Faculty of Engineering
Department Of Textile Engineering
REPORT ON
Industrial Attachment
At
TANZILA TEXTILE LTD
Ashulia, Savar, Dhaka
Course Title: Industrial Attachment
Course Code: TE-410
Submitted By
Jahed Hossain Jamy ID-142-23-3934
Md. Masrukh Ahmed ID: 142-23-3921
Academic Supervisor
Md. Abdullah Al Mamun
Assistant Professor
Department of Textile Engineering
This Report presented in partial fulfillment of the Requirement for the Degree of Bachelor of Science in Textile Engineering.

Advance in Apparel Manufacturing Technology

Duration: From January 07, 2018 to March 06, 2018
Acknowledgement

First of all we are grateful to Allah who gives us sound mind & sound health to accomplish Industrial Attachment at Tanzila Textile Ltd successfully. We are also grateful to our supervisor - Md. Abdullah Al Mamun, Senior Lecturer, Department of Textile Engineering, Faculty of Engineering, Daffodil international University. Her endless patience, scholarly guidance, continual encouragement, energetic supervision, constructive criticism, valuable advice, reading many inferior draft and correcting these at all stages have made it possible to complete this project.

We would like to give special thanks to the supervisors, technicians, operators and all other staffs of Tanzila Textile Ltd, who were most cordial and helpful to us during internship.

We are also thankful to our all teachers, lab assistant, register sir, coordinators and all the employees of Daffodil International University. We are highly delighted to express our regards & gratitude to honorable Head Prof. Dr. Md. MahbubulHaque for providing his best support to us. Finally, we would like to express a sense of gratitude to our beloved parents and friends for their mental support, strength and assistance throughout completing industrial attachment.

Declaration

We hereby declare that the work which is being presented in this report entitled, “Industrial Attachment at Tanzila Textile Ltd ” Is original work of our own, has not been presented for a degree of any other university and all the resources of collected information for this report have been duly acknowledged.

<table>
<thead>
<tr>
<th>Name</th>
<th>Id</th>
<th>Signature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jahed Hossain Jamy</td>
<td>134-23-3934</td>
<td></td>
</tr>
</tbody>
</table>
Letter of Approval

April

To

The Head

Department of Textile Engineering

102, Shukrabad, Mirpur Road, Dhaka 1207

Subject: Approval of Industrial Attachment Report of B.Sc in TE Program.

Dear Sir,

I am just writing to let you know that this Industrial Attachment in “Tanzila Textile LTD” has been prepared by the student bearing ID 142-23-39 and 142-23-3921 is completed for final evaluation. The whole report is prepared based on the proper investigation and information in Tanzila Textile Ltd. The student were directly involved in their industrial attachment report activities.

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

Yours Sincerely

Md. Masrukh Ahmed
Table of Contents

Executive Summary .......................................................................................................................... 1
  1. Executive Summary .................................................................................................................. 2

Chapter-2........................................................................................................................................ Error! Bookmark not defined.

Information about Factory .............................................................................................................. 3

  2.1 Basic Information ................................................................................................................... 4
    2.1.1 Company Name & Address ............................................................................................... 4
    2.1.2 Head Office Address .......................................................................................................... 4
    2.1.3 Date of Establishment ........................................................................................................ 4
    2.1.4 Founder and Directors ...................................................................................................... 4
    2.1.5 History of the Group .......................................................................................................... 4
    2.1.6 Compliance Certifications .................................................................................................. 4
    2.1.7 Sister Concerns ................................................................................................................. 4

  2.2 General Information ................................................................................................................ 5
    2.2.1 Layout ............................................................................................................................... 5
    2.2.2 Total Area .......................................................................................................................... 5
    2.2.3 Total Building ..................................................................................................................... 5
    2.2.4 Total shade ........................................................................................................................ 5
    2.2.5 Production capacity .......................................................................................................... 5
    2.2.6 Major Buyers with Their Logos ......................................................................................... 5
    2.2.7 Transport Facility .............................................................................................................. 7

  2.3 Human resource & organization structure: ............................................................................ 7
    2.3.1 Organogram ....................................................................................................................... 8
    2.3.2 Total no. of Departments .................................................................................................... 8
    2.3.3 Name of Department ......................................................................................................... 9
    2.3.4 Main production ................................................................................................................. 9
    2.3.5 Total no. of employee ....................................................................................................... 9
2.3.6 Total salary ........................................................................................................... 10
2.3.7 Vision and Mission ............................................................................................... 10

Chapter-3 ....................................................................................................................... Error! Bookmark not defined.
Details of Attachment ..................................................................................................... 11

### 3.1 KNITTING SECTION ............................................................................................. 11

- 3.1 Knitting Section ........................................................................................................ 11
- 3.1.1 Knitting Section Layout ....................................................................................... 12
- 3.1.2 Organogram .......................................................................................................... 13
- 3.1.3 Machine List .......................................................................................................... 13
- 3.1.4 Machine Description ............................................................................................ 14
- 3.1.5 Working Process in Knitting Section .................................................................. 15
- 3.1.6 Basic Knitting Element ......................................................................................... 15
- 3.1.7 Yarn Passage Diagram ......................................................................................... 16
- 3.1.8 Fabric Inspection Process .................................................................................... 16
- 3.1.9 Different Defect in Fabric .................................................................................... 16
- 3.1.10 Knit card ............................................................................................................. 18
- 3.1.11 Types of yarn used .............................................................................................. 18
- 3.1.12 Precaution .......................................................................................................... 18

### 3.2 DYEING SECTION .................................................................................................. 19

- 3.2.1 Layout .................................................................................................................. 20
- 3.2.2 Organogram .......................................................................................................... 21
- 3.2.3 Lab ......................................................................................................................... 21
- 3.2.4 Physical test Equipment ....................................................................................... 22
- 3.2.5 Color test Equipment ........................................................................................... 23
- 3.2.6 Process dyeing and finishing ............................................................................... 24
- 3.2.7 Batch section ........................................................................................................ 24
- 3.2.8 Work done in Batch Section ............................................................................... 24
- Formula for Batching .................................................................................................... 24
- 3.2.9 Fabric Turning Machine ...................................................................................... 24
- 3.2.10 Dyeing machine Specification .......................................................................... 25
3.2.11 Dyeing Machine ................................................................. 26
3.2.12 Dyeing Process ................................................................. 27
3.2.13 Chemical used in different process and their function .......... 27
3.2.14 Recipe of bright white shade fabric .................................. 28
3.2.15 Finishing ........................................................................... 29
3.2.16 Slitting Machine ................................................................. 29
3.2.17 Stenter Machine ................................................................. 29
3.2.18 Compactor Machine .......................................................... 31
3.2.19 Sueding Machine ............................................................... 32
3.2.20 Brushing Machine .............................................................. 33
3.2.21 Rolling machine ................................................................. 33
3.2.22 Quality Control ................................................................. 34
3.3 GARMENTS SECTION .............................................................. 36
3.3.1 Layout of garments section .................................................. 37
3.3.2. Organogram .................................................................... 37
3.3.3 Machine Description ............................................................. 38
3.3.4 CAD and Sample Section ...................................................... 40
3.3.5 Store Section ....................................................................... 41
3.3.6 Fabric Relaxation procedure ................................................. 43
3.3.7 Lab Section ........................................................................ 43
3.3.8 Shrinkage Checking Procedure ............................................. 44
3.3.9 Light Box Checking Instruction ............................................ 44
3.3.10 Spreading .......................................................................... 44
3.3.11 Cutting Section ................................................................. 46
3.3.12 Process of Cutting ............................................................... 46
3.3.13 Machine in cutting section ................................................ 46
3.3.14 Parts of Cutting Machine with Their Functions ................. 48
3.3.15 Points Should Concern Fabric Cutting .................................. 49
3.3.16 Lay Height ........................................................................ 49
3.3.17 Cutting Table Specification ............................................... 49
3.4.9 Finishing ................................................................................................................................. 71

3.5 ETP ........................................................................................................................................ 72

3.5.1 Process of Bio-chemical ETP ................................................................................................. 73

3.5.2 Function of ETP processes .................................................................................................... 73

3.5.3 Tested treated effluent parameter ......................................................................................... 74

3.5.4 Chemical Used in ETP ........................................................................................................ 75

3.5.5 Equipment for testing ........................................................................................................... 75

3.5.6 Capacity of treat water ......................................................................................................... 75

Chapter 4 ..................................................................................................................................... Error! Bookmark not defined.

4. Impact of Internship ...................................................................................................................... 76

4.1 Knitting Section .......................................................................................................................... 77

4.2 Dyeing Section .......................................................................................................................... 77

4.3 Garments Section ...................................................................................................................... 77

4.4 Printing Section ........................................................................................................................ 77

4.5 ETP ........................................................................................................................................... 78

Chapter-5 .................................................................................................................................... Error! Bookmark not defined.

