No: 102660
- Needles: 2220
- Diameter: 30''
- Feeder: 90
- Gauge: 24

- **Origin: Japan**
- Brand: Fukuhara
- Model: JLS-2
- Machine No: 081106
- Needles: 2544
- Diameter: 34''
- Feeder: 102
- Gauge: 24

- **Origin: Japan**

- Brand: Fukuhara
- Model: JLS-2
- Machine No: 081102
- Needles: 2256
- Diameter: 30''
- Feeder: 90
- Gauge: 24

- **Origin: Taiwan**

- Brand : Goang -Lih
- Model: JLS-2
- Machine No: 081101
- Needles: 2256
- Diameter: 30''
- Feeder: 90
- Gauge:24

- Origin: Switzerland
- Brand: Santex
- Model: DXC-35
- Machine No: 0044013
- Needles: 165
- Diameter: 20''
- Feeder: 54
- Gauge: 24

- Origin: Switzerland
- Brand: Santex
- Model: DXC-35
- Machine No: 0044014
- Needles: 1656
- Diameter:

3.2.12 Production of INCTL

3.2.12.1 Description of Production Process in INCTL:

In every mill, there maintains a sequence in production processing. It is also followed in this mill where I was in industrial attachment. The process sequences are in list below:

1. Firstly, knitting manager gets a production sheet from merchandisers as accordance as consumer requirements. Then he informs or orders senior production officer about it
2. Senior production officer informs technical in charge and knows about m/c in which the production will be running.
3. Technical in charge calls for leader of mechanical fitter troops, they two take decision about m/c for production considering m/c condition, production capacity, maintenance complexity etc.
4. Production officer with experienced mechanical fitter adjusts required stitch length And grey GSM (gram per square meter) for required final GSM.
5. Supervisor check daily production regularity and make operators conscious about finishing in due time.
6. Operators operate machine in highly attention as if there were no faults in the fabrics. If he is sure about any fabric fault, then he call for mechanical fitter in duty. Mechanical fitter then fixes it if he can or he informs technical in-charge. He then comes in spot.
7. After required production and final inspection in 4-point system, they are sent in dyeing section.

3.2.12.2 Production parameters:

During production of fabric in circular knitting machine following parameters must be maintain:

1. Machine Diameter;
2. Machine RPM (Revolution per Minute);
3. Number of feeds or feeders in use;
4. Machine Gauge;
5. Count of yarn;
6. Required time (Machine running time);
7. Machine running efficiency.

3.2.13. Yarn count used according to grey GSM:

Name of required fabric	Grey gsm	Finish gsm	Yarn count	Stitch length(mm)	Lycra count(D)	Machine gauge	Machine diameter
Single jersey	90	90	50/s	2.45		24	30
Single jersey	105	120	36/s	2.61		28	30
Single jersey	145	160	26/s	2.77		28	30
Single jersey	185	200	20/s	2.90		20	30
Single jersey	260	275	30/s	3.10		18	30
Single jersey	135	150(silic on finish)	28/s	2.62		24	30
Single jersey (3% viscose)	165	180(after wash 190-200)	24/s	2.74		20	30
Slub single jersey (organic cotton)	100	110	40/s	2.61		24	34
Lycra single jersey	175	190	34/s	3	20	24	30

A/Stripe single jersey	195	210(after peach finish)	18/s	2.96		20	26
Multi feeder single jersey	195	"	20/s	3		24	36
Lycra fleece	245	260/270	30/s	2.8	20	24	30
Lycra F/Terry	225	240	30/s	2.80	20	24	30

1×1 Normal Rib	210	220	28/s	2.70		18	30
H/F Lycra 2×1 Rib	385	400	20/s	2.87	70	18	40
2×1 Rib	225	240	24/s	2.75		18	30
Polo PQ	185	200	26/s	2.60		24	30

Table 3.2.13.1: Yarn count used according to grey GSM

3.2.13.1 Relation between grey GSM and finish GSM:

Finish process/Color shade %	(%) Percent increase/decrease
1) White	15% to 18% increase
2) Light color (0.5% – 2%)	18% to 20% increase
3) Medium color (2% - 3.5%)	20% to 23% increase
4) Deep color (3.5 %– 6%)	23% to 25% increase
5) Extra deep (6%- 9%)	25% to 30% increase

3.2.13.2 Relation between fabric diameter and machine diameter:

Count	Finish GSM	Grey fabric diameter increases than machine diameter
30	142	5-8%
28	155	8-12%
26	165	12-15%
24	180	15-20%
20	200	20-25%

Table 3.2.13.2.1: Relation between fabric diameter and machine diameter

3.2.14. Production calculation:

A. Production/shift in kg at 100% efficiency :(formula)

$$= \frac{RPM \times No.of Feeder \times No.of Needle \times SL(mm) \times 60 \times 12}{10 \times 2.54 \times 36 \times 840 \times 2.2046 \times Yarn count}$$

$$= \frac{RPM \times No.of Feeder \times No.of Needle \times SL(mm)}{3527.80 \times Yarn count}$$

B. Production/shift in meter: (formula)

$$= \frac{Course / min.}{Course / cm}$$

$$= \frac{RPM \times No.of Feeder \times 60 \times 12 \times Efficiency}{Course / cm \times 100}$$

C. Fabric width in meter: (formula)

$$= \frac{\text{Total no. of wales}}{\text{Wales / cm} \times 100}$$

$$= \frac{\text{Total no. of Needles used in knitting}}{\text{Wales / cm} \times 100}$$

D. production calculations are following according to various types of

fabric Fabric Type: Single Jersey Plain

Number of Feeder : 90 R.P.M. of Machine: 30
 Machine Dia : 30 Machine Gauge : 24
 Count of Yarn : 24/1 Ne Stitch Length : 2.74
 Efficiency :85%

$$\text{Production/8 hours shift} = \frac{90 \times 30 \times 60 \times 8 \times 0.85 \times 3.14 \times 30 \times 24 \times 2.74}{10 \times 2.54 \times 36 \times 840 \times 24 \times 2.2046} \text{ Kg}$$

$$= 168 \text{ Kg}$$

Actual production

$$\text{Efficiency} = \frac{\text{Actual production}}{\text{Calculated production}} \times 100\%$$

$$= 138/168 \times 100$$

$$= 82\%$$

Fabric Type: 1 x 1 RIB

No of Feeder: 60 R.P.M. of Machine: 25
 Machine Dia: 30 Machine Gauge : 20
 Yarn Count : 34/1 Stitch length : 2.54
 Efficiency :80%

$$\text{Production/ 8 hours shift} = \frac{60 \times 25 \times 60 \times 8 \times 0.8 \times 3.14 \times 30 \times 20 \times 2.54}{10 \times 2.54 \times 36 \times 840 \times 34 \times 2.2046} \text{ Kg}$$

$$= 96 \text{ Kg}$$

$$\text{Actual production Efficiency} = \frac{\text{Actual production}}{\text{Calculated production}} \times 100\%$$

$$= 83\%$$

Fabric Type: Plain Interlock

No of Feeder: 108

R.P.M. of Machine: 26

Machine Dia: 34

Machine Gauge : 24

Yarn Count : 34/1

Stitch Length : 1.54

Efficiency :80%

$$\text{Production/day} = \frac{108 \times 26 \times 60 \times 8 \times 0.8 \times 3.14 \times 34 \times 24 \times 1.54}{10 \times 2.54 \times 36 \times 840 \times 34 \times 2.2046} \text{ Kg}$$

$$= 147 \text{ Kg}$$

$$\text{Efficiency} = \frac{\text{Actual production}}{\text{Calculated production}} \times 100\%$$

$$= 74 \%$$

E) Stitch length meter measurement for 28 gauge machine:

Length of 4 yarns (35.40,35.65,35.60,34.75) are taken by stitch length meter for 5 revolution.

Then stitch length is calculated as bellow:

$$= \frac{35.40 + 35.65 + 35.60 + 34.75}{4}$$

$$= 35.35$$

$$= \frac{35.35}{5}$$

$$= 7.07 \times 1000$$

$$= \frac{7070}{2640}$$

$$= 2.67 \text{ mm}$$



Figure 3.2-14-1: Measurement with stitch length meter

Calculation of S.L where yarn count = 24

$$\rightarrow S.L = 16.66d$$

$$= 16.66 \frac{1}{28 \sqrt{\text{Count}}}$$

$$= 16.66 \frac{1}{28 \sqrt{24}} = .308 \text{ cm} = 3.08 \text{ mm}$$

F) G.S.M calculation [G.S.M \rightarrow gm/m²]:

GSM means grams per square meter. In knitting fabric it is the main parameter. It is controlled by loop length. If loop length increases GSM will decrease and vice versa. It is measured by GSM cutter & electric balance. It may also be calculated as below.

$$\text{GSM} = \frac{s \times l \times tex}{100}$$

Where,

S = wale per cm × course per cm.

= wpc × cpc.

l = loop length in mm.

$$\text{GSM} = \frac{s \times l \times 590}{Ne}$$

3.2.14.1 Industrial calculation of INCTL:

A) Collect sample (s/j) by G.S.M cutter and weighted from the weighting balance:

e.g.; → form balance we get 1.838g grey fabric

So, Gray G,S.M = $1.838 \times 100g / m^2$

$$= \mathbf{183.8gm/m^2}$$

Calculate Finish G.S.M as like procedure

By calculation finish G.S.M = **235g/m**

B) From finish G.S.M calculating grey GSM, SL, count:

→ Suppose a fabric involve 180 finishes G.S.M

$$\text{So, gray G.S.M} = \frac{\text{Finish G.S.M}}{1.3} = \frac{180}{1.3} = 138$$

$$\frac{\text{So, count}}{\text{F.G.S.M}180} = 4320 = 4320 = 24/s$$

$$\text{So, S.L} = \frac{95351.5}{\text{Count} \times \text{G.GSM}} = \frac{95351.5}{24 \times 138} = 28.78 \text{ cm} = 2.9 \text{ mm}$$

3.14.2 Considerable points to produce knit fabrics:

Before production of knitted fabric, these factors are needed to consider. These includes-

1. Type of Fabric or design of Fabric.
2. Finished G.S.M.
3. Yarn count
4. Types of yarn (combed or carded)
5. Diameter of the fabric.
6. Stitch length
7. Color depth.

3.2.15. Important information:

☛ Germs per Square Meter (G.S.M.):

It is technical term that indicates the weight of the fabric per square meter.

☛ Point Considered While Setting Grey G.S.M.:

1. Enzyme level
2. Color
3. Suided or non- suided

Changing of GSM:

1. Major control by VDQ pulley.
2. Minor control by stitch length adjustment.
3. Altering the position of the tension pulley changes the G.S.M. of the fabric.
If pulley moves towards the positive directive then the G.S.M. is decrease.
And in the reverse direction G.S.M will increase.

❖ **Factors That Should Be Changed in Case of Fabric Design On:**

1. Cam setting.
2. Set of needle.
3. Size of loop shape.

❖ **Effect of Stitch Length on Color Depth:**

If the depth of color of the fabric is high loop length should be higher because in case of fabric with higher loop length is less compact. In dark shade dye take up% is high so GSM is adjusted then. Similarly in case of light shade loop length should be relatively smaller.

3.15.1. Methods of increasing production:

By the following methods the production of knitted fabric can be increased:

1. By Increasing Machine Speed:

Higher the m/c speed faster the movement of needle and ultimately production will be increased. But it has to make sure that excess tension is not imposed on yarn because of this high speed.

2. By Increasing the Number of Feeder:

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

3. By Using Machine of Higher Gauge:

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

4. By Imposing Automation in the Machine:

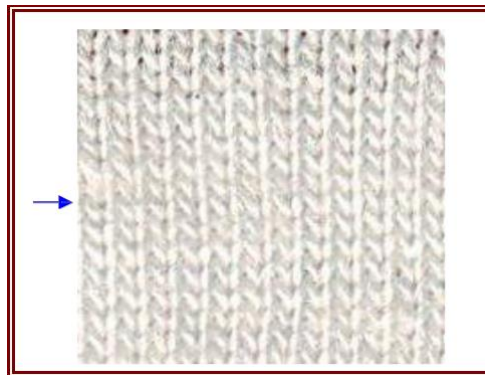
- a) Quick starting & stopping for efficient driving system.
- b) Automatic machine lubrication system for smoother operation.
- c) Photo electric fabric fault detector.

- d) Using creel-feeding system.
- e) Applying yarn supply through plastic tube that eliminates the possibilities of yarn damage.
- f) Using yarn feed control device.

3.2.16. Different types of faults and causes:

A) Thick yarn course:

Sample:

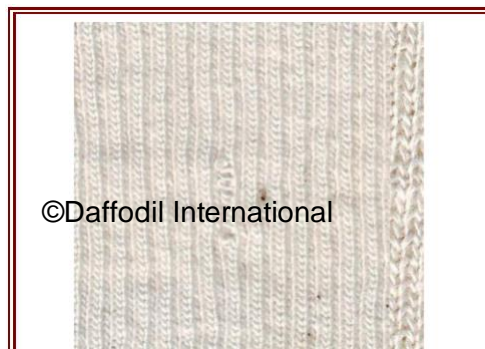


Causes:

- lot mixing
- Negligence of worker etc.

B) Hole:

Sample:

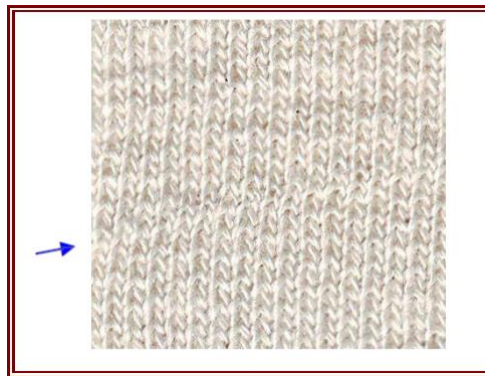


Causes:

- bad needle
- knots in yarn
- take down mechanism too tight
- high tension on the yarn
- Bad yarn etc.

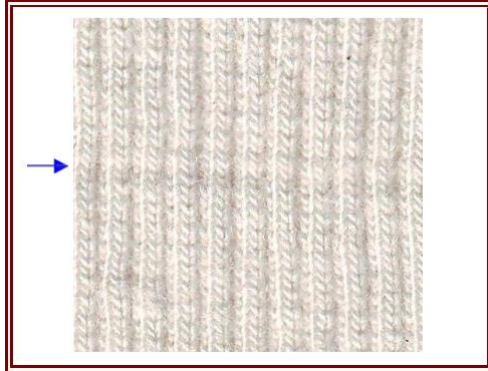
C) Missing yarn:

Sample:



Causes:

- Yarn breakage
- Faulty stop motion etc.



Causes:

- Incorrect position of yarn guide
- Improper sinker ring setting etc.