Conclusion ...................................................................................................................................... 78

5. Conclusion ................................................................................................................................. Error! Bookmark not defined.
Executive Summary
1.1 Executive Summary

This report presents a conception of Textile sector especially of a knit composite industry and tries to clarify the overall processes required to complete a garment. Two months long training is not enough to capture all the information related to but it is possible to overview of all the departments. Tanzila Textile Ltd. In where we try to gather information about all the departments. The factory has a nice system for the internship students that are the training schedule provided by the authority. There are several departments in Tanzila Textile Ltd among them knitting, Dyeing, printing and garments are the major ones. There are also other departments those act as supporting of them. It describes about the activities of each departments and the relation among the departments. Training schedule is prepared in such a way that helps a learner to know that to produce a garment which department works first and correspondingly which works at last. This paper includes from where order is received and to where it is supplied and how a large scale of products is produced within a very short period of time. Different types of order are running on the same time on a same floor with different types of garments from several buyers. But there is no miss match of any product except some cases which are removed by inspection. This paper concludes by identifying some important information about different department that help the factory to grow up quickly with large amount of profit with environment friendly technologies. This report may be a guideline for other small industries to become large in size and for students or other people to learn a little about a knit composite industry without visiting. We have started our 2 months internship in 7th January 2018 and have successfully completed in 6th March 2018.
Information about Factory

Figure: 2.1 Tanzila Textile Ltd
2.1 Basic Information

2.1.1 Company Name & Address
TANZILA TEXTILE LTD
Ashulia, Savar, Dhaka.Bangladesh-1345

2.1.2 Head Office Address
Road # 32,
House # 492 (2nd Floor)

2.1.3 Date of Establishment:
2008

2.1.4 Founder and Directors:
Chairman : Tahmina Zaman

2.1.5 History of the Group
Tanzila Textile has been established since 2008 and has rapidly become a major supplier of ready-made garments from Bangladesh. When it comes to ready-wear manufacturing, TANZILA TEXTILE LTD. Is a cut above the rest. TANZILA TEXTILE LTD. Is a 'tells a tale of' a company that has everything right about it-its people, its technology, its systems, its customers and its location. At TANZILA TEXTILE LTD. we endeavor to provide our customers with an exceptional service of the highest standard and quality to guarantee client satisfaction. Today, TANZILA’s success is a result of state of the art equipment and experienced personnel from the management team to the factory force. With a team of such quality TANZILA TEXTILE LTD Is able to run a highly efficient and competitive production unit, enabling us to meet the industries continuous increasing standards and demands. As TANZILA’s reputation grows, so does interest from other countries.

2.1.6 Compliance Certifications
Tanzila Textile Ltd realizes the importance of adapting to changes in external environment and keeping the workplace safe and enjoyable for employees to be motivated and productive. Compliance certifications include

- SEDEX CERTIFIED
- BSCI
- OEKO-TEX

2.1.7 Sister Concerns
Divine Group
2.2 General Information

2.2.1 Layout

Figure: 2.3 Factory layout

2.2.2 Total Area: 50,000 sq. feet

2.2.3 Total Building: 5

2.2.4 Total shade: 4

2.2.5 Production capacity

<table>
<thead>
<tr>
<th>Units</th>
<th>Space</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knitting</td>
<td>15000 S.Feet</td>
<td>8 tons/day</td>
</tr>
<tr>
<td>Dyeing</td>
<td>50,000 S.Feet</td>
<td>12 tons/day</td>
</tr>
<tr>
<td>Cutting</td>
<td>10,000 S.Feet</td>
<td>35,000 pcs/day</td>
</tr>
<tr>
<td>Sewing</td>
<td>75,000 S.Feet</td>
<td>30,000 pcs/day</td>
</tr>
<tr>
<td>Finishing</td>
<td>10,000 S.Feet</td>
<td>35,000 pcs/day</td>
</tr>
<tr>
<td>Product Type</td>
<td>Area</td>
<td>Capacity</td>
</tr>
<tr>
<td>------------------------------------</td>
<td>-------</td>
<td>---------------</td>
</tr>
<tr>
<td>Embroidery</td>
<td>4000 S.Feet</td>
<td>5000 pcs/day</td>
</tr>
<tr>
<td>Screen Printing</td>
<td>7000 S.Feet</td>
<td>28,000 pcs/day</td>
</tr>
<tr>
<td>Offset Printing</td>
<td>2000 S.Feet</td>
<td>30,000 unit/day</td>
</tr>
<tr>
<td>Sewing Thread (Reconning)</td>
<td>1000 S.Feet</td>
<td>3000 pcs/day</td>
</tr>
<tr>
<td>Sample</td>
<td>2500 S.Feet</td>
<td>100 pcs/day</td>
</tr>
<tr>
<td>Ware House (Garments)</td>
<td>12,000 S.Feet</td>
<td>1,00,000 pcs</td>
</tr>
<tr>
<td>Ware House (Yarn)</td>
<td>12,500 S.Feet</td>
<td>200 tons</td>
</tr>
<tr>
<td>Ware House (Grey Fabrics)</td>
<td>12,500 S.Feet</td>
<td>200 tons</td>
</tr>
<tr>
<td>Ware House (Finish Fabrics)</td>
<td>12,500 S.Feet</td>
<td>100 tons</td>
</tr>
<tr>
<td>Ware House (Dyes-Chemical)</td>
<td>8,000 S.Feet</td>
<td>500 tons</td>
</tr>
<tr>
<td>Utility</td>
<td>4500 S.Feet</td>
<td></td>
</tr>
</tbody>
</table>

2.2.6 Major Buyers with Their Logos

<table>
<thead>
<tr>
<th>Buyer Name</th>
<th>Logo</th>
</tr>
</thead>
<tbody>
<tr>
<td>NKD</td>
<td><img src="image" alt="NKD Logo" /></td>
</tr>
<tr>
<td>Cotton On</td>
<td><img src="image" alt="Cotton On Logo" /></td>
</tr>
<tr>
<td>ICA</td>
<td><img src="image" alt="ICA Logo" /></td>
</tr>
</tbody>
</table>
Table: 2.1 Buyer of Tanzila Textile Ltd

2.2.7 Transport Facility
Office Stuff: Bus, Car
Product: Cargo van

2.3 Human Resource & Organization Structure
2.3.1 Organogram

![Organogram Diagram]

2.3.2 Total no. of Departments
09
2.3.3 Name of Department

I. Knitting section
   ➢ Knitting
   ➢ Inspection

II. Printing Section
   ➢ Screen Printing
   ➢ Offset Printing

III. Dyeing Section
   ➢ Dyeing
   ➢ Finishing
   ➢ Quality

IV. Garments section
   ➢ Sample
   ➢ Cutting Section
   ➢ Sewing Section
   ➢ Finishing Section
   ➢ Merchandising

V. Utility section
   ➢ Electricity
   ➢ Gas
   ➢ Boiler

VI. Store Section

VII. Administration Section

VIII. Security Section

IX. Warehouse
   ➢ Yarn
   ➢ Gray Fabric
   ➢ Finish Fabric
   ➢ Dyes Fabric

2.3.4 Main production
Knitting, dyeing & printing
Spandex, Fleece, S/J, Interlock, Rib, Lacoste, Pk etc.

Garments

All types of knit items for, such as T-shirt, pant, Ladies, Mens, Kids, Babies and Children.

2.3.5 Total no. of employee
Almost 1500
2.3.6 Total salary: $50 millions

2.3.7 Vision and Mission

Vision

To become a truly global supplier that provides a sustainable growth opportunities for its customer, county and its employees, whilst achieving its goal of becoming the number one value fashion supplier across the world.