Causes:

- Uneven dial & cylinder relationship
- Lot mixing
- Yarn count mix etc.

F) Sinker mark:

Sample:

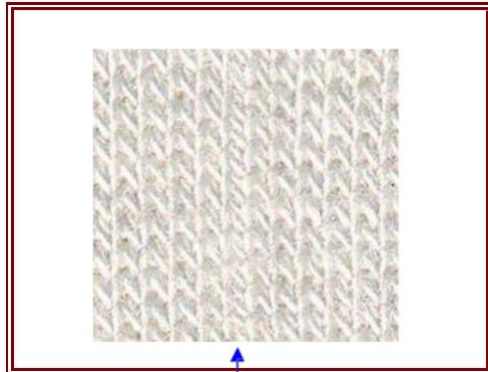


Causes:

- Old sinker
- Sinker mixing
- Dust in sinker ring etc.

G) Needle

line: Sample:



Causes:

- Bad needle
- Needle mixing
- Dust in needle track etc.

H) Drop stitch:

Sample:



Causes:

- Bad needle latch.
- Incorrect feeder setting etc.

3.2.17. End products of knitting machine:

Single Jersey M/C:

- ✓ Single Jersey Plain
- ✓ Single Lacoste
- ✓ Double Lacoste
- ✓ Single Pique
- ✓ Double Pique
- ✓ Baby Terry
- ✓ Three Thread Fleece
- ✓ Lycra Single Jersey
- ✓ Lycra Single Lacoste

Double
Jersey M/C:

- ✓ 1*1 Rib
- ✓ 2*1 Rib
- ✓ 1*1 Lycra Rib
- ✓ 2*1 Lycra Rib
- ✓ Flat Back Rib

3.2.18. Grey Fabric inspection:

Inspection refers to an investigation process of accepting or rejecting the final finished fabric from the bulk. It is an observation process of finding out each & every visible fault in the fabric.

3.2.18.1 Process of grey fabric inspection:

Set fabric roll in machine



Run the machine



Check the faults



Record the faults



Accept/Reject



Send for next process



To detect and identify the fault in fabric by the knitting, visual assessment on inspection machine.

3.2.19. Fabric Inspection Machine



Picture: 3.2.19.1 fabric inspection

3.2.19.1 Following faults are detected:

Faults:

H= Hole

DS= Drop stitch.

NL = Needle line.

TT = Thick & Thin yarn.

SM = Sinker Mark.

OS= Oil stain

WD=Wrong Design

S = Stripe

S = Slub

WP=Wrong Ply, etc.

BN= Broken needle

PH= Pin Hole

TC= Tight Course

MY= Missing Yarn

3.2.19.2. Four – point system:

Size of defect	Penalty
3 inches or less	1 points
over 3 but not over 6	2 points
Over 6 but nor over 9	3 points
Over 9 inches	4 points

Table 3.19.4 Four – point system

3.2.19.3 Acceptance calculation:

Total point per 100 square yards

$$= \frac{\text{Actual points counted}}{\text{Actual Roll length} \times \text{Actual width}} \times 36 \times 100$$

= Points/100 square yards.

3.2.19.4. Classification of Inspection Fabric:

< 40 points = A 41-

60 points = B 61-

80 points = C

80 above = Reject.

3.19.5 Acceptance:

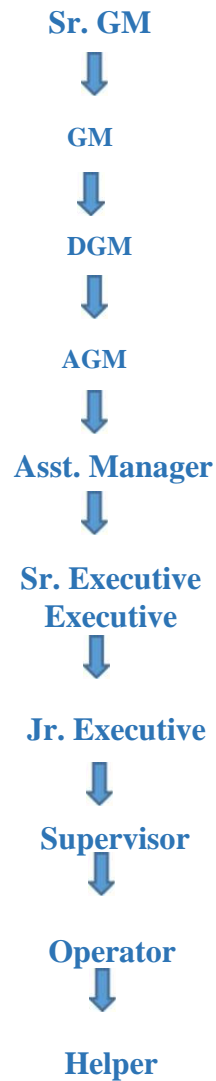
Generally any piece of fabric with 40 points or less faults per 100sq. yard is allowed to pass however for a roll, the average value should not exceed 18point per 100sq.yard. More than 40points faults per 100sq yard is recorded as "REJECT"

3.3. Dyeing Section

3.3.1. Layout



3.3.3. ORGANOGRAM



3.3.4. Batching

Batching is the process to get ready the fabrics which should be dyed and processed for a particular lot of a particular order.

Function or Purpose of Batch Section:

- To receive the grey fabric roll from knitting section or other source.
- Turn the grey fabric if require.

- To prepare the batch of fabric for dyeing according to the following criteria –

- Order sheet (Received from buyer)
- Machine Capacity
- Machine Available
- Dyeing shade
- Emergency

- To send the grey fabric to the dyeing floor with batch card.

- To keep records for every previous dyeing.



Machine Specification of Batch Section

Machine Name	: Air turning m/c
Brand Name	: Taida
Origin	: Korea
Model	: DNAT
M/c Speed	: 300-500m/min
Max up clothing	: 150 kg



Fig: 3.3.4.1 Air turning machine

3.3.5. Dyeing

A process of coloring fibers, yarns, fabrics or garments with either natural or synthetic dyes under specified conditions. Dyeing is normally done in a special solution containing dyes and particular chemical material. After dyeing dye molecules have uncut chemical bonds with the fiber molecules.

Two key factors of dyeing

1. Temperature and
2. Time controlling

- Total bulk machine= 24
- Total sample machine= 22
- Total machine capacity= 32800 kg
- Total dyeing capacity= 31 ton per day

3.3.6. Dyeing Machine specification (Bulk)

M/c no.	Type	Brand	Origin	Capacity (kg)
01,08	High Temperature, High Pressure	SCLAVOS	Greece	150
02	High Temperature, High Pressure	SCLAVOS	Greece	300
03,04,05	High Temperature, High Pressure	SCLAVOS	Greece	250
06,12,19	High Temperature, High Pressure	SCLAVOS	Greece	500
07,13,20	High Temperature, High Pressure	SCLAVOS	Greece	600
09	High Temperature, High Pressure	Fong's	China	1000
10	High Temperature, High Pressure	SCLAVOS	Greece	900
11,15,16	High Temperature, High Pressure	SCLAVOS	Greece	1000
14,22	High Temperature, High Pressure	SCLAVOS	Greece	1500
17,18,23	High Temperature, High Pressure	SCLAVOS	Greece	750
21	High Temperature, High Pressure	SCLAVOS	Greece	1200
24	High Temperature, High Pressure	SCLAVOS	Greece	1800

3.3.7. Dyeing Machine specification (Sample)

M/c no.	Type	Brand	Origin	Capacity (kg)
01,02	High Temperature, High Pressure	SCLAVOS	Greece	70
03	High Temperature, High Pressure	Fong's	China	5
04	High Temperature, High Pressure	SCLAVOS	Greece	15
05	High Temperature, High Pressure	SCLAVOS	Greece	20
06	High Temperature, High Pressure	SCLAVOS	Greece	30
07	High Temperature, High Pressure	SCLAVOS	Greece	50
08	High Temperature, High Pressure	Fong's	China	50
09	High Temperature, High Pressure	Fong's	China	10
10	High Temperature, High Pressure	Tonjong	Taiwan	10
11	High Temperature, High Pressure	Tonjong	Taiwan	50
12	High Temperature, High Pressure	Tonjong	Taiwan	30
13	High Temperature, High Pressure	Tonjong	Taiwan	15
14	High Temperature, High Pressure	Tonjong	Taiwan	15
15	High Temperature, High Pressure	Fong's	China	10
16	High Temperature, High Pressure	Fong's	China	30
17	High Temperature, High Pressure	Fong's	China	30
18	High Temperature, High Pressure	Fong's	China	30
19	High Temperature, High Pressure	SCLAVOS	Greece	50
20	High Temperature, High Pressure	SCLAVOS	Greece	50
21	High Temperature, High Pressure	SCLAVOS	Greece	80
22	High Temperature, High Pressure	SCLAVOS	Greece	80

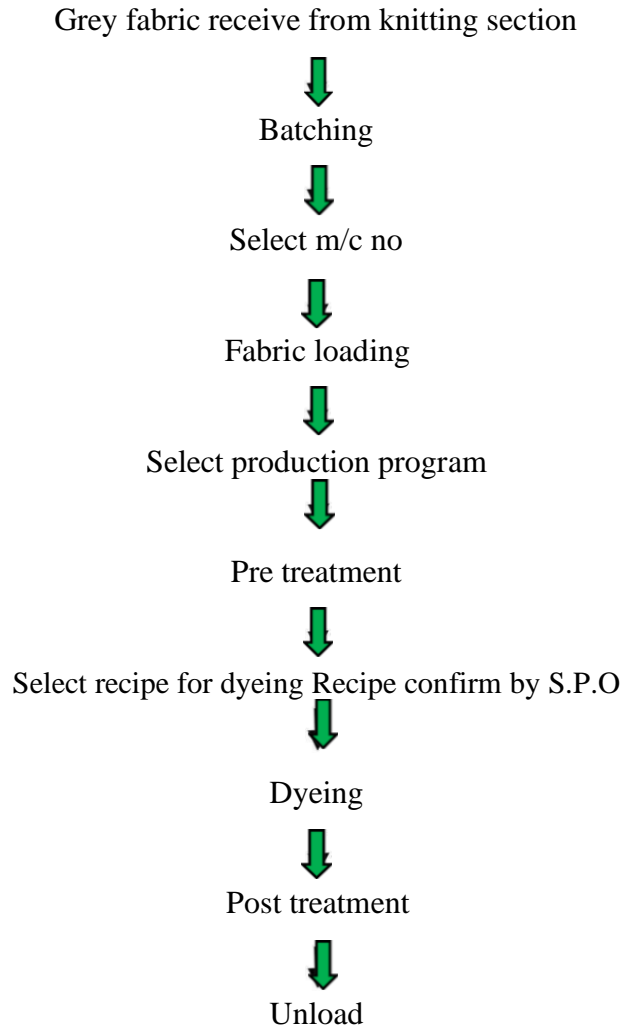
3.3.8. Dyeing Parameter

P^H level for different Operation

- Bleaching bath pH: 10.5 – 11
- Neutralization or after bleaching pH : 5.5 – 6.5
- Bio polishing bath pH : 4 -4.5
- Initial dye bath pH : 5– 6
- After salt addition pH : 6.5 – 7.5
- After alkali addition pH : 10.5 – 11.2
- After dyeing pH : 5.0 – 6.0
- Fixation bath pH : 4– 4.5

- Softener bath pH: 5.5 – 6.0 (For white)

3.3.9. Flow Chart for Dyeing



Raw materials for dyeing:

Raw materials used in the dyeing section are:

- Grey fabrics
- Chemicals
- Dyes

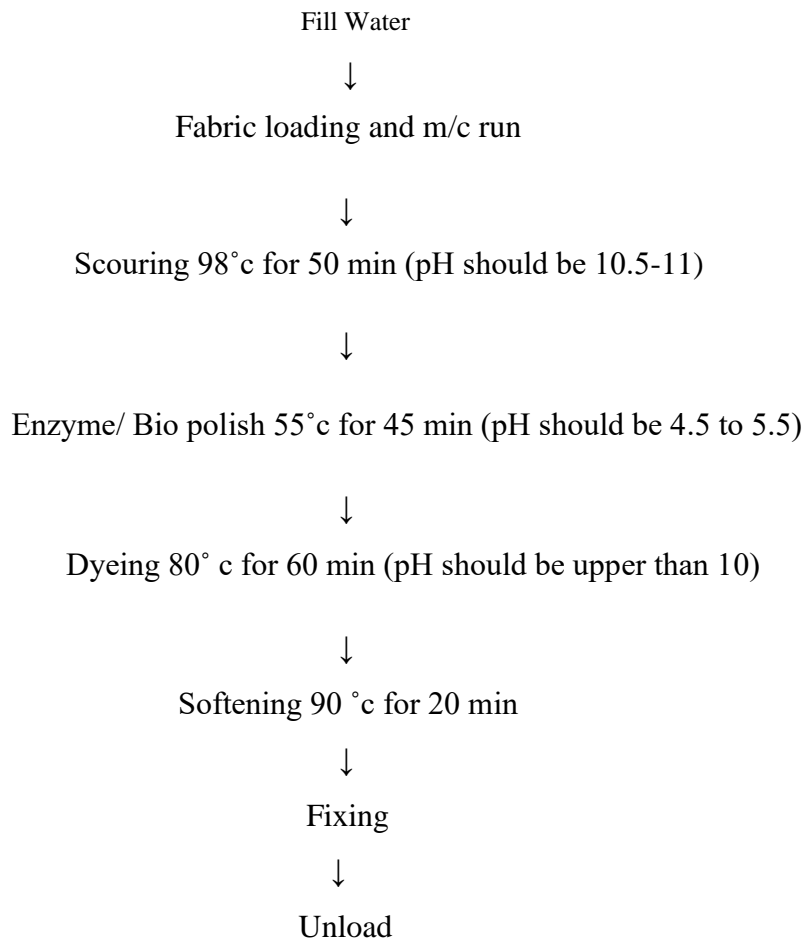
3.3.10. Different types of chemicals used in INCTL with their function

Aids	Chemicals name
General Chemicals	Soda ash
	Caustic
	H ₂ O ₂
	Hydroses
	Antifoam-39
	Gluber salt(anhydroses)
Acid	H ₂ SO ₄
	Acetic Acid
	Formic Acid
	Invatex AC
	Oxalic Acid
Cat-ionic softener	Aikamine CWS
	Sun Soflon FK-21
Non-ionic (white)	Sun SofterA300
	SupamineFPS
Anticrease	TexportD-900
	Ciba Fluid C
	Texport GL-500
Wetting Agent	Invadine DA
	Sun Morl CK-1
	SandocleanPCLF
Fixing Agent	Neofix R-250(FDR)
	cibatex ECO
Buffer	AmoniumSulphide
	cibatex AB-45
Soaping Agent	Alcosper Ad
	Lipotol PS-60
	SadopurRSk
Sequestering Agent	Invatex CS
	Neocrystal BGS
	Sirrix 2Ud
Leveling Agent	Cibacel DBC
	Neocrystal 200B
	Drimagin E2R
	Lyoprint RG
	setamal BL