Mission

- Be a market leader in the field of value global supplier of RMG.
- Deliver quality fashionable products at affordable prices.
- Be innovative, cost effective and globally competitive.
3.1 KNITTING SECTION

3.1 Knitting Section

Fig: 3.1. Knitting Section
3.1.1 Knitting Section Layout

Figure: 3.2 Layout of knitting section
3.1.2 Organogram

![Organogram of knitting](image)

Figure: 3.3 Organogram of knitting

3.1.3 Machine List

<table>
<thead>
<tr>
<th>Machine Name</th>
<th>UNIT</th>
<th>No. of Machine</th>
<th>Capacity</th>
<th>Actual Production</th>
</tr>
</thead>
</table>
### Circular knitting machine

<table>
<thead>
<tr>
<th>M/C TYPE</th>
<th>Brand</th>
<th>Dia</th>
<th>Gauge</th>
<th>Feeder</th>
<th>QTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>S/J</td>
<td>Pia lung</td>
<td>40</td>
<td>24</td>
<td>120</td>
<td>1</td>
</tr>
<tr>
<td>S/J</td>
<td>Pia lung</td>
<td>38</td>
<td>24</td>
<td>114</td>
<td>1</td>
</tr>
<tr>
<td>S/J</td>
<td>BCTEX</td>
<td>38</td>
<td>24</td>
<td>120</td>
<td>1</td>
</tr>
<tr>
<td>S/J</td>
<td>Pia lung</td>
<td>36</td>
<td>24</td>
<td>108</td>
<td>1</td>
</tr>
<tr>
<td>S/J</td>
<td>BCTEX</td>
<td>36</td>
<td>24</td>
<td>114</td>
<td>2</td>
</tr>
<tr>
<td>Rib/Interlock</td>
<td>Pia lung</td>
<td>36</td>
<td>18,24</td>
<td>72</td>
<td>1</td>
</tr>
<tr>
<td>Rib/Interlock</td>
<td>BCTEX</td>
<td>34</td>
<td>18,24</td>
<td>72</td>
<td>1</td>
</tr>
<tr>
<td>Rib/Interlock</td>
<td>Pia lung</td>
<td>32</td>
<td>18,24</td>
<td>64</td>
<td>1</td>
</tr>
<tr>
<td>S/J</td>
<td>Pai Lung</td>
<td>32</td>
<td>20,24</td>
<td>96</td>
<td>1</td>
</tr>
<tr>
<td>S/J</td>
<td>BCTEX</td>
<td>32</td>
<td>24,28</td>
<td>102</td>
<td>2</td>
</tr>
<tr>
<td>S/J</td>
<td>Pai lung</td>
<td>34</td>
<td>24</td>
<td>102</td>
<td>1</td>
</tr>
<tr>
<td>S/J</td>
<td>BCTEX</td>
<td>34</td>
<td>20,24,28</td>
<td>108</td>
<td>2</td>
</tr>
<tr>
<td>S/J</td>
<td>Pai Lung</td>
<td>34</td>
<td>20,24</td>
<td>90</td>
<td>1</td>
</tr>
<tr>
<td>S/J</td>
<td>BCTEX</td>
<td>30</td>
<td>20,28</td>
<td>96</td>
<td>2</td>
</tr>
<tr>
<td>S/J</td>
<td>Pai Lung</td>
<td>30</td>
<td>24</td>
<td>84</td>
<td>1</td>
</tr>
<tr>
<td>S/J</td>
<td>Pai Lung</td>
<td>28</td>
<td>24</td>
<td>78</td>
<td>1</td>
</tr>
<tr>
<td>Fabric Check</td>
<td>Foshan best leader</td>
<td>26</td>
<td></td>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>

### Flat knitting machine

<table>
<thead>
<tr>
<th>M/C TYPE</th>
<th>Brand</th>
<th>Dia</th>
<th>Gauge</th>
<th>Feeder</th>
<th>QTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collar</td>
<td>500pcs/12hour.per m/c</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cuff</td>
<td>1100pcs/12hour.per m/c</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Fabric inspection machine

<table>
<thead>
<tr>
<th>M/C TYPE</th>
<th>Brand</th>
<th>Dia</th>
<th>Gauge</th>
<th>Feeder</th>
<th>QTY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table: 3.1 Machine List

#### 3.1.4 Machine Description

**Circular Knitting Machine**
Fabric Inspection Machine

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>AATPR Industry Company Ltd.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Origin</td>
<td>Thailand</td>
</tr>
</tbody>
</table>

Table: 3.3 Description of fabric inspection Machine

3.1.5 Working Process in Knitting Section

- **Sample receive**
- **Yarn test report ok**
- **Trial batch ok**
- **Bulk production running**
- **Production grey store**
- **Sample develop**
- **Yarn Test**
- **Trial batch ok**
- **Yarn receive**
- **Bulk production ok**
- **Yarn booking**
- **Production grey store**

Figure: 3.4 Working Process in Knitting Section

3.1.6 Basic Knitting Element

- **Needle.**
  - It is a principal element of the knitting machine. It helps the yarn to create a loop. And by this way fabric are produce.

- **Sinker.**
  - It helps to loop forming, knocking over and holding down the loop.
Cam.
Cam is a device which converts the rotary machine drive into a suitable reciprocating action for the needles.

3.1.7 Yarn Passage Diagram

![Yarn Passage Diagram]

Figure: 3.5 Yarn Passage Diagram

3.1.8 Fabric Inspection Process
Four point system

<table>
<thead>
<tr>
<th>Defect size</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 inch or less</td>
<td>1</td>
</tr>
<tr>
<td>3 to 6 inch</td>
<td>2</td>
</tr>
<tr>
<td>6 to 9 inch</td>
<td>3</td>
</tr>
<tr>
<td>Over 9 inch</td>
<td>4</td>
</tr>
<tr>
<td>All hole</td>
<td>4</td>
</tr>
</tbody>
</table>

Table: 3.5 four point system

28 points per 100 square yards is acceptable

Points count x 36 x 100

Formula: \[ \text{Points} \times 36 \times 100 \]

Roll length 9 (yds.) x Fabric dia (inch)

3.1.9 Different Defect in Fabric

<table>
<thead>
<tr>
<th>Fault Name</th>
<th>Causes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heading</td>
<td>Problems</td>
</tr>
<tr>
<td>--------------------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| Hole               | ➢  Yarn feeder badly set.  
➢  Yarn breakage. |
| Set-off            | ➢  Yarn breaks before the yarn feeder.  
➢  Yarn package. winding faults, |
| Oil spot           | When oil licks through the needle to the fabrics                        |
| Sinker mark        | Sinker head bend                                                        |
| Needle line        | Caused by bend needle                                                   |
| Yarn contamination | Count mixing occurs                                                     |
| Dust knit          | Dust on the machine part                                                |
| Star mark          | ➢  Yarn tension variation during production  
➢  Due to damage of needle latch |
| Fly                | When lint is too much flying during fabric production                  |
| Needle mark        | ➢  Needles are not cleans.  
➢  Use of defected bent needle.  |
| Thick & Thin Places | ➢  It causes due to yarn problem. If thick & thin places remain in yarn.  
➢  Tension variation |

Table: 3.6 Different Defect in Fabric
3.1.10 Knit Card
In Knitting section knit card is used to indicate some information. Such as:

- Order number
- Yarn type
- Buyer name
- Fabric type
- Colour
- GSM etc

3.1.11 Types of Yarn Used
- 100% cotton
- Mélange
- PC
- CVC
- Polyester
- Spandex
- Organic

3.1.12 Precaution
Mask and air plug should be used during production.
3.2 DYEING SECTION
3.2.1 Layout

Figure: 3.7 Layout of dyeing section
3.2.2 Organogram

Figure: 3.8 Organogram of dyeing section

3.2.3 Lab

There are two types of testing

i. Physical Test
ii. Color Test
3.2.4 Physical Test Equipment

**Incubator**

Function

- Used for Perspiration, Saliva, Phenolic yellowing test

**Washing machine**

Function

- Used to wash the sample with standard washing chemical in order to assess the dimensional stability of sample.

**Crock meter**

Function

- Used to test the color fastness of fabric against rubbing

**GSM cutter**

Function

- Used to cut sample for GSM check.

**Tumble dryer**

Function

- Used to dry the sample.

**Pilling tester**

Two types

a. ICI Pilling box
b. Martindale pilling test

Function

- Used to test the resistance of fabric against pilling.

**Shrinkage test**

- Sample whose shrinkage test is to be done is placed on the table.
- Putting the glass template on sample and marking with unchangeable marker is done.
Then the sample is washed at 60°C temperature for 90 minutes & Sample is dried out.

Three points on warp side and three points on weft side are checked to find out the dimensional change and mean value is taken for accurate result.

**PH meter**

Function

- Used to determine the PH of a solution.

**3.2.5 Color test Equipment**

**Auto disperse machine**

Function:

- Used for making a solution of dyes and chemical in accurate amount.

**Data color Spectrophotometer**

Function:

- Color matching
- Measuring color difference

**Sample dyeing machine**

Function:

- Used for dyeing the lab samples.

**Water Hardness Tester**

Function:

- Used to test the hardness of water.

**Light box**

Function:

- Checking color difference under different light source like D65, UV etc.
3.2.6 Process Dyeing and Finishing

![Diagram of dyeing and finishing process]

Figure: 3.9 Process of dyeing and finishing

3.2.7 Batch section
Batching is the process to get ready the fabrics which should be dyed and processed for a particular lot of a particular order. In batch section, quantity of fabric according to ratio of rib and body fabric is calculated.

3.2.8 Work done in Batch Section

- Receive the grey fabrics roll from knitting section or other source.
- Turn out the tubular fabric to safe the face side of the fabric from any type of friction during dyeing.
- Prepare the batch card of fabric for dyeing according to the following criteria-
  - Order sheet
  - Dyeing shade
  - Machine available
  - Type of fabrics (100% cotton, PC etc.)
- Send the grey fabric to the dyeing floor with batch card.
- Keep records for every previous dyeing.

Formula for Batching

\[
\text{Ratio Wise batch (kg)} = \frac{\text{Batch quantity} \times \text{Dia. Quantity}}{\text{Total quantity}}
\]

3.2.9 Fabric Turning Machine
If fabric produced in tube form, fabric turning machine is used. It is used for turning into back side to face side of fabric before dying. It is done mainly using high air speed.
Function

- To make the back face side
- To remove some dirt from the fabric

![Fabric Turning Machine](image)

Figure: 3.10
Fabric turning Machine

### 3.2.10 Dyeing machine Specification

<table>
<thead>
<tr>
<th>Operation</th>
<th>No of machine</th>
<th>Capacity</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>For sample</td>
<td>Sample 4</td>
<td>50kg per machine</td>
<td>Brand name: TURKIYE</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Design temp.:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Manufacturer:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Origin: TURKIYE</td>
</tr>
<tr>
<td>Bulk</td>
<td>1</td>
<td>120 kg per machine</td>
<td>Brand name:DILMENLER</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>250 kg per machine</td>
<td></td>
</tr>
</tbody>
</table>
Table 3.7 Dyeing machine Specification

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>500 kg per machine</th>
<th>760 kg per machine</th>
<th>1000 kg per machine</th>
<th>1400 kg per machine</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Design temp.</td>
<td>Design temp. : 140°C</td>
<td>Manufacturer:</td>
<td>Manufacturer:</td>
<td>Manufacturer:</td>
</tr>
<tr>
<td>2</td>
<td>Manufacturer:</td>
<td>Manufacturer:</td>
<td>Origin: TURKIYE</td>
<td>Origin: TURKIYE</td>
<td>Origin: TURKIYE</td>
</tr>
</tbody>
</table>

3.2.11 Dyeing Machine

![Figure: 3.11 Dyeing machine](image-url)
### 3.2.13 Chemical used in different process and their function

<table>
<thead>
<tr>
<th>Process</th>
<th>Chemical</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-treatment</td>
<td>Detergent</td>
<td>Used as wetting agent and also remove impurities.</td>
</tr>
<tr>
<td></td>
<td>Sequestering agent</td>
<td>Used for remove water hardness.</td>
</tr>
<tr>
<td></td>
<td>Ant creasing agent</td>
<td>Used for reducing crease effect of fabric during processing.</td>
</tr>
<tr>
<td></td>
<td>Antifoaming agent</td>
<td>Antifoaming agent is used to resist foam formation during pretreatment and dyeing.</td>
</tr>
<tr>
<td></td>
<td>Stabilizer</td>
<td>Increase rate of hydrogen peroxide</td>
</tr>
<tr>
<td></td>
<td>Alkali</td>
<td>Dead fiber and dust remove.</td>
</tr>
<tr>
<td></td>
<td>Bleaching agent</td>
<td>Increase the fabric whiteness.</td>
</tr>
<tr>
<td>Neutralization</td>
<td>Peroxide killer</td>
<td>Killed peroxide which is remaining in the material.</td>
</tr>
<tr>
<td></td>
<td>Acid</td>
<td>pH control</td>
</tr>
<tr>
<td></td>
<td>Enzyme</td>
<td>Remove Hairiness</td>
</tr>
<tr>
<td>Dyes &amp;</td>
<td>Leveling agent</td>
<td>Used for uniform dyeing.</td>
</tr>
<tr>
<td></td>
<td>Dye</td>
<td>For fabric coloration.</td>
</tr>
<tr>
<td></td>
<td>Salt</td>
<td>Increase the exhaustion rate of the dyeing process.</td>
</tr>
</tbody>
</table>
Chemical | Soda | Control of the rate of reaction between reactive dye and cellulosic material.
--- | --- | ---
Neutralization & Wash off | Acid | pH control
| Wash off | For removing unfixed dyes.
Fixing | Fixing agent | Fix the dyestuff and also remove unfixed dyes.
Softener | Softener | Soft the fabric.
| Acid | pH control

Table: 3.8 Chemical used in different process and their function

3.2.14 Recipe of bright white shade fabric

In here:

Lot weight: 405kg
M: L=1:6
Water= 2500L

<table>
<thead>
<tr>
<th>Process</th>
<th>Chemical &amp; amount</th>
<th>Run time &amp; Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-treatment</td>
<td>PCL5- .8 gm./l =2kg</td>
<td>40min 88°C</td>
</tr>
<tr>
<td>2UD-.5 gm./l =1.25kg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soft-1.5 gm./l =3.75kg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C2G-1.2 gm./l =2.5kg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caustic- 3.3 gm./l =7.5kg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>H2O2- 9.1 gm./l =22.5kg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neutralization</td>
<td>3BK- 2% = 810gm</td>
<td>24min, 80°C</td>
</tr>
<tr>
<td>Acid- 1 gm./l = 2.5kg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enzyme- .15% = 607gm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PH= 4.5-5.5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table: 3.9 Recipe of bright white shade fabric
3.2.15 Finishing

3.2.16 Slitting Machine
Manufacturer name: CorinoMacchine Spa

Year: 2011
SN.: 287/12
Type: Super slit
Origin: Italy

Figure: 3.13 Slitting Machine

Object of slitting machine
- To open tube fabric according to specific needle mark.

Function
- Remove excess water.
- Slit the tube fabric by the knife for opening of the fabric.

3.2.17 Stenter Machine
Manufacturer: BRUCKENER

Origin: Germany
Temperature range: 50-250°c
Pressure: 1.5-4.0 kg, normally 4 kg
Figure: 3.14 Stenter Machine

**Function**

- Width of the fabric is controlled by the stenter.
- Spirility controlled by the stenter.
- GSM of the fabric is controlled by stenter.

**Chemical used in Stenter machine**

i. Anti-crease + Detergent for heat seat
ii. Softener / fixing agent for color fabric

Temperature needed:
White: 110\(^0\)c - 140\(^0\)c  
Black: 120\(^0\)c - 160\(^0\)c  
Dark: 120\(^0\)c - 120\(^0\)c  
Light: 130\(^0\)c - 140\(^0\)c

**3.2.18 Compactor Machine**

Brand Name: Lafer  
Manufacturer: SPA Machine Tessili  
Origin: Italy  
Serial: 10KS03225

![Compactor machine](image)

**Function of Compactor machine**

i. **Control GSM**
   - If over feed is more then GSM is also more.
   - If over feed speed is less then GSM is also is less.

ii. **Control shrinkage**
    Shrinkage is controlled by proper over feeding
iii. Control fabric Dia.
   Dia is controlled by dia controlling meter scale
   - If over feed speed is more then dia of the fabric will be more.

iv. Increase smoothness of fabric

**Temperature needed**

White: 100\(^\circ\)c

Off white: 110\(^\circ\)c

Dark: 130\(^\circ\)c - 140\(^\circ\)c

Fleece: 140\(^\circ\)c - 160\(^\circ\)c

**3.2.19 Sueding Machine**

Brand name: Lafer

Manufacturer: SPA Machine Tessili

Country: Italy

Cylinder: 1

Machine Speed: 40 m/min

Roller: 6

Pile: 3

Counter Pile: 3

![Sueding Machine](image)

**Figure: 3.16 Sueding Machine**

**Function**

Sueding is a mechanical finishing process in which a fabric is abraded on one side to raise or create a fibrous surface. This fibrous surface improves the fabric appearance, gives the fabric a softer, fuller hand.

Types of fabric used

- Rib 1/1, 1/2,
- Lycra S/J
- Cotton S/J
- Fleece
- CBC, PC S/J
3.2.20 Brushing Machine
Brand name: Lafer
Manufacturer: SPA Machine Tessili
Country: Italy
Cylinder: 2
In upper cylinder: 14 pile & 14 counter pile
In lower cylinder: 14 pile & 14 counter pile

![Brushing Machine](image)

Figure: 3.17 Brushing Machine

**Function**

This process gives an attractive and smooth surface to the fabric. It is done by the machine having rotating cylinders with spiral blades. Its action resembles that of a lawn mower.

**Fabric used**

- Cotton Fleece
- Terry Fleece
- CBC Fleece

3.2.21 Rolling machine
Manufacturer: EhwhaGlotech
Origin: South Korea
Serial No: EH08-00104-R-26
Machine Speed: 100 m/min
Working width: 2650 mm

![Rolling Machine](image)

Figure: 3.18 Rolling Machine

**Function**

Used for fabric rolling.