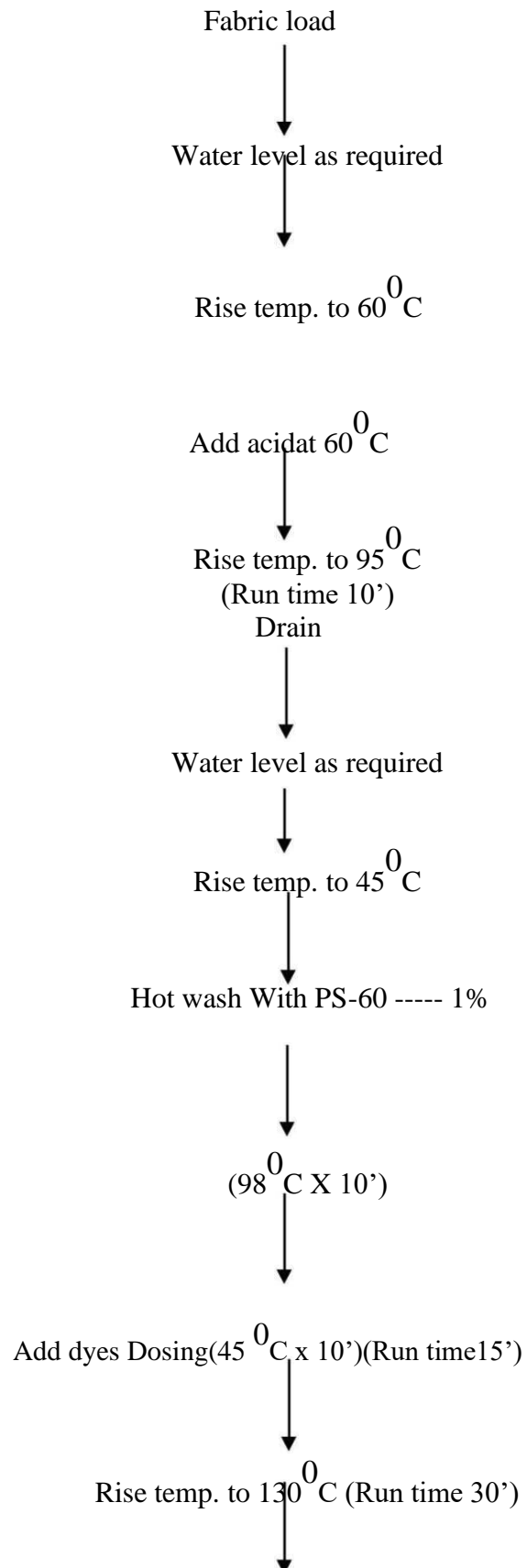
3.3.11. Required Time for different Dyeing Purpose

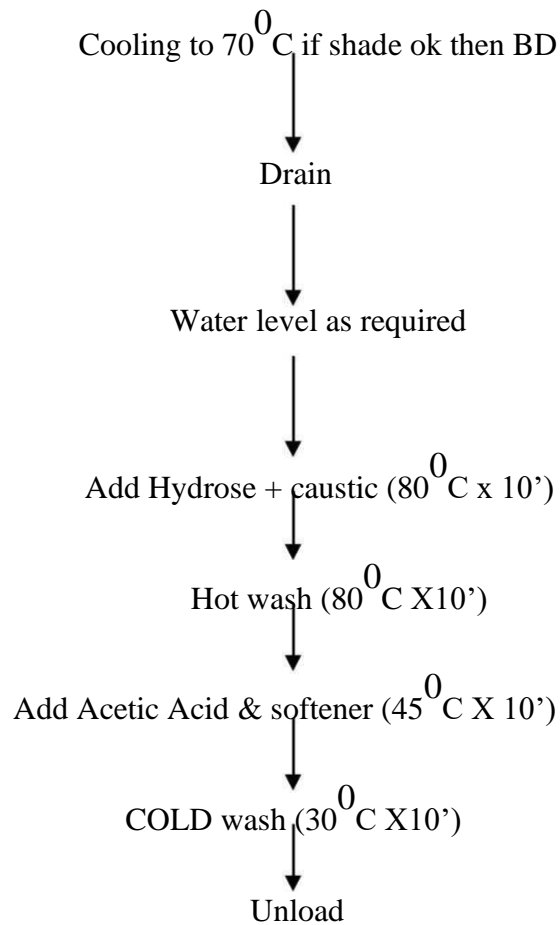
- Average Color → 8 hours
- Double Part Dyeing → 12 hours
- Only Polyester Dyeing → 7 hours
- White Dyeing → 3 hours
- Pigment Dyeing → 12 hours
- Turkish color Dyeing → 10 hours

3.3.12. Typical Process Flow Chart of Cotton Dyeing



3.3.13. Typical Process Flow Chart of Polyester Dyeing





3.3.14. Finishing section

Textile finishing is a term commonly applied to different process that the textile material under go after pre-treatment, dyeing or printing for final betterment to enhance their attractiveness and sale appeal as well as for comfort and usefulness.

Finishing can be done for getting the following purposes.

To improve fabric attractiveness.

- By modification of fabric appearance (Calendaring, Optical brightening)
- By altering fabric handle (Softening, Stiffening)
- Control of fabric dimension (Sanforising, Compacting)

- Protection of fabric (Flame proofing, Water proofing)
- Improved performance (Water repellency, Raising)

- Easy care properties (Resin finish, Crease recovery)

After dyeing, knit fabric is required to finish. During dyeing all knit fabric are dyed in tubular form. According to buyer's requirement knit fabric are finished in open form or tubular form.

Types of finishing:

a. Chemical finishing:

Chemical reaction of auxiliaries with fibers

Application of the handle modifying products / additives.

b. Mechanical finishing:

Mechanical treatment with machines.

3.3.15. Machine Specification of Finishing Section

Tumble Dryer

- Brand name : PMD
- Origin : Taiwan
- Model : TD-300
- Maximum Temperature : 120° c

3.3.16. Slitting machine

There is 4 slitting - machine-

- Brand name -
- Origin -
- Pressure -
- Speed -



Fig: 3.3.16.1. Slitting machine

Important parts:

- Twist Direction
- Cutting knife/device

Main Function of Slitting m/c

- To open the fabric tube of fabric
- Wash the fabric
- Dewatering

Controlling Points

- Pressure: The padder pressure should be according to requirement (7 bar)
- Speed: The speed should be optimum (30-80 m/min)

3.3.17. Stenter Machine

Brand Name : Burckner

Model No : Platinum

Origin : Germany

Speed : 5 – 40 m/min

Over feed : 40% max

Chamber : 8

Burner : 8×2

Blower : 8×2

Temperature range : 100 – 300° C

Important parts

- Burner
- Exhaust air fan
- Suction Fan
- Overfeed Roller
- Nozzle
- Chain arrangement

Fig: 3.3.17.1.Stenter Machine

The basic functions of the stenter machine:

- To control width
- To control GSM
- To control shrinkage
- To control spiral
- Drying of fabric
- To remove edge curl of the fabric
- To remove the crease mark of the fabric
- To remove the hardness of the fabric
- To increase the better shade properties

3.3.18. Compactor machine

Specification

- Brand name : Lafer
- Origin : Italy
- Speed : 15-20 m/min
- Over feed : 7% maxi
- Temperature : 100° c- 150° c



Fig: 3.3.18.1. Compactor machine

Important parts:

- Overfeed roller
- Blanket
- Steam Sprayers
- Teflon Covers

The basic functions of the Open compactor machine:

- To control the GSM. (Increase & decrease).
- To control the dia.
- To control the shrinkage. (Increase & decrease).

3.3.19.1. Common dyeing faults with their remedies

SL	Types of Fault	Sources	Remedies
1	Crease mark	From improper storage or dyeing process	More attention in storage and wet process
2	Oil spot	Mostly from knitting	More attention and preparation requires during production
3	Dirty spot	Mostly from dyeing and finishing	More attention and preparation requires during production
4	Softener spot	Mostly from dyeing	Need to control wet process correctly
5	Uneven dyeing	Improper color dosing	Proper color dosing and proper pre-treatment

3.3.20. CPB dyeing:

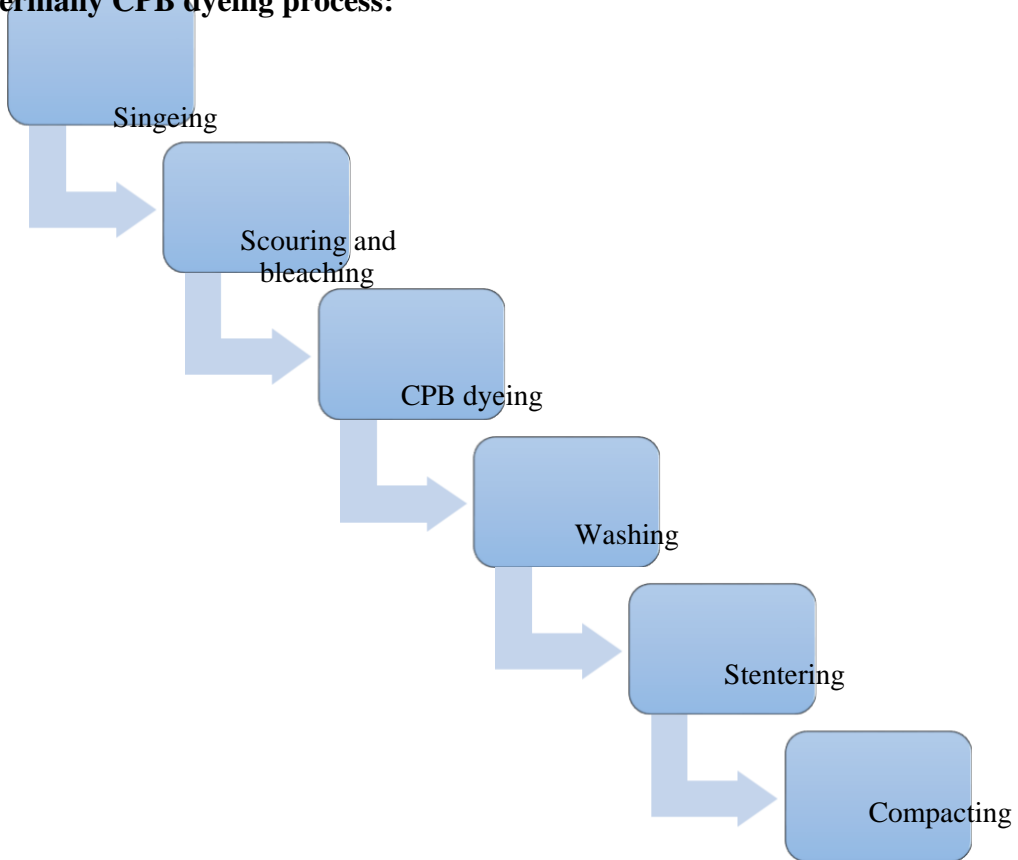
CPB means Cold Pad Batch. Cold Pad Batch dyeing technology achieves 13% carbon savings and over 50% water savings in fabric manufacturing compared with the conventional exhaust dyeing. Ecological sustainability demands are constantly rising, especially with regard to the consumption of water and energy. Cold Pad Batch (CPB) dyeing is one of the most economical and environmentally friendly approaches in the textile industry.

Many methods are used for dyeing cotton with reactive dyes, but the CPB method is relatively more environment-friendly due to high dye fixation and non-requirement of thermal energy owing to low bath ratio (M: L = 1:1) required for the process. It is a widely used technique for the semi-continuous dyeing process.

3.3.21.1. No of machine: 1

Manufacturer: ERBATECH,

Germany CPB dyeing process:



Main parts:

- Centering roller.
- Expende roller.
- Mip

Brand name of thre Dyes used:

- Kaizer
- IRISH Liz fashion
- KDS
- Networks

Function:

- Cost effective process with a very high level of reproductivity.
- No salt and steam is required.
- Higher fixation rates.
- Cellulosic fabric is dyed with ractive dye.
- 50% water saving as ratio of M:L = 1:1.

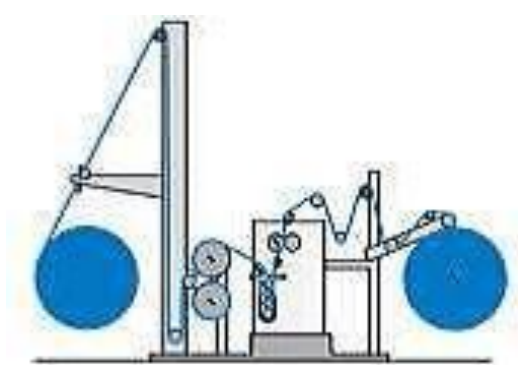
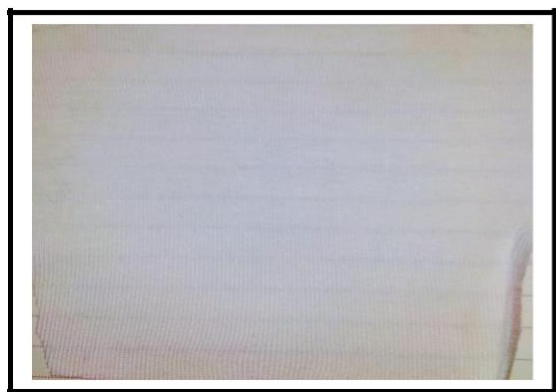


Fig: schematic diagram of CPB machine.