**3.2.22 Quality Control**

i. GSM check

ii. Fabric inspection

Fabric inspection is done by 4 systems

28 points is acceptable in 100 sq. yards

- Up to 18: Grade A
- 19 – 28: Grade B
- Over 28 is reject

**Defects Name**

- Uneven Dyeing
- Crease mark
- Dye spot
- Wrinkle mark
- Rib mark
- Needle line
- Hole
- Lycra missing
- Dirty spot
- Iron spot
- Patta

iii. Shade check
3.3 GARMENTS SECTION
3.3.1 Layout of Garments Section

Figure: 3.19 Layout of garments section

3.3.2 Organogram
Figure: 3.20 Organogram of garments section

3.3.3 Machine Description

<table>
<thead>
<tr>
<th>Section</th>
<th>Name of the Machine</th>
<th>Number of Machine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Store</td>
<td>Fabric inspection machine</td>
<td>2 pc</td>
</tr>
<tr>
<td></td>
<td>Snap testing machine</td>
<td>3 pc</td>
</tr>
<tr>
<td>Lab</td>
<td>Washing Machine</td>
<td>1 pc</td>
</tr>
<tr>
<td>--------------</td>
<td>-----------------</td>
<td>------</td>
</tr>
<tr>
<td></td>
<td>Wascator</td>
<td>2 pc</td>
</tr>
<tr>
<td></td>
<td>Tumble Dryer</td>
<td>3 pc</td>
</tr>
<tr>
<td></td>
<td>Gyro Wash</td>
<td>2 pc</td>
</tr>
<tr>
<td></td>
<td>Crock Master</td>
<td>2 pc</td>
</tr>
<tr>
<td></td>
<td>Orbittor –pilling tester</td>
<td>2 pc</td>
</tr>
<tr>
<td></td>
<td>Specto-Photometer</td>
<td>2 pc</td>
</tr>
<tr>
<td>Cutting</td>
<td>Spreading Machine</td>
<td>2 pcs</td>
</tr>
<tr>
<td></td>
<td>Cutting Machine</td>
<td>12 pcs</td>
</tr>
<tr>
<td>Sewing</td>
<td>Plain m/c 1 needle</td>
<td>244 pcs</td>
</tr>
<tr>
<td></td>
<td>Plain m/c 2 needle</td>
<td>39 Pcs</td>
</tr>
<tr>
<td></td>
<td>Over lock 4 thread</td>
<td>297Pcs</td>
</tr>
<tr>
<td></td>
<td>Flat bed</td>
<td>62 Pcs</td>
</tr>
<tr>
<td></td>
<td>Flat lock cylinder bed</td>
<td>67 Pcs</td>
</tr>
<tr>
<td></td>
<td>Flat lock small piping</td>
<td>25 Pcs</td>
</tr>
<tr>
<td></td>
<td>Flat lock raw edge cutter</td>
<td>6 Pcs</td>
</tr>
<tr>
<td></td>
<td>Feed of the arm</td>
<td>8 Pcs</td>
</tr>
<tr>
<td></td>
<td>Button hole</td>
<td>17 Pcs</td>
</tr>
<tr>
<td></td>
<td>Bar tack</td>
<td>7 Pcs</td>
</tr>
<tr>
<td></td>
<td>Button stitch</td>
<td>9 Pcs</td>
</tr>
<tr>
<td></td>
<td>PMD kanchi</td>
<td>4 Pcs</td>
</tr>
<tr>
<td></td>
<td>Snap button</td>
<td>8 Pcs</td>
</tr>
<tr>
<td></td>
<td>Rib cutter</td>
<td>5 Pcs</td>
</tr>
<tr>
<td></td>
<td>Fusing machine</td>
<td>09pc</td>
</tr>
<tr>
<td></td>
<td>Heat transfer trace</td>
<td>8cs</td>
</tr>
<tr>
<td>Finishing</td>
<td>Needle detector machine</td>
<td>2 pc</td>
</tr>
<tr>
<td></td>
<td>Spot remover</td>
<td>3pc</td>
</tr>
<tr>
<td></td>
<td>Thread soaking</td>
<td>1 pcs</td>
</tr>
<tr>
<td></td>
<td>Iron become</td>
<td>32 pcs</td>
</tr>
</tbody>
</table>

Table: 3.10 Machine Description
3.3.4 CAD and Sample Section

Functions of CAD room:

- Producing pattern
- Marker making
- Calculate marker consumption

Figure: 3.21 CAD section

Marker machine specification

Brand name: AUDACES

Manufacturer: Ioline Corporation

Origin: USA

(Marker length in inch + AL) x (Marker width in inch + AL) *GSM

Marker consumption = \( \frac{1550 \times 1000 \times \text{number of pattern pieces}}{12} \)

- Maximum marker width 72"
- Marker efficiency should be minimum 85%.
- Marker efficiency depend on wastage during cutting

Software
For marker making TUKA CAD software is used

**Key factors during marker making**

- Fabric width must be higher than marker width
- Fabric length must be higher than marker length
- Allowance must give in end and selvedge minimum 1”
- Grain line must be parallel to the line Wales in knitted fabric.

![Image](image.png)

Figure: 3.22 Sample section

**Function of sample section**

- Working pattern making

Pattern which is used to make sample garment

Working pattern used as a base for manipulation when generating design pattern.

- Size set sample making

**Machine in sample room**

- Plain machine
- Overlock machine
- Flatlock machine
- Button hole machine

**3.3.5 Store Section**

**Function**
➢ Store the materials for order
➢ Issue and supply the materials to production unit
➢ Prepare Inventory report

Figure: 3.23 Fabric store

➢ After receiving fabric for each order then numbering different shade of color of the fabric role.
➢ Locally and Imported fabric is stored.
➢ Different types of fabric like 100% cotton single jersey, Terry, Fleece & spandex etc.

Figure: 3.24 Accessories

Different Types of Accessories

<table>
<thead>
<tr>
<th>Main label</th>
<th>Elastic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Care label</td>
<td>Zipper</td>
</tr>
</tbody>
</table>
3.3.6 Fabric Relaxation Procedure

- 100% cotton single jersey and terry
  Minimum 12 hours
- Single jersey cotton 5% Spandex & rib
  Minimum 24 hours
- Fleece 100% cotton
  Minimum 16 hours
- Fleece Polyester/ cotton
  Minimum 12 hours

3.3.7 Lab Section

Figure: 3.25 Garments Lab

Equipment’s List

- Electric balance
- GSM cutter
3.3.8 Shrinkage Checking Procedure

- 10% roll of fabric from a lot for shrinkage test.
- Take 25”*25” fabric for washing according to Buyer instruction.
- Then wash the fabric for 3 times
- Each time 10 minute wash + 5 Minute dryer
- After that find out the measurement of fabric by using formula

\[
\text{Formula} = \frac{(\text{Before wash} - \text{After wash}) \times 100}{\text{Before wash}}
\]

3.3.9 Light Box Checking Instruction

Light box is used for checking fabric shade

- F - Florescent
- D65 - Day Light
- TL 84 - Tube Light
- UV - Ultra Violet
- CWF - Color White Fluorescent used for checking white and blue shade

3.3.10 Spreading

Fabric spreading is the part of apparel manufacturing process. Fabric spreading is done after marker making. Spreading of fabric can be defined as the smooth laying out of the fabric of specific length and width. The marker is laid on the top most layer of the fabric. Cutting operation is done after completing fabric spreading. Cutting performance depends on fabric spreading. Spreading is done manually
Figure: 3.26 Fabric spreading

Requirements of Fabric Spreading

- Alignment of fabric ply,
- Correct ply tension,
- Fabric must be flat,
- Elimination of fabric defects,
- Correct ply direction and lay stability
3.3.11 Cutting Section

Figure: 3.27 cutting Section

3.3.12 Process of Cutting

Laying Paper on Cutting Table → Laying Fabric on the Paper → Put Marker Paper on the Laid Fabric

Creating Hole on Marker Paper → Attaching Marker Paper With Fabric Layer By Tape → Cutting

Bundle Numbering → Quality Check → If Quality Is Not Satisfied Then Sample Is Taken To Re-cut Table

Input Room

Figure: 3.28 Process of cutting

3.3.13 Machine in Cutting Section

<table>
<thead>
<tr>
<th>Machine name</th>
<th>End / lay cutter machine</th>
</tr>
</thead>
</table>

©Daffodil International University
**Specification**

- Brand name: Spreading Machine
- Manufacturer: Japan
- Origin: LEEWAI

**Function**

- Used for cutting end of fabric layer during fabric spreading

Table: 3.12 End / lay cutter machine description

![End cutter machine](image)

Figure: 3.29 End cutter machine

**Machine name** | **Cutting machine**
--- | ---
**Specification** | Model: BLUE STREAK II
 | Manufacturer: Eastman machine company
Table: 3.13 Fabric cutting machine description

<table>
<thead>
<tr>
<th>Function</th>
<th>Used for cutting fabric layer according to maker.</th>
</tr>
</thead>
</table>

3.3.14 Parts of Cutting Machine with Their Functions

- Plate: To stand the machine and help to move the machine.
- Feed: To hold the layer of fabric by pressure.
- Knife: To cut the layer of fabric precisely.
- Handle: To help to move the whole cutting machine according to design.
- Power switch: It is used to run and stop the machine.
- Oil box: To supply oil or lubricant to the machine parts.
- Motor: To give reciprocating motion to the knife for cutting.
- Sharpening device: To make sharp the knife edge when required.
3.3.15 Points Should Concern Fabric Cutting

- During Cutting operator must be used metal gloves.
- Precision in cut i.e. the dimension of pattern and fabric parts is cut should be same.
- The cut edge must be cleaned.
- Infused edge.
- Drill hole and size should be appropriate and it will be placed in its right place. If it is too large it would be seen after sewing. But if it is too small then it can be blocked easily.
- Should position the pattern pieces on the fold or on the grain line as indicated.
- Without shoe operator should not use cutting machine.
- Mask must be used during cutting.

3.3.16 Lay Height

- Single jersey/ spandex/ interlock: Maximum 2-2.4”
- Single jersey/Cotton & Others: Maximum 3-5”
- Fleece Maximum 4-5”
- Mesh/Dazzle: 2”

3.3.17 Cutting Table Specification

- Total Cutting Table: 4 pcs
- Table Height: 38”
- Table Width: 99.5”
- Table Length: 930”

3.3.18 Wastage during Cutting

- Ends of ply losses.
- Selvedge loss.
- Loss of fabric in roll.

3.3.19 Sewing Section

In the apparel industry or clothing industry, sewing section is the main department for garments manufacturing. When all the garments are complete to cut in the cutting section, all of these cutting parts are sending to sewing department for making garment. In this section different cutting parts are joining together with the help of different types of sewing machine, threads and needle. To complete the perfect garment easily and timely Floor in-charge always maintains a working procedure. Working procedure is also called as process flow chart of sewing department in the garments industry.
3.3.20 Process

Product analysis

Set up target for production

Set up machine layout on the basis of target

Set up operator layout on the basis of target

Line balancing

Line setup

Distribution all the processes

Cutting parts distribution to the operator and helper

Complete parts making individually

Online QC check

Counting output and checking with the target

Final quality check (for each Garment)

Figure: 3.31 sewing process
3.3.21 Different Type’s Machineries with Functions in Sewing Section

Figure: 3.32 Plain machine

Application:

- Bottom hemming
- Belt making
- Loop tack stitch
- Pocket joint stitch
- Zipper joint

Figure: 3.33 Over lock machine

Application:

- Neck piping
- Sleeve piping
- Sleeve joint

Figure: 3.34 Flat bedmachine

Application:

Figure: 3.35 Flat lock cylinder bedmachine

Application:
<table>
<thead>
<tr>
<th>Belt top seam</th>
<th>Sleeve hem</th>
</tr>
</thead>
<tbody>
<tr>
<td>Back tape joint</td>
<td>Leg hem</td>
</tr>
</tbody>
</table>

**Figure: 3.36 Button Holemachine**

**Application:**
To create a hole for button

**Figure: 3.37 Heat Sealmachine**

**Application:**
Attached main label with garments
Figure: 3.38 Snap Button machine
Application:
Attached snap button and eyelet in garments.

Figure: 3.39 Feed of the Arm machine
Application:
Used for neck piping

Figure: 3.40 Fusing Machine
Application:
For interlining

Figure: 3.41 Button attaching machine
Application:
To attached button in garment
Figure: 3.42 PMD Kanchimachine
Application:
Waist band

Figure: 3.43 Rib Cuttermachine
Application:
Cutting rib and make roll

Figure: 3.44 Bar tackmachine
Application:
Bar tack stitch

Figure: 3.45 Flat lock raw edgecuttermachine
Application:
For body hem.

Table: 3.14 Sewing Machine needle information

<table>
<thead>
<tr>
<th>Machine Name</th>
<th>Needle Name</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plain</td>
<td>Db</td>
<td>7-12</td>
</tr>
<tr>
<td>Over Lock</td>
<td>Dc</td>
<td>7-12</td>
</tr>
<tr>
<td>Flat Lock/Feed of the Arm</td>
<td>Uy</td>
<td>7-12</td>
</tr>
<tr>
<td>Button Hole/ Bartech</td>
<td>dp-5</td>
<td>11-14</td>
</tr>
<tr>
<td>Button Attaching</td>
<td>Dp-17</td>
<td>11-14</td>
</tr>
</tbody>
</table>

Table: 3.15 Sewing Machine needle information
3.3.23 Machine layout (T-shirt)

![Diagram of T-shirt machine layout]

Figure: 3.46 Machine layout (T-shirt)

3.3.24 Machine layout (legging pant)

![Diagram of legging pant machine layout]

Figure: 3.47 Machine layout

3.3.25 Line Target/Hour

In this garments machine cost per day $40

Cost per machine * Number of machine per product in line = Total cost

CM cost / dz. Of garments

---------------------------------- = CM cost/pcs
Total cost

------------------- = production/day

CM cost/pcs

In garments section daily 10 hours is available.

3.3.26 Quality control in sewing section

Sewing defects

- Needle damage
- Skipped stitch
- Seam pucker
- Wrong stitch density
- Uneven stitch
- Defected stitch
- Oil spot

Seaming defects

- Uneven width
- Uneven seam line
- Not secured by back stitch
- No matching of check or stripe
- No matching of seam
- 4 point check

3.3.27 Finishing Section
3.3.28 Finishing Work in Process

![Diagram of Finishing Work in Process]

3.3.29 Process and Their Function

<table>
<thead>
<tr>
<th>Process</th>
<th>Function</th>
<th>View</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inside Check</td>
<td>Check defect in inner part of garments.</td>
<td><img src="image" alt="Inside Check View" /></td>
</tr>
<tr>
<td></td>
<td>Like missed stitch, uneven seam.</td>
<td></td>
</tr>
<tr>
<td>Thread checker</td>
<td>Remove loose thread from garments part.</td>
<td><img src="image" alt="Thread Checker View" /></td>
</tr>
<tr>
<td>Needle Detector Check</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Ironing</strong></td>
<td>Create a shape of garments.</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td></td>
</tr>
</tbody>
</table>
| **Top side Check** | Check defect in top part of garments  
Like,  
Uncut thread, Skipped stitch, |
| **Get-up check** |  
- Check Cutting small thread  
- Check Whether color shade is right or not  
- Check Spot in garments |
| **Measurement check** | Check measurement according to buyer requirement |
| **Asymmetric check** | Check uneven parts of garments. |
| **Hang tag attach** | Hang tags are attached with a garment, such as,  
| | a) Price tag  
| | b) Tag of garment type |
| **UPC check** | Checking barcode and style number of garments |
| **Lot pass audit** | In here takes number sample from a lot then check all faults. If faults are found greater than the acceptable range then the lot is rework. |
| **Needle detector check** | It identifies needles in garments if have. |
| **Folding** | Pressed garments are folded in a specific dimension. This work is usually done by |
women labors.

<table>
<thead>
<tr>
<th>Assortment</th>
<th>In this section garments are assorted in different size and color in a ratio.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poly</td>
<td>In this section garments are packed in poly.</td>
</tr>
<tr>
<td>Carton</td>
<td>Poly is filled in carton.</td>
</tr>
</tbody>
</table>

Table: 3.16 Finishing Process and Their Function

**3.3.30 Final Inspection**

Garments are inspected by AQL. In this system samples are collected inspected by statistically from the lot size and will decide the lot of garments to be granted or rejected. AQL is mainly used in final inspection after garment making.