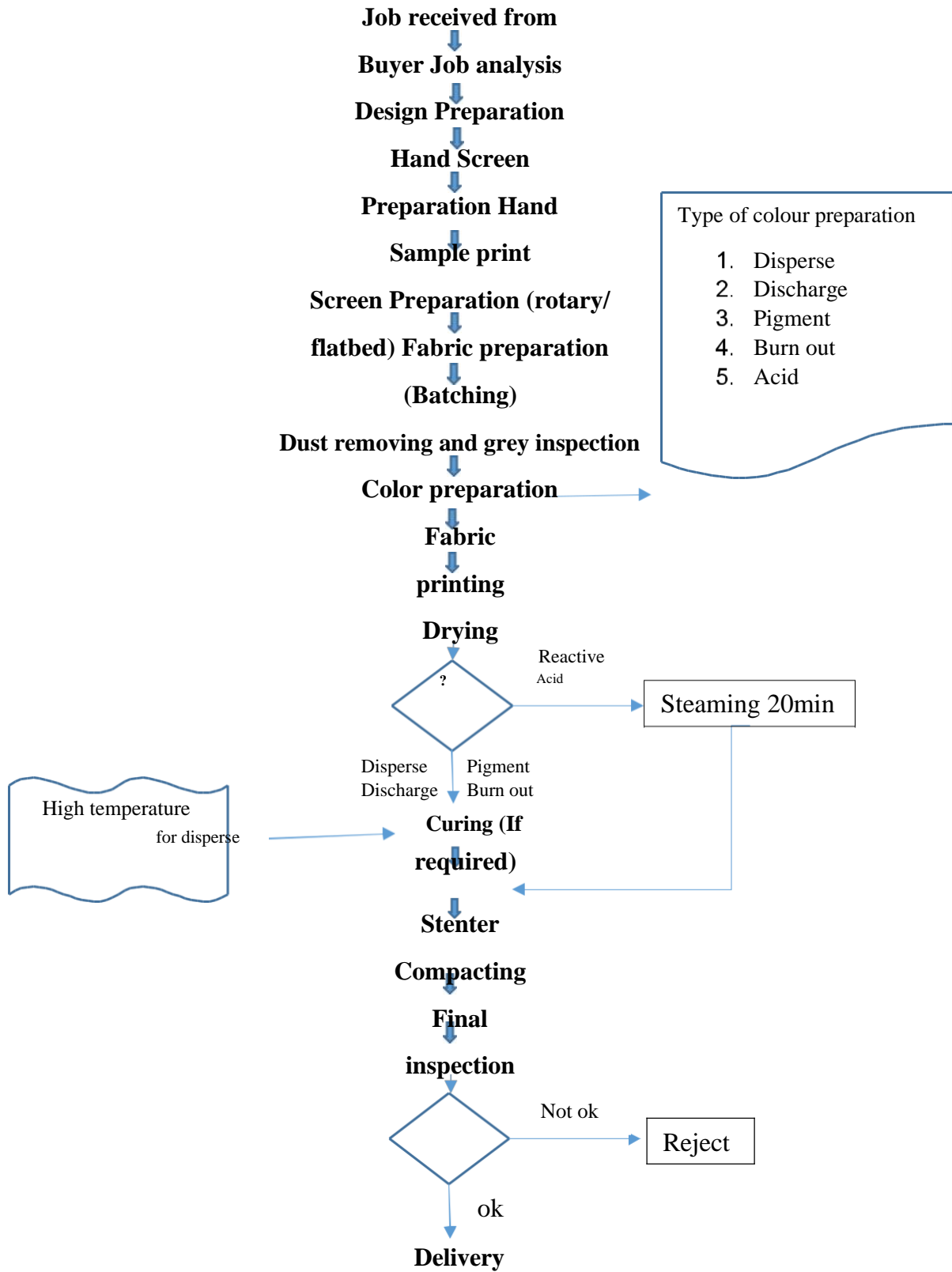
Before



After

3.3.21. Printing

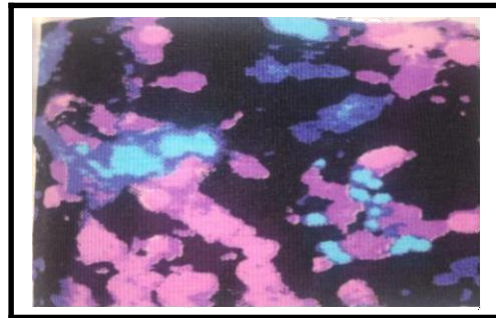
Process Flow chart of AOP (All over printing)



1. **Pigment – Any fabric**
2. **Reactive – Cotton**
3. **Discharge – Dyed fabric**
4. **Burn out – CVC/Pc**
5. **Glitter – Any fabric**

Pigment paste

Binder = 10-25%
 Fixer= 1-2%
 Thickner= 3-4%
 Uria= 5%
 Softener=1%
 LAmunia=1%
 Glysarín= 1%
 Print>Curing>Finishig



Reactive Paste

Sodium Alginate Powder 4% have to wet for few min. Sodium Carbonate= 4%
 Resi Salt= 1.5%
 Soda Ash= 1%
 Urea= 15%
 Print>Steam>Wash>Finih



Discharge Paste

DC-300 + DC 35 = 95%
 Discharge Agent= 5%
 Print>Curing>Wash>Finishig



Burnout Paste

Guar Gum Powder= 4% Burn
out agent= 25% Detergent= 2%
Print>Curing>Wash>Finishing



Glitter Paste

Glitter paste
EGP=70% Pigment
Paste=25% Golden-
Glitter=5%



3.4.3. IMS maintains three method,

1. QMS – Quality management system (ISO 9001)
2. EMS – Environmental management system (ISO 4001)
3. Occupational health and safety assessment system (OSHAS 18001)

The lab is also OEKO-TEX (APPENDEX 6) certified. This certification say that

- Every chemicals are hazardous free.

3.4.4. Audit system:

- 1st party – Employee
- 2nd party – Buyer
- 3rd party – others

Now I will describe the lab section of Impress-New-Tex Composite Textiles Ltd. Firstly I describe about the physical tests after complete physical tests I will describe about chemical tests and procedure.

3.4.5. Equipment for physical test:

1. Tumble dryer
2. Dimensional stability test
3. PH meter
4. Perspiro meter
5. Washing machine
6. Crock meter
7. Yarn count tester
8. GSM cutter
9. Pilling tester

3.4.6. Some common tests are given below:

1. Color fastness to wash
2. Color fastness to water
3. Color fastness to perspiration
4. Color fastness to rubbing
5. Color fastness to light
6. Saliva
7. Sweat
8. Dimentional stability to washing (shrinkage)
9. Appearance
10. Sprality (sewing to sewing straight)

11. Pilling
12. Bursting strength
13. Yarn test (count, twist)
14. PH
15. Nickel release

3.4.6.1 Color fastness to light

Brand: ATLAS, XENO test 150

- Inside this light box, xenon light is used to get sunlight for color test.
- Here 8 types blue wool fabric is used
- Humidity is 40 %
- Sample size 10/45 mm
- Here mounting card is used to set fabric
- Time standard for color fading
- Used 4 grade blue wool
- Color is changed after 15 hours
- After test sample is rating by blue wool fabric.

3.4.6.2. Color fastness to washing (ISO 105C06)

- Model : Electrolux W555H
- It is front loaded washer extractor
- Maximum capacity 6kg/ 13lb
- Dimension: height 850mm, width 595mm , depth 680 mm
- Net weight 99kg

Instrument

- Rota wash
- Stainless still ball (.6 mm dia)
- Multifibre fabric
- Grey scale
- Color matching cabinet

Chemical

- sodium per borate
- ECE Phosphate

Sample

- Sample fabric 10/4 cm
- Multifiber fabric 10/4cm

In washing, temperature required 40 degree, 50 degree, 60 degree. 150 ml solution needed for 1 specimen (PH 5-7.5). After washing sample is dry at 60 degree temperature.

Dimension stability to wash

Here three methods are applied,

- ISO 6330
- ISO 3759
- ISO 5077

- Temperature required 40 degree 50 degree, 60 degree

- Highest 2 kg sample is washed.

- 3 types blast is used 100% polyester, 100 % cotton and silk

- ECE detergent used normally 20 gm

3.4.6.3. Color fastness to water

Here two methods are used

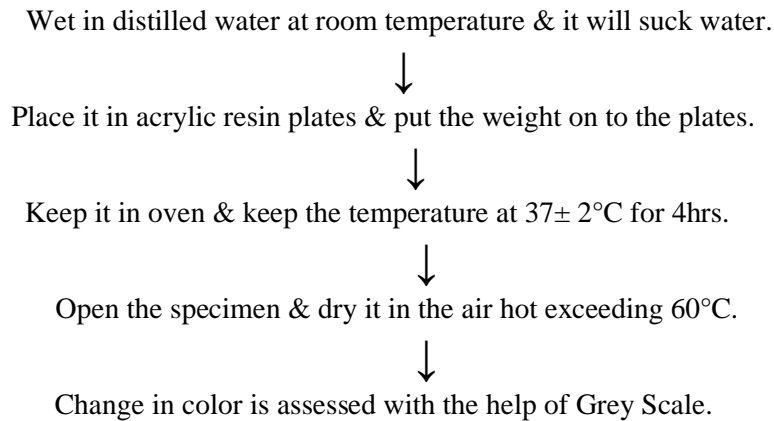
- ISO 10SE01
- ISO 105EO1

Some important apparatus used in this procedure

- Perspiration tester
- Oven
- Grey scale
- Multi fiber fabric
- Color matching cabinet
- Glass plate
- Weight 12.5 kpa or 5 kg pressure
- Glass beaker
- Stirring rod

In this method De- ionized water is used because natural water is variable in this composition. For the test the sample is required 10/4 cm.11 glass plate used for test. For this test the oven temperature is 37 (+_).

Procedure



3.4.6.4 Color fastness to perspiration

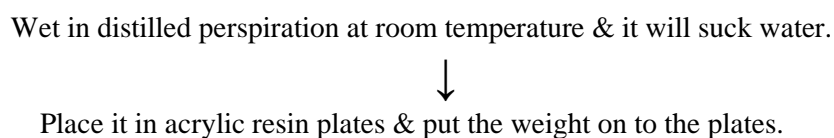
Here two methods are used

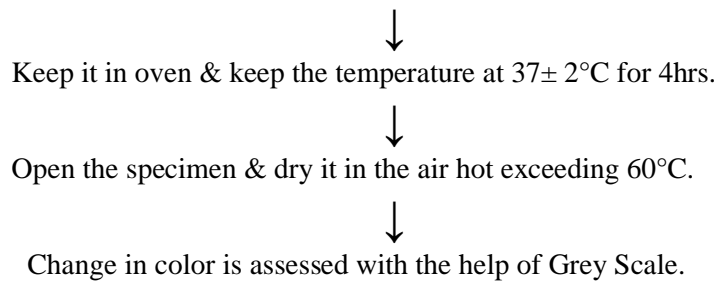
- ISO 10SE01
- ISO 105EO1

Some important apparatus used in this procedure

- Perspiration tester
- Oven
- Grey scale
- Multi fiber fabric
- Color matching cabinet
- Glass plate
- Weight 12.5 kpa or 5 kg pressure
- Glass beaker
- Stirring rod

In this method De- ionized water is used because natural water is variable in this composition. For the test the sample is required 10/4 cm.11 glass plate used for test. For this test the oven temperature is 37 (+-)





Color fastness to water and color fastness to perspiration is the same method .only one difference is seen here .In color fastness to water here water is used and color fastness to perspiration, perspiration is used.

3.4.6.5. Color fastness to Fenoliquorine

- Here ISO 105*18 method is used.
- Compound of Ni and fenol on air that effect to fabric
- Here white and light color fabric is applied
- Specimen size is 10/3 mm
- One test paper is used
- Total 7 plate is used
- Test is produced by fenol compound
- The fabric is controlled by one glass plate and specimen is controlled by other plate.
- 63 microns thickness makes a package into BHT free polythene
- Pressurized 5 kg weight and inter into oven
- After this set the temperature at 50 degree
- Required time is 16 hour
- After the test fenol paper is yellow

3.4.6.6. Color fastness to rubbing

- At first conditioning the sample for 4 hour
- Specimen size is 50/140 mm
- Two way for rubbing one is wet and another is dry
- Rubbing cloth is used here
- The pressure of rubbing machine is 9 N
- Rubbing cycle is 10 times
- Rubbing fastness is depend on nature of the color and depth of the shade

3.4.6.7. Color fastness to pilling

- Here ISO 12945 method is used for this test
- Two types of pilling test is available in this laboratory
- One is marntile pilling test and another is ICI pilling test
- Marntile pilling test is fabric to fabric rubbing and ICI pilling test is fabric to other substance
- The rpm of this pilling tester m/c is 60

3.4.7. PH test

Take 2 gm sample

To make solution by using potassium chloride

Required time 2 hours

At last check the PH in PH meter

3.4.8. Yarn count test

- Here ISO 2060 method is applied
- At first set the yarn to the machine
- Then set the cycle run for 100 times
- Then take the yarn from the machine
- Weight the sample in analytic balance
- Convert the gram into pound
- After this calculate the count by this equation

$$\text{Count} = \frac{\text{Length in yard} \times \text{Weight Unit}}{840 \text{ Yard} \times \text{Weight in pound}}$$

3.4.9. Twist tester

- Here ISO 2061 is applied
- Here need to yarn package, yarn guide, yarn twister, tensioner
- At first draw the yarn into tensioner
- fixed jaw and then have to untwist the yarn with the help of handle
- The single yarn untwist re twist meters is used and number of turns per-inch is determined from control reading.

- The main term of twist the yarn is machine is run same direction of the twist and opposite direction of the twist.

3.4.10. Chemical test

Lab is the heart of the textile industry. Higher precision lab can aid easily to achieve the goal of the organization. Before bulk production a sample for the approval from industry is sent to the buyer as per the requirement of the buyer the shade is prepared in a lab considering the Economical aspects.

List of Equipment for Chemical test

- Sample dyeing machine
- Water heater
- Washing machine
- Electrical balance
- PH meter
- Water hardness tester
- Oven
- Light box

In this factory the coloration lab is modern and the solution making machine is automatic and its system is robotic system.



Picture: 3.4.10.1.robotic machine

All the recipe set on the computer and this machine is make the suitable color



Picture3.4.10.2 sample dyeing machine

Function: Used for dyeing the lab samples.

Machine specification:

- Brand: Mathis LABOMAT
- Origin: Switzerland

Technical information:

- Capacity: 24 pots
- Dyeing pot capacity: 200 ml
- Heating system: Infrared heating system
- Cooling system: Cooling is done by using water
- Temperature: For polyester: 130°C, For hot brand reactive dye: 80°C-95°C
- M:L: 1:6



Picture 3.4.10.3 water heater

Used to heat water when emergency hot water is needed for washing a sample manually.

- **Hot air oven**



Picture 3.4.10.4 hot air oven

Used to dry the sample that has been wet treated.

- **Light box**



Picture 3.4.10.5.light box

Checking color difference under different light source like D65, TL84, F, UV etc.

Light source available:

- TL 84
- D 65
- F
- UV

Meta metric:

This is a property of color for which its tone shows variation in different light source. Color same = no metamerism

Different color shade = presence of metamerism

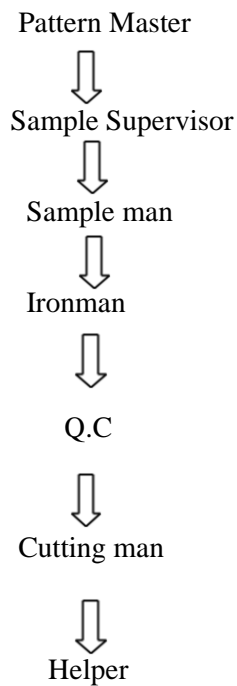
Data color helps to remove the metamerism

3.5. Garments section

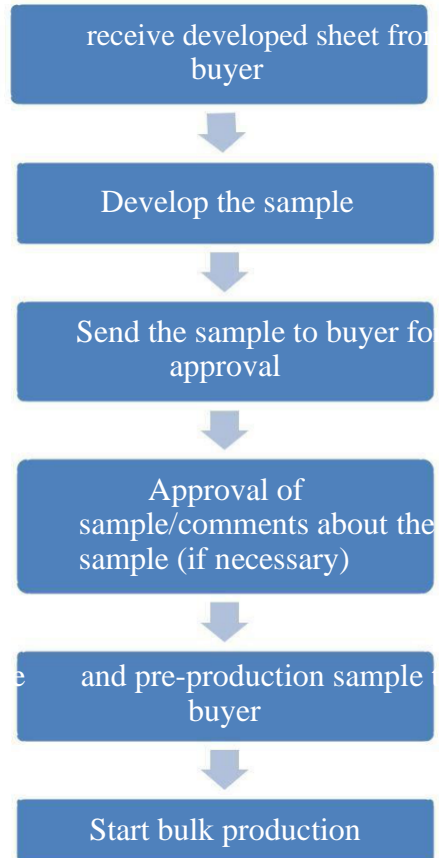
3.5.1. Sample Section

In garments industry, the sample which is come from buyer and it is followed for bulk production called sample. Garment samples are inevitably important and are developed tested before starting the bulk production. It means making a sample of the garment /fabric which requires to be sold. Sampling is one of the main processes in Garment Industry and it has a vital role in attracting buyers. Because the buyers generally places the order after they are satisfied with the quality of the samples.

3.5.1.1. Organogram



3.5.1.2. Flow sequence of sample section



3.5.1.3. Types of Sample produce

1. Design development:

- This is the first sample which is made for any style by most of the buyer.
- Design development is either done by buyer or factory
- The main purpose is to take the decision to proceed with the same line or not.

2. Proto sample:

- Proto sample is developed at very initial stage and normally order is confirmed to the factory based on proto sample only.
- Normally, buyer send proto sample request to 2-3 factories.
- The factory which submits the good quality and optimum price will get confirmation from buyer.
- Proto sample are normally prepared in similar fabric if actual fabric is not available.
- Substitute Trims can be used on proto.
- As proto sample is given first time to the factory to buyer, so to develop the proto sample buyer need to provide necessary information along with the proto request. These are: Specification Sheet (Tech Pack), Bill of Material, Development sample (optional), Paper patterns (optional), Sample of novelty trims, Sample of fabric yardage (it may be send by buyer or asked to develop), Details of Print or Embroidery, if any.
- Generally proto request is responded within the 7-10 days by merchandiser.
- Factory need to submit at least 4 proto samples (quantity may change buyer to buyer)
- If buyer does not approve the proto sample, factory needs to submit the 2nd proto sample to get approval.
- Once proto get approved buyer asks to start working on fit sample.

3. Fit sample

- Fit sample is made and send to conform the fit of the garment on live models or on dummy and for approval of construction details.
- At this stage of sampling, buyer makes sure that factory understands thoroughly the construction and quality details and standards .The sample sent mostly in medium and large sizes mentioned by the buyer.

- The fabric used for fit sample production is the actual fabric which is going to be used for bulk production or sample yardage fabric is used.

4. Ad or photo shoot sample:

- In order to promote the new style in the market normally buyer asks for AD sample for photo shoot.
- Buyer uses this photo for marketing purpose either on catalogue or various media like, print, TV or websites to see the response of the consumer.
- This sample mainly sends in medium to large or sizes specified by buyer.

5. Sales man / Marketing /Showroom sample:

- The main purpose of salesman sample is to collect the order from the retailers.
- In Sales man sample actual accessories, actual fabric is used.
- The quality of the sample should be up to the mark of the buyer; hence merchandiser should aware and make sure that product development team is well aware about the sample quality parameters.
- The cost of sample production is given by buyer.

6. Size set sample / Back seal Sample:

- The main purpose of size set sample is to check the factory's capability to make the sample in all sizes.
- The size set sample should be made in the actual fabric and trims.
- The samples can be made in the sampling room or actual production floor, as required by the buyer.
- Bulk cutting of fabric for production should start only after size-set sample get approved.
- Normally, 1-2 samples (or quantity specified by buyer) of each size need to send to buyer.
- If sizes are more in number then buyer may ask to skip some sizes, called jump size set sample.

7. GPT sample (Garment Performance Test):

- The main purpose of GPT is to perform the physical and chemical testing on garment to ensure the performance of the garment.
- The tests done on garments are: Shrinkage, Color Fastness, Seam performance etc.
- Garments for GPT sample can be done along with Size Set sample.
- Normally, GPT Sample is sent to 3rd party inspection and results are sent to both factory as well as buyer.
- If same style is having 3-4 different colours then only one color sample is tested completely and other colours samples are tested only with colour way test i.e. only colour fastness tests are conducted.

8. Pre- production sample: (PP sample)

- PP sample is considered to be a contract between the buyer and the factory.
- It has to be made in original fabric and trims.
- Washing, embroidery and printing should match to actual.
- PP Sample is the standard for production and bulk production garments should be identical to PP sample.
- The factory can start the production of bulk garment only after the approval of preproduction sample.
- PP sample sends in only one size 1-2 samples or specified by buyer.

9. Wash sample:

- Wash sample is made and submitted to buyer for assessment of feel and handle of fabric after washing of Denim or shirt washing program, hence either at size set stage or PP stage washing sample is sent to buyer for approval and carry forward of washing program.
- If sample is not approved or approved with comments, factory needs to submit 2nd sample to get approval.

- After feel assessment buyer may suggest the changes in washing program.

10. TOP sample (Top of Production):

- The top of production is sent to the buyer as soon initial pieces are come out of sewing line with suggestion of QA department.
- In TOP sample Buyer tries to evaluate the actual manufacturing of the style.
- Buyer check whether bulk production is as per submitted sample or not.
- TOP sample also checked by the buyer for the packaging.

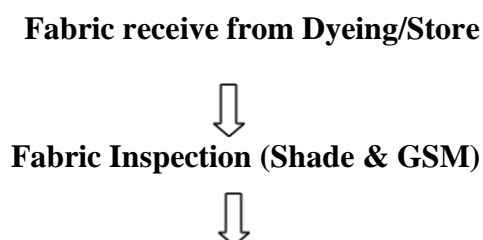
11. Shipment sample:

- Few buyers may ask for the shipment samples which factory needs to pull form the actual shipment and sent to buyer.
- The main purpose of this sample is to assure buyer about the actual shipment dispatch.

3.5.2. Cutting Section

The definition of cutting is very complex. In garments industries fabric is cut from lay and spreading with accuracy and properly which is termed as fabric cutting. Marker outline is used to cut the fabric. Fabric cutting is very important as if something is cut in wrong way, cannot be rectified.

3.5.2.1. Process Sequence of Cutting Section Fabric



Fabric Inspection (4-point System)



Fabric Relaxation



Receive Fabric to Cutting Table



Fabric Spreading



Marker Setting



Fabric Cutting



Numbering



Bundeling



Quality Checking



Cutting Store



Forward to Sewing

3.5.2.2. Fabric Relaxation

Here, the time of fabric Relaxation

Types of Fabric	Relaxation time
100% Cotton single jersey, pique, 1x1 Rib, Interlock	24 hours
Lycra single jersey, Lycra pique, Lycra Rib, Lycra Interlock	36 hours
Any kind of viscose	36 hours

Terry , Fleece	12 hours
Polyester fabric	36 hours

3.5.2.3. Fabric Spreading

Spreading means the smooth laying out of the fabric in superimposed layers of specific length. The cutting marker paper is laid in the top of the fabric layer. During spreading number of the plies should be not more than three hundreds but it depends on the thickness of the fabric and the height of the cutting knife.

For example: if the thickness of the fabric is higher than the number of plies mentioned above would not valid and in case of straight knife cutting instrument the maximum lay height should be 70% of the blade height.

3.5.2.4. Types of Fabric Spreading

1. Automatic Spreading
2. Manual Spreading

In this Industry only Automatic Spreading done.

3.5.2.5 Ideal Lay height

Fabric type	No. of ply	Lay height
Single jersey	90-100	3"
Rib	60-70	2.5"
Lycra	80	2.5"-3"
Viscose	70	1.5"
Fleece	55-60	3"
Pique	70-80	2.5"-3"

3.5.2.6 Requirements of fabric spreading

- Alignment of fabric plies.
- Correct ply tension.
- Elimination of fabric faults.
- Correct ply direction and adequate lay stability.
- Elimination of static electricity.
- Avoidance of fusion of plies.
- Avoidance of distortion in spread

3.5.2.7 Spreading system in factory

- Manual spreader group: 3 groups.
- Gerber Spreader: 5 pcs.

3.5.2.8 Marker making

Marker is a thin paper which contains all the pattern pieces of a garment. It is made just before cutting and its purpose is to minimize the wastages. The width of a marker is equal to the width of the fabric and it should not be greater than the width of the fabric i.e. the width of the marker is kept less than or equal to the width of the Fabric. The pattern pieces should be placed very carefully in such a way that it will obviously minimize wastages.

3.5.2.9. Objects of marker making

- To reduce cost.
- To improve the quality of the garments.
- To reduce the cutting time.
- To facilitate large scale production.

3.5.2.10. Types of marker making

Generally, there are two methods by which marker can be made –

a) Manual Method of Marker:

The man performs it by himself using his hands. It is a conventional system and requires more time. Manually two types of marker are made –

1. Full size marker:

Full size marker is made for production purpose.

2. Miniature type marker:

Miniature type marker is sometime made and its purposes are to plan or schedule and learn or study i.e. for planning and learning purposes.

b) Computerized Method:

Now the commonly used system of marker making is computerized method. In this system, a man performs it by himself using computer software (CAD and CAM) and it requires considerably less time than manual system. Two types of marker are generally made using computerized system –

1. Full size marker:

Using Digitalizing Board the pattern pieces are input into the computer. Computer uses software and a marker paper is printed out that will be used in the production.

3. Miniature type marker:

Only for learning, practicing, and planning purposes this type of marker is printed from the computer. To get the optimum efficiency of markers as well as to minimize fabric wastage they done marker by computerized marker making system (VEITH).

But this Industry only use the manual marker system.

3.5.2.11. Factors considered during marker making

The important factors considered during marker making are –

1. Nature of the Fabric:

The fabric may be either symmetric or asymmetric. Thus the nature of the fabric should be considered during marker making.

2. Lay planning of patterns:

Improper lay planning of patterns may create more wastage. Thus it should be taken under consideration.

a. Alignment of the pattern pieces according to the grain line:

b. It is also another important factor that must be considered. The warp direction of a fabric is very much important for a garment and the grain line indicates the warp or wale direction.

c. Requirements of cutting:

Before placing the pattern pieces on to the marker or during marker making the cutting allowances are considered where necessary and where is not. It may produce more wastage and may reduce the dimensions of patterns.

d. Production planning:

Different types and sizes of garments manufacturing may on at a time in an industry. So during marker making it should be considered.

e. Size of marker:

During marker making we have to think about the table size, length of the fabric, etc.

f. Marker Efficiency:

The ratio between the total areas of the pattern pieces to the total area of the marker paper is technically termed as Marker Efficiency. It is expressed in percentage. If it is denoted by the symbol η then – Marker Efficiency (η) = (Total areas of the pattern pieces/Total area of the Marker paper) \times 100

3.5.2.12. The factors which influence the Marker Efficiency

- Length of the marker.
- Pattern Engineering.
- Nature of the fabric.
- Method of marker making.
- Marker width.
- Kinds or design of garments

3.5.2.13. Marker Setting

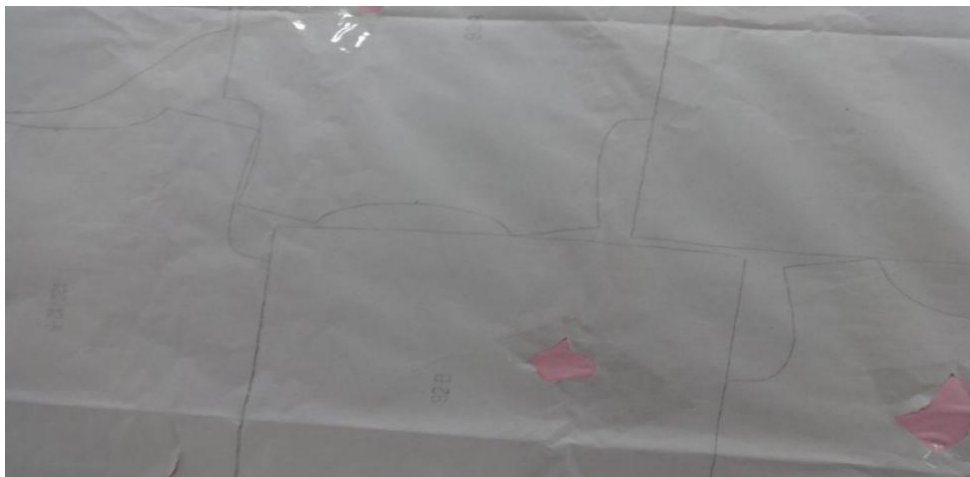


Fig: 3.5.2.13.marker setting

3.5.2.14. Fabric Cutting



Fig3.5.2.14: Fabric Cutting

3.5.2.15. Methods of Fabric Cutting

Fabric cutting methods are as follows:

Manual Method:

- Scissor.
- Straight knife.
- Band knife.
- Round knife.
- Die cutting.
- Notcher.
- Drill etc

3.5.2.16. Different Types of Cutting Machine

Straight knife cutting machine

- Machine name: K.M company cloth cutting m/c
- Model : K.M KS_AUV
- Origin : JAPAN
- Type : Heavy duty industrial cloth cutting m/c self sharpening
- Dimension : 8 inch width ×11 inch length ×24 inch height
- Weight : 33.5 lb
- Current : A.C (3.3/2.6 amps)
- Speeds : 3000/3600



Figure 3.5.2.16 cutting machine

Machine parts of Straight knife Cutting machine

- Base plate
- Terminal block
- Plug
- Clamp washer
- Pressure foot
- Blade
- Sharpener pulley
- Pulley spring
- On/off Switch

Features of Straight knife cutting machine

- Features of Straight knife cutting machine
- Possible to cut pattern pieces directly from the fabric lays
- 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 attaching grinding facilities.
- Blade height 10 to 33 cm.
- Blade stroke 2.5 to 4.5 cm.
- Special attachment such as sew edge or serrated edge can be provided for heavy fabric such as canvas or denim.

Advantages of straight knife

- 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 than even round knife.
- 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.

3.5.2.17. Numbering

In this stage sticker is attached with all part of cutting part for shade matching. The sticker number maintains cutting number, size number, serial number.

Striker machine: 10 pcs.

3.5.2.18. Bundling

Prepare bundling card according to fabric lay report this card maintain

- Date
- Style No
- Size Number
- Card Serial
- Quantity
- Color
- Lot Number

3.5.2.19. Quality Check

- Oil spot
- Dirty spot
- Crease mark

- Needle mark
- Foreign yarn

- Slub
- Contamination
- Hole

Then same numbers of sticker are matched fold & bundled.