**Defect Classification**
The client defines the AQL and the maximum number of defective goods allowed in the sample size. Defects detected during visual inspection are usually classified within 3 categories: “Critical”, “Major” and “Minor”

<table>
<thead>
<tr>
<th>Lot Size</th>
<th>Inspection Level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 ( Light )</td>
</tr>
<tr>
<td>2 to 8</td>
<td>A</td>
</tr>
<tr>
<td>9 to 15</td>
<td>A</td>
</tr>
<tr>
<td>16 to 25</td>
<td>B</td>
</tr>
<tr>
<td>26 to 50</td>
<td>C</td>
</tr>
<tr>
<td>51 to 90</td>
<td>C</td>
</tr>
<tr>
<td>91 to 150</td>
<td>D</td>
</tr>
<tr>
<td>151 to 280</td>
<td>E</td>
</tr>
<tr>
<td>281 to 500</td>
<td>F</td>
</tr>
<tr>
<td>501 to 1200</td>
<td>G</td>
</tr>
<tr>
<td>1201 to 3200</td>
<td>H</td>
</tr>
<tr>
<td>3201 to 10000</td>
<td>J</td>
</tr>
<tr>
<td>10001 to 35000</td>
<td>K</td>
</tr>
<tr>
<td>35001 to 150000</td>
<td>L</td>
</tr>
<tr>
<td>150001 to 500000</td>
<td>M</td>
</tr>
<tr>
<td>500001 to over</td>
<td>N</td>
</tr>
<tr>
<td>Code Letter</td>
<td>Sample size</td>
</tr>
<tr>
<td>-------------</td>
<td>-------------</td>
</tr>
<tr>
<td>A</td>
<td>2</td>
</tr>
<tr>
<td>B</td>
<td>3</td>
</tr>
<tr>
<td>C</td>
<td>5</td>
</tr>
<tr>
<td>D</td>
<td>8</td>
</tr>
<tr>
<td>E</td>
<td>13</td>
</tr>
<tr>
<td>F</td>
<td>20</td>
</tr>
<tr>
<td>G</td>
<td>32</td>
</tr>
<tr>
<td>H</td>
<td>50</td>
</tr>
<tr>
<td>J</td>
<td>80</td>
</tr>
<tr>
<td>K</td>
<td>125</td>
</tr>
<tr>
<td>L</td>
<td>200</td>
</tr>
<tr>
<td>M</td>
<td>315</td>
</tr>
<tr>
<td>N</td>
<td>500</td>
</tr>
<tr>
<td>P</td>
<td>800</td>
</tr>
<tr>
<td>Q</td>
<td>1250</td>
</tr>
<tr>
<td>R</td>
<td>2000</td>
</tr>
</tbody>
</table>

Table: 3.17&18 AQL chart

Allowed defect according to lot size

For all sample size, Critical defect= 0

Major= 2.5

Minor= 4.0 / 6.5.
3.3.31 Merchandising Department
Merchandising is the department which mediates marketing and production departments. Sometimes, merchandising department will also have to do costing and pricing.

Work Done by Merchandiser
- Buyer searching
- Costing and consumption
- Order receive
- Sample approval
- Prepare TNA
- Fabric and accessories booking
- Follow up lead time
- Production follow up
- Delivered good at right time and right quantity

3.3.32 Calculation of Knit Fabric Consumption (T-shirt)
Body fabric consumption per dozen, (all measurements in cm)

\[
\text{Body fabric consumption per dozen} = \left( \frac{\text{Width}}{2} + \frac{\text{Neck Rib Width}}{2} + \frac{\text{Total Height}}{2} \right) \times \left( \frac{\text{Width}}{2} + \frac{\text{Total Height}}{2} \right) \times \frac{\text{Neck Rib Width}}{2} \times \frac{\text{Total Height}}{2} + \frac{\text{Neck Rib Width}}{\%}
\]

Neck Rib Consumption:
- Width = Neck width x 2 + 2 cm (Round)
- Total Height = Rib Height x 2 + Allowance

3.3.33 Points for consumption
- Types of fabric and fabric GSM will be confirmed by the buyer.
- For body length and sleeve length, approximate sewing allowance should be needed at body hem, shoulder joint, sleeve hem and armhole joint.
- For chest width, approximate sewing allowance should be needed at both side.
- And approximate fabric wastage in various stages is 5 to 15%.

3.3.34 Costing of a Basic T-shirt
Total fabric consumption = 2 kg/dz.

Actual fabric consumption = 2 + (13% process loss + 5% cutting wastage)

= 2.38 kg/dz.

Yarn cost -------------------------- $2.7/kg
Knitting cost----------------------$.2/kg
Dyeing cost----------------------$1.7/kg

----------------------------------------------------------
Total-------------------------------$4.6/kg

Others

CM (cost of making) ----------------------$ 6.00
Accessories cost ---------------------- $ 3.50
Chest print ---------------------- $ 2.00
Lab test ---------------------- $ 1.00
Others cost----------------------$3.00

----------------------------------------------------------
Total ---------------------- $14.50

In total cost /dz. = ($ 4.6×2.38) +$ 14.50 = $ 23.7/dz.

Buying house (%) + profit % = 5% + 10%

= 15%

Now cost of a t-shirt= ($23.7+15%) / 12

Per pcs FOB = $2.28

3.3.35 Thread Requirement Chart

<table>
<thead>
<tr>
<th>Machine name</th>
<th>Classification</th>
<th>Required thread per inch</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plain machine</td>
<td>1</td>
<td>2.5”</td>
</tr>
<tr>
<td>Plain machine</td>
<td>2</td>
<td>5”</td>
</tr>
<tr>
<td>Over lock</td>
<td>3</td>
<td>13.25”</td>
</tr>
<tr>
<td>Over lock</td>
<td>4 Thread</td>
<td>15.75’</td>
</tr>
<tr>
<td>Over lock</td>
<td>5 Thread</td>
<td>18.75”</td>
</tr>
<tr>
<td>Flat lock</td>
<td>3 Thread</td>
<td>16.75”</td>
</tr>
</tbody>
</table>
### Table: 3.20 Thread Requirement Chart

<table>
<thead>
<tr>
<th>Flat lock</th>
<th>5 Thread</th>
<th>22.25”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bar tack stitching</td>
<td></td>
<td>7” per operation</td>
</tr>
<tr>
<td>Button hole stitching</td>
<td></td>
<td>7” per hole</td>
</tr>
<tr>
<td>Button attaching 2 hole</td>
<td></td>
<td>3” per button</td>
</tr>
<tr>
<td>Feed of the arm</td>
<td></td>
<td>7” for 1 needle</td>
</tr>
<tr>
<td>Kanchi stitching</td>
<td></td>
<td>7” for 1 needle</td>
</tr>
<tr>
<td>Back tape stitching</td>
<td></td>
<td>7” for 1 needle</td>
</tr>
</tbody>
</table>

#### 3.3.36 Production Planning and Control (PPC) Department

Production planning and Control department is one of the important department for the apparel manufacturing company.

Working area:

- **Job Scheduling**
  
  Preparation of time and action calendar for each order from order receiving to shipment.

- **Material Resource Planning**
  
  Preparation of Material requirement sheet according to sample product

- **Loading production**
  
  Planner defines which style to be loaded to the production line and how much quantity to be loaded.

- **Process selection & planning**
  
  According to the order requirement PPC department select processes for the orders. Sometime extra processes are eliminated to reduce cost of production.

- **Capacity planning**
  
  PPC department plays a major role during order booking. They decide how much order they should accept according to their production capacity.

- **Line planning**
Line planning with daily production target for the production line.

- Follow up

PPC department keeps close look whether everything is progressing according the plan. They update order wise completed tasks on the Time & action Calendar.

### 3.3.37 Maintenance Section

![Maintenance Section](image)

**Figure: 3.49 Maintenance section**

Maintenance is a process by which equipment is looked after in such a way that trouble free.

- All machines are checking in every month.
- Oil change depends on machine use.
- Mostly cutting machine oil change in every 7 days.
- If any problem occurs exchange machine or solve machine problem as early as possible.
3.4 PRINTING SECTION

3.4.1 Layout
Figure: 3.50 Layout of printing section
3.4.2 Organogram

Figure: 3.51 Organogram of printing section

3.4.3 Printing Type
AOP- All over printing/ fabric print
Print Types

- Pigment (for all fiber)
- Reactive (only for cotton)
- Discharge
- Metallic/Glitter
- Burn Out

3.4.4 Printing Process

![Diagram of the printing process]

Figure: 3.52 Printing process

3.4.5 Screen Making Process

![Diagram of the screen making process]

Figure: 3.53 Screen making process

3.4.5 Machine

- Auto Printing Machine

Brand name: SROQUE

Origin: Portugal

- Auto Plate Shot

Origin: Switzerland
3.4.8 Chemical Used in Printing

<table>
<thead>
<tr>
<th>Name</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Binder</td>
<td>To fix color</td>
</tr>
<tr>
<td>Thickener</td>
<td>Maintain viscosity</td>
</tr>
<tr>
<td>Softener</td>
<td>Soft</td>
</tr>
<tr>
<td>Urea</td>
<td>To reduce friction</td>
</tr>
<tr>
<td>Liquor Ammonia</td>
<td>pH control</td>
</tr>
<tr>
<td>Fixing agent</td>
<td>Fixation</td>
</tr>
<tr>
<td>Resist salt</td>
<td>Prevent color bleeding</td>
</tr>
</tbody>
</table>

Table: 3.21 Chemical used in printing

3.4.9 Finishing

Small Compressor

**Function**

- Dye is fixed by subjecting the print to hot air by using heat of steam.
- Mainly used after reactive color print of cotton fabric.
Figure: 3.54 ETP
3.5.1 Process of Bio-chemical ETP