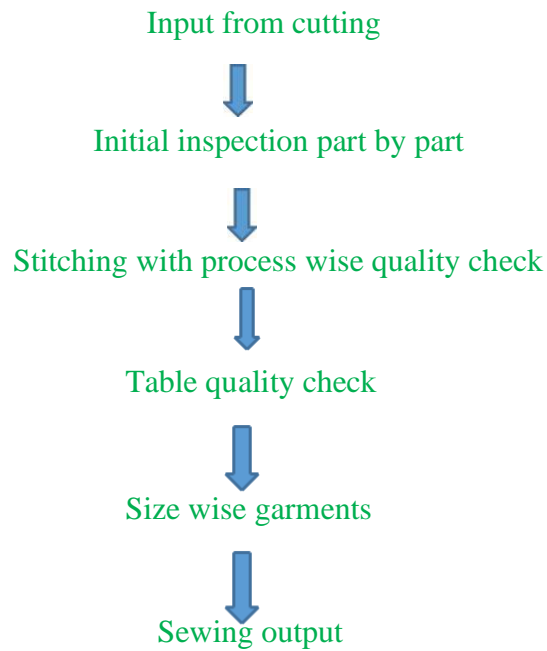
Cutting store

After cutting all bundles are put in the input rack then send to sewing section.

3.5.2.20. Limitation of Cutting Section

- Input problem
- There is may be no group for any table
- Preparing the bundle cards by writing on a piece of fabric.
- Check, variegated rib fabric lay quantity may be excess. As a result reject percentage may be increase.
- Fabric spreading

3.5.3.2. Flow process of sewing section



3.5.3.3. Element of sewing

- Sewing machine
- Needle
- Sewing thread

3.5.3.4. Sewing machine

In sewing section the total machine is 315

Types of sewing machine:

- Single needle machine
- 4 thread over lock machine
- Flat lock machine
- Bar take machine
- Feed of the arm
- Button hole machine
- Button attaching machine
- Rib cutting machine

3.5.3.5. Different sewing machine

Name of the m/c: single needle plain m/c

Brand name: JACK

Model: JK – SHIRLEY IIE



Origin: China

Needle type: DB

Stitch type: lock stitch

Motor type: servo motor

Rpm: 400-4000

Name of the m/c: 4 thread over lock m/c

Brand name: JUKI

Model no: JUKI MO – 6714DA



Origin: Japan

Needle type: DC

Stitch type: chain stitch

Motor type: servo motor

Rpm: 400-8000

Name of the m/c: flat lock m/c

Brand name: PEGASUS WROO

Model no: W264P –O1GB



Origin: Japan

Needle type: UY

Motor type: clutch motor

Stitch type: chain stitch

Rpm: 2600

Name of the m/c: Feed of the arm

Brand name: JACK

Origin: china



Needle type: TV×64 , DV ×57

Stitch type: Chain stitch

Rpm: 400-2800

Name of the m/c: Button hole m/c

Brand name: JUKI

Origin: Japan



Model no: MO-6700D

Needle type: DP ×5

Stitch type: Lock stitch

Rpm: 4000-8000

Name of the m/c: Button attaching m/c

Brand name: JUKI

Model no: LK-1903B-BS



Origin: Japan

Needle type: DP ×17

Stitch type: lock stitch

Rpm: 400-3600

Name of the m/c: Bar take m/c

Brand name: Brother

Model no: BE-438D



Origin: China

Needle type: DP×17

Stitch type: Lock stitch

Rpm: 400-2700

3.5.3.6 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 manufacturing from high carbon steel wire, nickel or gold plated for corrosion resistance. The highest quality embroidery needles are made of platinum.

Needle size is denoted by a number on the packet. The convention for sizing is that the length and thickness of a needle increases as the size number decreases. For example, a size 1 needle will be thicker and longer, while a size 10 will be shorter and finer. The action of needle has a direct effect on seam strength and garments performances.

Function of a needle:

The functions of a sewing needle are –

- To produce a hole in the material for the thread to pass through without causing any damage to material.
- To form a loop that will be picked up by the hook of bobbin case

- To pass the needle thread through the loop formed by the looper mechanism on machines other than lock stitch.

Parts of a Sewing Needle

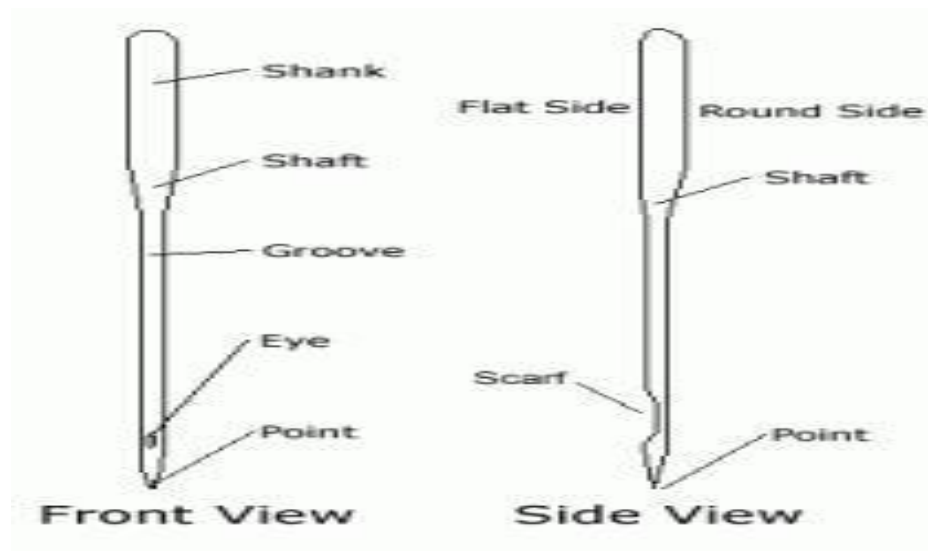
The different parts of a needle and their functions are mentioned below: -

Butt - It is the truncated conical shape at the top end of the needle which is needed to attach the needle with needle bar or clamp

Shank - Shank is the upper part of the needle which locates within the needle bar. It may be cylindrical or flat at one side.

Shoulder- Shoulder is the section intermediate between the shank and the blade.

Blade- It is the longest portion of the needle from the shoulder to eye. This part is responsible for the most amount of friction between needle and fabric.



Long Groove- There is a fine slot in the needle from its shoulder to eye. The needle thread remains at this slot when the needle penetrates the fabric and goes up and down.

Short Groove - Short groove is the slot on the side of the needle towards the hook or looper. It assists in forming the loop of needle thread.

Eye- Needle eye is a hole at the tip of the needle through which the sewing thread passes. It prevents the sewing thread from damage during sewing.

Scarf- Scarf or clearance cut is the portion across the whole faces of the needle just above the eye. Its purpose is to enable a closer setting off the hook or looper to the needle

Point- It provides the best penetration of material according to its nature and the appearance that has to be produced.

Tip- Tip is the keen extreme end of the point.

3.5.3.7. Sewing thread:

Sewing threads are special kinds of yarns that are engineered and designed to pass through a sewing machine rapidly. They form efficient stitches without breaking or becoming distorted during the useful life of the product. The basic function of a thread is to deliver aesthetics and performance in stitches and seams.

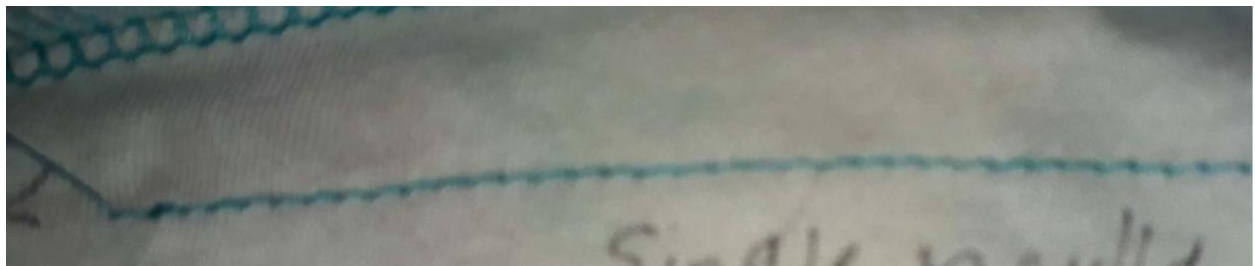
Sewing thread used in factory

- Cotton
- Flaming thread
- Elastic thread

3.5.3.8. Different types of stitch:

Machine name: single needle plain m/c

Stitch type: lock stitch



Front view

Machine name: over lock machine

Stitch type: chain stitch



Front view



Back view

Machine name: Flat lock m/c

Stitch type: chain stitch



Front view

Machine name: Feed of the arm

Stitch type: chain stitch



Front view



Back view

Name of the machine: Bar take machine

Stitch type: lock stitch



Front view



Back view

Machine name: Button Hole Machine

Stitch type: lock stitch



Front view



Back view

3.5.3.9. Lay out of a polo shirt:

Shoulder join



Shoulder top stitch



Sleeve join



Placket rolling



Placket join



Placket top stitch



Pattern top sewing



Placket box



Body hem



Side seam



Cuff make



Cuff join



Side bend tape neck



Side bend tape join



Side bend top stitch



Collar neck



Collar ¼ top stitch



Collar bend rolling



Band join



Band top stitch

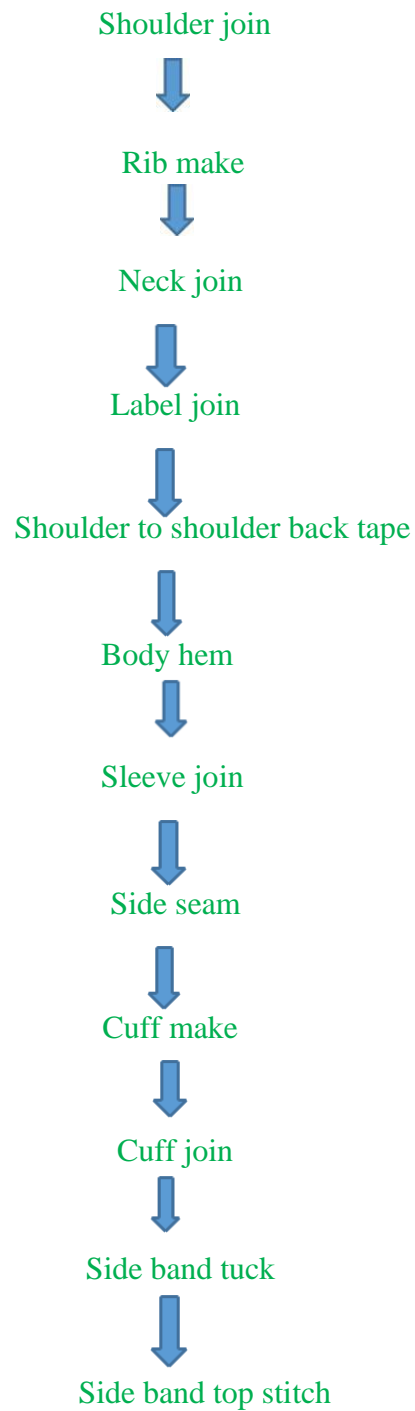


Collar join



Collar top stitch

3.5.3.10. Lay out of long sleeve T shirt:



3.5.3.11. Sewing Line quality Check List

- Buyer Approved Sample & Measurement Sheet Check.
- Sample Wise Input Check.

- Buyer Approved Trims Card Check.
- Buyer Approved Sample Wise Style Check.
- All Machine Thread Tension Check.
- Style Wise Print & Embroidery Placement Check.
- All Process Measurement Check.
- All Machine Oil Spot Check.
- All Process S.P.I Check as Per Buyer Requirement.
- Input Time Shading, Bundle Mistake & Size Mistake Check.
- Buyer Approved Wise Contrast Colour Check.
- As per Buyer Requirement Wise Styling Check.
- All Machine Stitch Tension Balance Properly.

3.5.3.12. Sewing Quality checking points

- ❖ Skip/Drop/Broken stitch
- ❖ Raw edge
- ❖ Size mistake
- ❖ Uneven hem
- ❖ Uneven cuff
- ❖ Uneven neck
- ❖ Uneven shoulder
- ❖ Uneven placket
- ❖ Uneven pocket
- ❖ Twisting
- ❖ Without care label
- ❖ Open tack
- ❖ Sleeve up-down
- ❖ Stripe up- down
- ❖ Open seam

- ❖ Four point up-down
- ❖ Shading

3.5.3.13. Sewing Table Quality Check List

1. Style Wise Garments Check.
2. All Process Measurement Check.
3. Front Part, Back Part, Sleeve & Thread Shading Check.
4. S.P.I check for all process.
5. Print/Embroidery Placement Check.
6. Main Label, Care Label, Size Label & Care Symbol Check.
7. Size Mistake Check.
8. All Process Alter Check.
9. Any Fabric Fault /Rejection Check.

3.5.3.14. Work Study

Work Study is the systematic examination of the methods of carrying on activities so as to improve the effective use of resources and to set up standards of performance for the activities being carried out.

Objectives of Work Study

- Simplify or modify the operation to reduce unnecessary work.
- Increase production and productivity.
- Setting time standards.
- Reduce cost by most effective usage of inputs.
- Improvement of conditions, which involve an element of excessive fatigue or danger.
- Improve quality.
- Evaluation of human work.

Basic terminology of work study

Capacity: Productive capability (output) of a plant. Machine or work centre in a given period of time.

Created from: machine, time, space, and capital, labour

Maximum Capacity: Total hours available under normal conditions for a given period of time

Efficiency Factor: A factor used to adjust the maximum capacity to a realistic level of potential production capacity.

Work Study can be best expressed in the following manner:

1. Method Study

Record to Compare

Seek best method

2. Work measurement

Time Study Synthetics

In a crux: —Methods are developed and rate set for each operation

3.5.3.16. SMV related formula

- $$\text{Rating} = \frac{\text{observed rating}}{\text{Standard rating}} \times 100\%$$
- Standard Rating: The pace at which a qualified worker perform a task. (Standard Rating=100)
- $$S M V = \text{Basic time} + \text{Allowances}$$
- $$\text{Basic time} = \text{Observed time} \times \text{Rating}$$
- $$\text{Individual Target} = \frac{\text{OU}}{SMV}$$
- $$\text{Line Target} = \frac{\text{OU}}{SMV} \times \text{manpower}$$
- $$\text{Efficiency} = \frac{\text{Produced minute}}{\text{Used minute}}$$
- $$\text{Produced minutes} = \text{Produced quantity} \times \text{SMV}$$
- $$\text{Used minutes} = \text{Manpower} \times \text{Working hours} \times 60 \text{ min}$$

3.5.3.17. Sewing defects

- ❖ Needle damage,
- ❖ Skip stitches,
- ❖ Thread Breakages,
- ❖ Broken Stitches
- ❖ Seam Grin
- ❖ Seam Puckering

❖ Pleated Seam

3.5.3.18. Sewing problems in a factory:

❖ Input problem

❖ Shortage of skilled operator

❖ To achieved the overtime, they worked slowly

1. If any problem will create during production then

❖ Nobody will take the responsibility,

❖ Nobody will give the instant decision.

2. Sewing line production may be depends on in charge.

3. Needle hole- due to friction, needle eye is to large, mistake of needle selection.

4. Measurement problem- from cutting section

5. Seam pucker

❖ Due to unequal tension of feed dog and pressure foot on two plies of fabric.

❖ Due to unequal thread tension.

❖ Shrinkage of either fabric or sewing thread.

6. Broken stitch

❖ Due to tension variation between needle & bobbin thread.

❖ Tension of needle thread is more.

❖ Low quality sewing thread.

❖ Needle heating or hook heating.

❖ Sharp edge of throat plat, hook plate, bobbin cage, needle groove etc.

7. Skipped/ Slipped stitch

❖ If the timing between needle & looper or bobbin is not proper. Needle thread loop is not picked up by bobbin thread loop when required.

❖ Unequal tension between sets of threads.

❖ Deflection or vibration of needle.

8. Variable stitch density

❖ If fabric cannot move forward properly due to lack of pressure of pressure.

3.5.4. Finishing section:



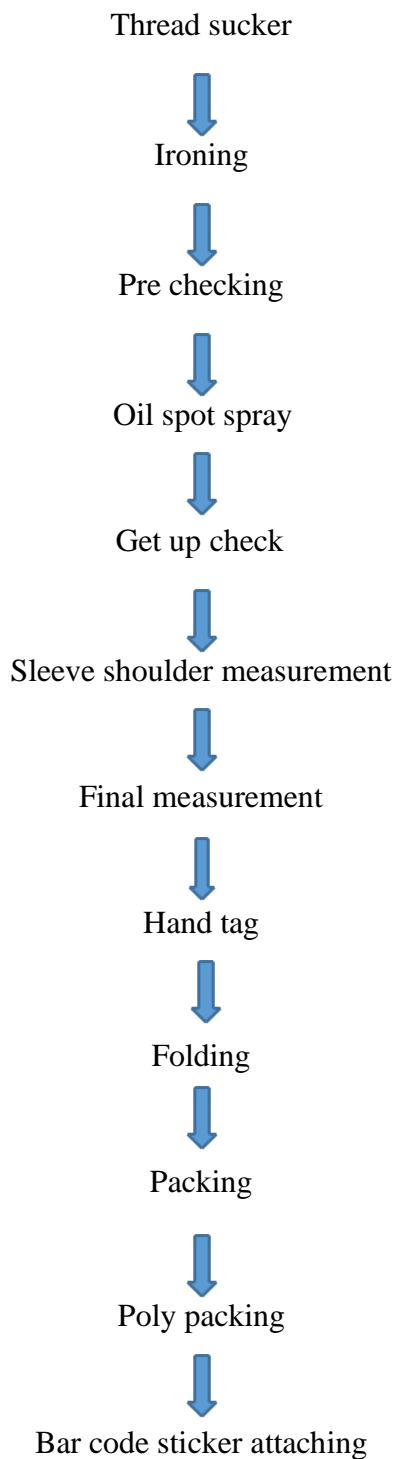
3.5.4.1 Lay out of finishing section:

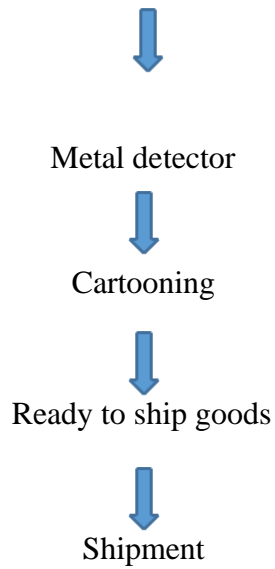


3.5.4.2. Garment finishing:

Garment finishing is the last step of garment making. All of the finishing processes are done here. The term Garments finishing mainly applies to pressing, folding, packing and cartooning of garments.

3.5.4.3. Flow process of garment finishing:





3.5.4.4. Machine Description of finishing section:

Machine name	Number
01. Steam iron	16pics
02. Thread sucker	01 pics
03. Metal detector	01 pics
04. Neck press	01pics

3.5.4.5. Metal detector machine:

Specification

Brand name : Gmc

Origin : China

Model : ON-688cdII

Motor power : 140 W

3.5.4.6. Thread sucker:



3.5.4.6. Thread sucker

3.5.4.7. Materials used in garment finishing:

- ❖ Metal clip
- ❖ Cuff link
- ❖ Droop loop
- ❖ Cable tie
- ❖ Boa tie
- ❖ Full board
- ❖ Hand tag
- ❖ Tag pin
- ❖ Tissue paper
- ❖ AI pin
- ❖ Ball pin
- ❖ Elastic clip
- ❖ Hanger
- ❖ Poly bag
- ❖ Size sticker

3.5.4.8. Ironing

Ironing is the use of a heated tool (an iron) to remove wrinkles from fabric. The heating is commonly done to a temperature of 180–220 °Celsius, depending on the fabric.

Ironing works by loosening the bonds between the long-chain polymer molecules in the fibers of the material. While the molecules are hot, the fibers are straightened by the weight of the iron, and they hold their new shape as they cool. Some fabrics, such as cotton, require the addition of water to loosen the intermolecular bonds.



3.5.4.8 Iron machine

3.5.4.9. Objects of Finishing

- To enhance the suitability of the fabric for end use.
- To improve appearance and sale appeal for comfort
- To give desirable qualities to the fabric like-
 1. Softness
 2. Lustre
 3. Drape
 4. Dimensional stability
 5. Crease recovery
 6. Soil repellence

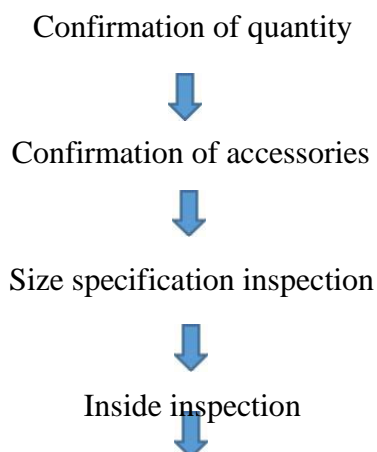
3.5.4.10. Work flow in the Finishing Room

As mentioned earlier, workflow in the Finishing Department is shown here for reference:

- ✓ Eliminate micro-dust and residual thread from the garment;
- ✓ Press/iron garments as specified by buyer or as per requirements;
- ✓ Fold the garments as required by customer;
- ✓ Fix necessary tickets (Price tickets) or tags (hang tags),etc to the garments at this stage;
- ✓ Insert garments into poly bags;
- ✓ Divide garments as per size and color (assortment).

3.5.4.11.

Garments inspection:



Outside inspection



Final inspection



Packing

3.5.4.12. Trims

Trim or trimming in clothing and home decorating is applied ornament, such as gimp, ribbon, ruffles, or, as a verb, to apply such ornament. Before the industrial revolution, all trim was made and applied by hand, thus making heavily trimmed furnishings and garments expensive and high-status.

Different types of trims

Plastic Clip

Tag pin

Scotch Tape

Hanger

Gum Tape

Sticker

Cartoon

Polybag

Tags

Elastic

Button

Labels

3.5.5. Merchandising Section

Merchandising department is the star of the department among all the working departments in the Export concern, because Merchandising is the only department having maximum control over the departments and total responsible for Profit and loss of the company. After LPG (Liberalization, Privatization & Globalization) the business gets more important and now merchandising is on its hot seats. So, it is necessary to understand the day to day happenings of the star department. Merchandise- means goods bought and sold; and trading of goods. Merchandising- is an activity of selling and promoting the goods.

3.5.5.1 Objects of Merchandising

Merchandising denotes all the planned activities to execute and dispatch the merchandise on time, taking into consideration of the 4 Rs to replenish the customer.

- **Right Quantity:** To dispatch right quantity of product what buyer ordered?
- **Right Quality:** It should be with right quality as accepted both parties.
- **Right Cost:** Everybody wants more from what they are paid.
- **Right Time:** No one wants to wait idle even in a Restaurant. Keeping delivery schedule is mandatory.

3.5.5.2 Flow Chart of Garments Merchandizing

Buyer Correspondence & Meeting



Recap Preparation



Lab Dip & Yarn Dip



Sample Fabric Booking



Accessories for Sample



Initial Sample Preparation



Fitting Sample Preparation



Photo Sample with actual specification



Pre-Production Sample Preparation



Bulk Accessories Booking after Buyer's Approval



Bulk Fabric Booking



Size Set Sample/ Trail Cutting



Production Start

3.5.5.3 Merchandising Calculation:

Fabric or Body Calculation:

= Result

kg/dozen NB:

- (BL+SL) Allowance= 10 cm. Allowance.
- When keep the chest allowance then body width, chest width and bottom width which are big (cm) with (4 cm+) Added.
- 10% overall Process Loss.
- Dozen = 12 pcs.

Body Consumption By Marker:

➤ _____ +12%

Dia Measurement

= Dia / Result

NB:

- Inch = 2.54 cm.
- When I dia measurement then chest or bottom with (4-6 cm) allowance added.

Self or Rib Fabric Neck Dia Measurement:

= Result.

Pant / Trouser or Pajama Consumption:

➤ _____ + 10 %(+)

= Result kg. / Dozen.

NB:

- L + Allowance with self-fabric waist minimum (12 cm) Allowance added.
- Without self-fabric waist minimum (8 cm) Allowance added.
- Allowance minimum 15 cm added with Hip or Dia.
- $DIA = Hip + Allowance / 2.54$

Pocket Consumption:

- Length + Width +

Allowance. NB:

- Allowance minimum 5 cm added with (L+ W).

Carton Dimension:

➤

= Result / SQM. NB:

- L + W + Allowance = 6 cm.
- W + H + Allowance = 3 cm
- = Double part.

Button Ligner (Find out Formula):

- GG = 144 Dozen.
- GG = 1728 pcs.

Yarn Booking:

- Fabric yarn (kg) + Process Loss. = Result / kg.

NB:

- Process loss keep the 10% added with total fabric.

Marker Consumption (Formula):

- Open Dia = $\times 12 + 10\% (+)$.

- Result = kg. / Dozen
- Tube Dia =
- Result = kg. / Dozen

Sewing Thread Consumption:

Machine Name	Thread required
Plain Machine	1" for 2.75"
Over lock (3 Thread)	1" for 14"
Over lock (4 Thread)	1" for 19"
Over lock (5 Thread)	1" for 24"
Flat lock (2 Thread)	1" for 7"
Flat lock (3 Thread)	1" for 17"
Flat lock (4 Thread)	1" for 24"
Flat lock (5 Thread)	1" for 28"
Button hole, Button Attach, Bar-take	1" for 7"

Cone Quantity = per garments thread × garments qty. × qty. in cone.

Calculation Cubic Meter (Cbm):

$$\text{CBM} = \frac{\text{Result}}{\text{Result}}$$

$$= \text{CBM} / \text{Result.}$$

NB:

- 100 cm x 100 cm x 100 cm = 1000000
- 20 Feet = 28-31 CBM
- 40 Feet = 56-62 CBM

3.6. Compliance

Compliance means conforming to a rule, such as a specification, policy, standard or law. Regulatory compliance describes the goal that organizations aspire to achieve in their efforts to ensure that they are aware of and take steps to comply with relevant laws, policies, and regulations.

3.6.1. Different compliance issues which Is maintained by Impress-Newtex Textile Composite Ltd.

Health & hygiene

- First aid ensures.
- Medicine registers.
- Maternity & pregnancy register.
- Pure drinking water.
- Dustbin & spittoons.
- Wash basin.
- Separate toilets for men & women.

Safety

- Safety committee
- Needle detector
- Fire alarm & switch
- Evacuation plan
- Smoke detector
- Fire extinguisher
- Gas mask
- Personal protective equipment
- Rubber mats to every iron man
- Metal Hand Gloves for every cutting master.

Welfare

- Welfare committee

Workplace condition

- Working place is safe and hygienic.
- Safety of building and machineries.
- Lighting.

Leaves & holidays

- Weekly holiday
- Annual leave with wage
- Festival holiday
- Casual leave
- Sick leave

Salary & wages

- Fix wages in considering minimum wages which is declared by the government.
- Salary and wages given before 7th day of month.
- Overtime wages is paid properly.

Environment:

Procedure and standards for waste management, handling and disposal of chemical and other dangerous materials, emissions & effluent treatment must or exceed minimum legal requirements.

Employment relationship:

Communication & relationship between management and workers are Good.

Others

- Attendance & leave register card.
- To maintain daily labor or manpower report.
- Canteen facility.
- Compliance item.

3.6.2. Health and Hygiene Management

Health &

Safety

Committee:

Newtex Knit Fashion Ltd. is very conscious about health & safety. Every month there is a meeting on health & Safety. They have a health & Safety committee. This committee consists of sixty persons. There are managers, workers, fire safety people, and security in charges in this committee. They have a documented health & Safety policy, signed by senior management. They also review this policy time to time.

First Aid Ensures:

There is emergency procedures in the facility for dealing with cases of trauma or serious illness. In each floor they have first aid box and first aid trainer in each floor. First aiders are trained every month.

Picture 3.6.2.1 First aid box

Medical care:

In New -Tex Knit Fashion Ltd. there is a doctor room.

For their workers emergency treatment they have one doctor, two nurses, permanently.

They are always helpful for the treatment of workers.

NEWTEX KNIT FASHIONS LTD.
জরুরী মেডিকেল পরিকল্পনা
Emergency Medical Policy

<p>রক্তক্ষরণ :</p> <p>রক্তপড়া বন্ধ করার চেষ্টা করুন। পানি বা তরল জাতীয় খাবার খেতে দিন। দ্রুত হাসপাতালে নেয়ার ব্যবস্থা করুন।</p>	<p>শ্বাস-প্রশ্বাস বন্ধ হলে :</p> <p>শ্বাস-প্রশ্বাস বন্ধ হয়ে গেলে কৃত্রিম শ্বাস-প্রশ্বাসের (সি.পি.আর) ব্যবস্থা করুন। দ্রুত ডাক্তার ডাকুন অথবা হাসপাতালে নেওয়ার ব্যবস্থা করুন।</p>
<p>পুঁড়ে গেলে :</p> <p>পোড়া স্থান থেকে চামড়া বা পোড়া অংশ তোলার চেষ্টা করবেন না। পোড়া স্থানে প্রচুর পানি ঢালুন। পর্যাপ্ত তরল খাবার দিন। দ্রুত হাসপাতালে নিন।</p>	<p>ভেঙ্গে গেলে :</p> <p>ভাঙ্গা অংশ নাড়াচাড়া করবেন না। ভাঙ্গা অংশ ব্যান্ডেজ বা শক্ত কাঠের টুকরা দ্বারা বেঁধে রাখুন। তরল খাবার খেতে দিন। হাসপাতালে নিন।</p>
<p>শক লাগলে:</p> <p>অজ্ঞান হয়ে গেলে শ্বাস-প্রশ্বাস লক্ষ্য করুন। রোগীকে আরামদায়ক পদ্ধতিতে শুইয়ে দিন। জ্ঞান ফিরলে পর্যাপ্ত তরল খাবার দিন।</p>	<p>অজ্ঞান হলে :</p> <p>শ্বাস-প্রশ্বাস লক্ষ্য করুন। প্রয়োজনে কৃত্রিম শ্বাস-প্রশ্বাস দিন। জ্ঞান ফিরলে পর্যাপ্ত তরল খাবার দিন।</p>

Picture 3.6.2.3. Emergency medical policy

Maternity & Pregnancy registers:

They are very aware of pregnancy time of every woman workers. They note down it in register book and do routine check-up. They give every pregnant woman maternity leave.



Picture 3.3.4. Maternity policy

Pure drinking water & wash basin:

In every floor sufficient pure drinking water for the workers. Drinking water is safe. They test their drinking water from BUET every after three month.

In every floor they have wash basin also.



Picture 3.6.2.5. Pure drinking water

Dustbin & spittoons:

In the New-Tex Knit Fashion Ltd. they have sufficient dustbin and spittoons in each floor.

Separate toilets for men & women:

New -Tex Knit Fashion Ltd. has 25 toilets, out of these for female toilet 15 & 10 toilets for male worker. To clean the toilet they have 5 sweepers.

3.6.3. Safety Management:

Fire Safety Policy:

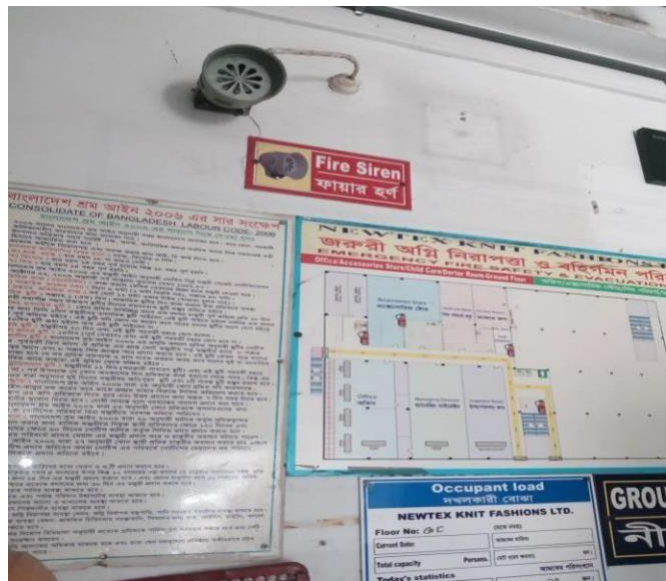
They have a written fire safety policy. They have also retired persons from Bangladesh fire service & civil defense. In their factory 7 persons are there in fire section. They do duty 8 persons in each shift. Total three shift. They have 110 fire extinguishers (A, B, C, CO2), 1 Panel board. They have also smoke detector. Moreover every month they practice fire drill.



Picture 3.6.3.1. Fire equipment



Picture 3.6.3.3. CO2 cylinder



Picture 3.6.3.5. Fire siren

Chemical Safety:

All Chemicals they have Material Safety Data Sheet (MSDS). All container of chemical they use correct label. They also assess chemical risk assessment. They also bring out risk reduction action plan. They have regular training for safe chemical handling.

Machine Safety:

The entire machine they have safety guard. All workers are using safety guard at their machine. They have regular machine maintenance program.

Personal Protective Equipment (PPE)

Their workers are using PPE'S where required. They provide all kind of PPE'S for the worker with free of cost.

Pi

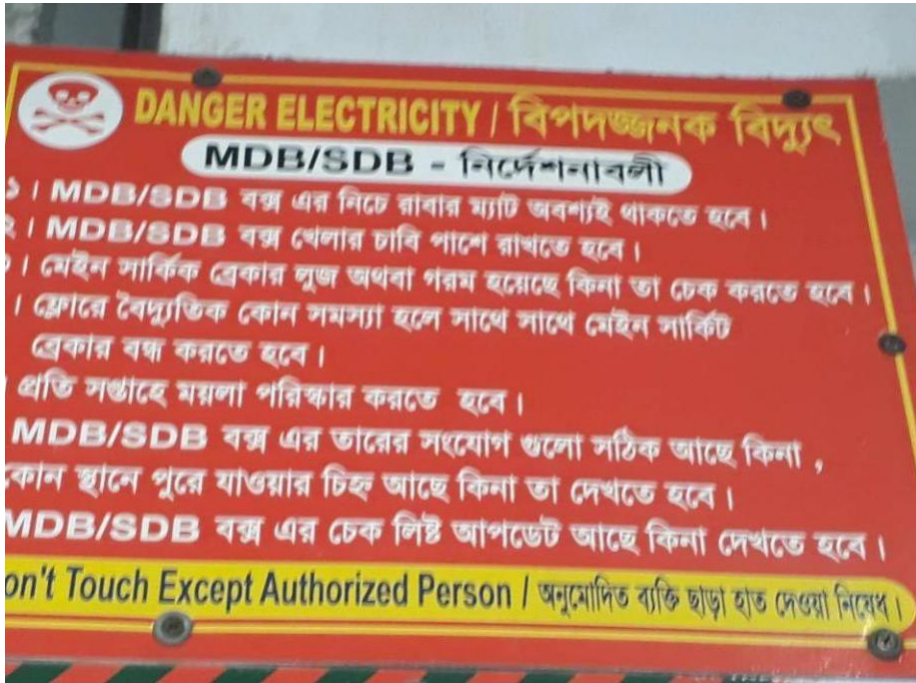
 NEWTEX KNT FASHIONS LTD. কর্মক্ষেত্রে ঝুঁকি নিরূপন ও তার প্রতিকার RISK ASSESSMENT & PREVENTION Sewing Section (সুইং সেকশন)			
ঝুঁকির উৎস	সম্ভাব্য ঝুঁকি	প্রতিকার	চিত্র
প্রেস সুইং মেশিন	সেলাই মেশিনে ব্যবহৃত সূঁচ (Needle) আঁতুপে, চোখে বা শরীরের অন্য কোন স্থানে আঘাত করতে পারে।	মেশিনে নিভিল গার্ড, আই গার্ড ব্যবহার করুন।	
	মেশিনে পুঁজি বেটে কাপড় বা অন্য কিছু পেঁচিয়ে দুর্ঘটনা ঘটতে পারে।	মেশিনের নিরাপত্তা কভার ভালো যেমন পুঁজি কভার, উপর ও নিচের বেস্ট কভার লাগিয়ে কাজ করুন।	
ফ্যাট লক এবং ওভার লক মেশিন	মেশিনে ব্যবহৃত সূঁচ (Needle) চোখে বা শরীরের অন্য কোন স্থানে আঘাত করতে পারে। মাস্ক না পরলে গ্রন্থাসের সাথে ময়লা পুঁজোবালি আপনার ফুসফুসে গ্রন্থেশ করে ভবিষ্যতে নানা ধরনের রোগ যেমন বী, যক্ষা হাঁপানী ইত্যাদি হতে পারে।	মেশিনে আই গার্ড ব্যবহার করুন। উপযুক্ত মাস্ক ব্যবহার করুন।	
বাটন হোল, বাটন স্ট্রিচ, স্ল্যাপ বাটন, বাটন এটাচ মেশিন	কাজ চলাকালীন সূঁচ বা বাটন ভেঙ্গে বা ফসকে চোখে লাগতে পারে। আঙ্গুল খেঁতলে যেতে পারে।	মেশিনে ফিঙ্গার গার্ড, আই গার্ড ব্যবহার করুন।	
সাধারণ	মেশিনের বৈদ্যুতিক কানেকশন লুজ থাকলে অগ্নি দুর্ঘটনা ঘটতে পারে।	কাজ শুরু পূর্বে মেশিনের বৈদ্যুতিক কানেকশন পরীক্ষা করে দিন ও রাবার ম্যাট ব্যবহার করুন।	

Picture 3.6.3.7. Risk assessment & Prevention

Electrical Safety:

Every machine has separate circuit breaker. For more safety they have proper earthing. For each zone they have main distribution point (MDB). Each floor has sub distribution point (SDB). For three to four fans there is circuit breaker. For every fan & light there is individual switch. They use bus bar system for more electric safety.

Their factory has been done electric safety audit by third party.



Picture 3.6.3.8. MDB/SDB policy

Occupational Health & Safety Training:

They have regular health and safety training for their workers. They have also health and safety team at their organization and they have regular health and safety meeting

3.6.5. Working condition:

Working condition of is very healthy. Ventilation is New-TEX Knit Fashion Ltd excellent. Lighting is sufficient. Drinking water is safe. They test their drinking water from BUET every after three month. Cleanliness is very high standard. For cleanliness New-TEX Knit

Fashion Ltd. has 10 ladies cleaner. All cleaner are their own paid. No outsource cleaner they have. New-TEX Knit Fashion Ltd. has 25 toilets, out of these for female toilet 15 & 10 toilets for male worker. To clean the toilet they have 5 sweepers.

3.6.6. Emergency light & Emergency Exit Door:

These factory have lots of emergency light and emergency exit door in each floor. Emergency exit doors are always open.



Picture 3.6.6.1. Light

3.6.7. Leaves & holidays:

In this factory Weekly holiday is Friday, Only one day.

Festival holiday is given, such as- Eid-UI-Fiter, Eid-UI-Adha, Durga Worship etc.
Casual leave, Sick leave, Annual leave with wage also give.

-

3.6.8. Salary & wages:

In New-TEX Knit Fashion Ltd.-

- Fix wages in considering minimum wages which is declared by the government.
- Salary and wages given before 7th day of month.
- Overtime wages is paid properly.

ওভার টাইম ক্যালকুলেশন

ওভার টাইম হিসাবঃ

মূল বেতন X ওটি ঘন্টা X ২ = মোট ওটি পাওনা

২০৮

২০৮=সর্বোচ্চ মাসিক কর্তব্যতা (২৬ কর্ম
দিন) X দৈনিক কর্তব্য সময় ৮ ঘণ্টা

Picture 3.6.8.2. Overtime wages

3.6.9. Discrimination

This garments employ workers on the basis of their ability to do the job, not on the basis of their personal characteristics or beliefs.

This factory employs workers without regard to race, color, gender, nationality, religion, age, maternity or marital status.

This factory pays worker's wages and provides benefits without regard to race, color, gender, nationality, religion, age, maternity or marital status.

3.6.10. Forced Labor

This factory does not use involuntary labor of any kind, including prison labor, debt bondage or forced labor by governments.

3.6.11. Child Labor

In This factory minimum legal age is 18 to work there. This factory maintain this rule properly. In our visiting and internship period we didn't see any child labor there.

3.6.12. Environment:

Procedure and standards for waste management, handling and disposal of chemical and other dangerous materials, emissions & effluent treatment must or exceed minimum legal requirements.

3.6.13. Employment relationship:

Communication & relationship between management and workers are Very good.

3.6.14. Others:

Here Attendance & leave register card is always available and always maintain it maintain daily labor or manpower report.

In this factory have one Canteen and one dining hall.

Here also arrange entertainment (such as –song) for the mind refreshment of worker.

Sports:

At every year they arrange sports for management and workers. At the end of the final match their managing director distributed the prize.

3.6.15. Wastage Management

Liquid wastage:

After the uses of water in the dyeing section and other housekeeping activities wasted water goes to ETP for treatment. ETP recycle the water and finally drain out the recycled water to canal which water is not harmful for the environment.

Solid wastage:

They collect all fabric jutes, Garbage, Wastage Paper, Empty Drum, Empty Container, Empty Bottle, Wastage Plastic, Broken Wooden box, Wastage Table, Chair, Wastage Furniture, Button, Hanger, Fabric, Polly, Zipper, Fused Tube Light, Broken Glass & other Wastage from the concerned sections and then they dispose these wastage after a certain period in the reassigned location. Some are sold or returned to the outside suppliers.

3.6.16. Housekeeping:

Housekeeping is more than just sweeping the floor and wiping dust off machines and equipment. It eliminates accident and fire causes. The most critical and most overlooked part of housekeeping is ORDER. A work area is in order when there are no unnecessary objects in the area and when all necessary items are in their proper places.

- Eliminates accident and fire causes
- Helps control property damage
- Encourages better working habits
- Reflects an image of a well-run operation
- Reduces the amount of cleanup and janitorial work
- Keeps inventory of materials to a minimum

3.6.17. Effluent Treatment Plant:

- Regular monitoring.
- Slag management.
- Maintaining communication with Ministry of Environment.
- Ensuring standard flow of the water.
- Maintaining Proper registers



Picture 3.6.17.1. ETP



Picture 3.6.17.2. ETP

4. Impacts of the Attachment

4. Impact of internship

4.1. Knitting

- Known about many type of knitting machine.
- Known about different fabrics knitting process.
- Known about different types of fabrics construction.
- Known about different types of knitting fault on grey fabric.

4.2. Dyeing and Finishing

- Known about dyeing process of different fabrics.
- Known about chemicals and their function.
- Known about dyeing and finishing machine.

4.3. Sample development

- Have known what type of sample produced here
- Have known System of sample approval
- Have known what type of machine here

4.4. Cutting

- Have known about cutting fabric
- Have known about method of cutting
- Have known defect of cutting section

- Have known about removal of fabric wastage

4.5. Sewing

- Have known about many type of sewing machine
- Have known about function of sewing machine
- Have known about sewing fault and their remedies
- Have known about total production of this section

4.6. Finishing

- Have known about total production of these garments.
- Have known about Trims and Accessories.
- Have known about how to quality assurance.

4.7. Quality

- Have gather knowledge about Quality Control system.
- Have known about garments inspection procedure

4.8. Merchandising

- Have known the activities of merchandising.
- Have known how they follow up production.
- Have known different consumption formula.

4.9. ETP

- Have known about Effluent Treatment Plant
- Have known about function of different Ingredients Used in E. T. P

4.9. Utilities

- Have known about Boiler
- Have known about air compressor
- Have known about generator

4.10. Compliance

- Have known about their compliance system
- Have known about medical facilities

5. Conclusion

Industrial attachment program has sent to the expected destiny of practical life. Through The completion of Two 42 weeks industrial attachment at **IMPRESS-NEWTEX COMPOSITE TEXTILES Ltd**, have got the impression that the factory is one of the most knit dyeing projects in Bangladesh. Though it was established in 1989, it has earned very good reputation for its best performance over any other knit dyeing project. During the industrial attachment program, had tried the best to do the duty properly. The supervising officer also satisfactory & offer co-operation in every steps. It is completely a new experience in the life, which will be very effective in the service life. During the training period, had realized that practical experience is valuable for service life.