Figure: 3.55 Process of Bio-chemical ETP
Table: 3.22 Function of ETP processes

<table>
<thead>
<tr>
<th>Process</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screening</td>
<td>Extra-largematerial removes from water.</td>
</tr>
<tr>
<td>Equalization Tank</td>
<td>Different color water mixing and cooling. Temperature controlled around 50°C</td>
</tr>
<tr>
<td>Flash Mixing Tank</td>
<td>Produce sludge. Chemical used: FESO₄·7H₂O</td>
</tr>
<tr>
<td>Flocculation Tank</td>
<td>Flocculate sludge in water. Polyelectrolyte is used for flocculation</td>
</tr>
<tr>
<td>Lamella Clarifier Tank A</td>
<td>Sludge separate from water.</td>
</tr>
<tr>
<td>Lamella Clarifier Tank B</td>
<td>Sludge separate from water.</td>
</tr>
<tr>
<td>PH Correction Tank</td>
<td>pH control in water.</td>
</tr>
<tr>
<td>Biological Tank</td>
<td>Bacteria breakecolor particle and feed. Some sludge is produced.</td>
</tr>
<tr>
<td>FMR Lamella</td>
<td>Remaining sludge is separated.</td>
</tr>
<tr>
<td>Post Aeration</td>
<td>Blowing air for providing oxygen to bacteria for treating and stabilizing the wastewater.</td>
</tr>
<tr>
<td>Sand Filter</td>
<td>Water filtration</td>
</tr>
<tr>
<td>Carbon Filter</td>
<td>Water filtration</td>
</tr>
<tr>
<td>Drain</td>
<td>Water pass out in river.</td>
</tr>
</tbody>
</table>
Table 3.23 ETP treatment parameter

3.5.4 Chemical Used in ETP

Lime:
Used for cleaning the water

Polyelectrolyte:
To Flocculate sludge

Urea & DAP:
Used for bacteria feed.

HCL:
Neutralize the waste water controlling the PH.

Ferrous sulphate:
Create sludge.

3.5.5 Equipment for testing

- TDS meter
- DO meter
- PH meter
- Microscope
- Temperature machine

3.5.6 Capacity of treat water
165 m³/day
Impact of Internship
4.1 Knitting Section
In knitting section we have learned about the following topics:

- Introducing with different types of knitting machine.
- Know about knitting faults.
- Knowing different types of fabric.
- Four point system.
- Knitting fabric inspection system.
- Knowing about fabric inspection machine.

4.2 Dyeing Section
In dyeing section we have learned about the following topics:

- Introducing different type of dyeing and finishing machine.
- Different types of dyeing and finishing machine functions.
- Inspection system.
- How to GSM control in stenter and compacting machine.
- Batch section work.
- Different types of test in lab.

4.3 Garments Section
In garments section we have learned about the following topics:

- Know about different types of sample.
- Introducing with CAD.
- Know about marker.
- How to make marker for production.
- How to improve marker efficiency.
- Know about fabric spreading procedure.
- Introduced to different cutting machine.
- Introducing different types of sewing machine.
- Know about different types of sewing machine function.
- Know about different type of stich.
- Know about different types of stitches.
- Inline inspection & Table inspection
- Final inspection.
- Daily production target calculation
- Inspection procedure of buyer.
- Maintenance section working process etc.

4.4 Printing Section
In printing section we have learned about the following topics:
Introducing different types of printing methods.
Know about different types of chemicals.
Method of screen preparation.
Know about print paste.
Different types of printing and finishing machine functions.
Know about limitation of printing machine. etc.

4.5 ETP
In ETP section we have learned about the following topics:

Know about function of ETP.
Know details about bio-chemical ETP.
Process of bio-chemical ETP.
Different types of chemical used in bio-chemical ETP.
Capacity of bio-chemical ETP.
Know about different type’s water test. etc.

Conclusion
Tanzila Textile LTD already established a brand name in Garments industry. Now they have lots of foreign customers and demand for their Garments is increasing day by day. Tanzila Textile LTD is providing washing, printing, embroidery facilities and sometimes accessories for Tanzila Textile which make production much easier. So if it can maintain its quality and standard it can have a huge business potential
<table>
<thead>
<tr>
<th>SL No.</th>
<th>Name of the Figure</th>
<th>Page No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2.1 Tanzila Textile Ltd</td>
<td>17</td>
</tr>
<tr>
<td>2</td>
<td>2.3 Factory layout</td>
<td>20</td>
</tr>
<tr>
<td>3</td>
<td>2.4 Factory organogram</td>
<td>23</td>
</tr>
<tr>
<td>4</td>
<td>3.1 Knitting Section</td>
<td>30</td>
</tr>
<tr>
<td>5</td>
<td>3.2 Layout of knitting section</td>
<td>30</td>
</tr>
<tr>
<td>6</td>
<td>3.3 Organogram of knitting</td>
<td>31</td>
</tr>
<tr>
<td>7</td>
<td>3.4 Working Process in Knitting Section</td>
<td>34</td>
</tr>
<tr>
<td>8</td>
<td>3.5 Yarn Passage Diagram</td>
<td>35</td>
</tr>
<tr>
<td>9</td>
<td>3.7 Layout of dyeing section</td>
<td>40</td>
</tr>
<tr>
<td>10</td>
<td>3.8 Organogram of dyeing section</td>
<td>41</td>
</tr>
<tr>
<td>11</td>
<td>3.9 Process of dyeing and finishing</td>
<td>45</td>
</tr>
<tr>
<td>12</td>
<td>3.10 Fabric turning Machine</td>
<td>47</td>
</tr>
<tr>
<td>13</td>
<td>3.11 Dyeing machine</td>
<td>49</td>
</tr>
<tr>
<td>14</td>
<td>3.12 Dyeing process</td>
<td>49</td>
</tr>
<tr>
<td>15</td>
<td>3.13 Slitting Machine</td>
<td>53</td>
</tr>
<tr>
<td>16</td>
<td>3.14 Stenter Machine</td>
<td>54</td>
</tr>
<tr>
<td>17</td>
<td>3.15 Compactor machine</td>
<td>56</td>
</tr>
<tr>
<td>18</td>
<td>3.16 Sueding Machine</td>
<td>57</td>
</tr>
<tr>
<td>19</td>
<td>3.17 Brushing Machine</td>
<td>58</td>
</tr>
<tr>
<td>No.</td>
<td>Section</td>
<td>Page</td>
</tr>
<tr>
<td>-----</td>
<td>---------</td>
<td>------</td>
</tr>
<tr>
<td>20</td>
<td>Rolling Machine</td>
<td>60</td>
</tr>
<tr>
<td>21</td>
<td>Layout of garments section</td>
<td>63</td>
</tr>
<tr>
<td>22</td>
<td>Organogram of garments section</td>
<td>64</td>
</tr>
<tr>
<td>23</td>
<td>CAD section</td>
<td>67</td>
</tr>
<tr>
<td>24</td>
<td>Sample section</td>
<td>68</td>
</tr>
<tr>
<td>25</td>
<td>Fabric store</td>
<td>69</td>
</tr>
<tr>
<td>26</td>
<td>Accessories store</td>
<td>70</td>
</tr>
<tr>
<td>27</td>
<td>Garments Lab</td>
<td>72</td>
</tr>
<tr>
<td>28</td>
<td>Fabric spreading</td>
<td>74</td>
</tr>
<tr>
<td>29</td>
<td>Cutting Section</td>
<td>75</td>
</tr>
<tr>
<td>30</td>
<td>Process of cutting</td>
<td>75</td>
</tr>
<tr>
<td>31</td>
<td>End cutter machine</td>
<td>76</td>
</tr>
<tr>
<td>32</td>
<td>Fabric cutting machine</td>
<td>78</td>
</tr>
<tr>
<td>33</td>
<td>Sewing process</td>
<td>80</td>
</tr>
<tr>
<td>34</td>
<td>Plain machine</td>
<td>81</td>
</tr>
<tr>
<td>35</td>
<td>Over lock machine</td>
<td>81</td>
</tr>
<tr>
<td>36</td>
<td>Flat bed machine</td>
<td>81</td>
</tr>
<tr>
<td>37</td>
<td>Flat lock cylinder bed machine</td>
<td>81</td>
</tr>
<tr>
<td>38</td>
<td>Button Hole machine</td>
<td>82</td>
</tr>
<tr>
<td>39</td>
<td>Heat Seal machine</td>
<td>82</td>
</tr>
<tr>
<td>40</td>
<td>Snap Button machine</td>
<td>83</td>
</tr>
<tr>
<td>41</td>
<td>Feed of the Arm machine</td>
<td>83</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>42</td>
<td>3.40</td>
<td>Fusing Machine</td>
</tr>
<tr>
<td>43</td>
<td>3.41</td>
<td>Button attachingmachine</td>
</tr>
<tr>
<td>44</td>
<td>3.42</td>
<td>PMD Kanchimachine</td>
</tr>
<tr>
<td>45</td>
<td>3.43</td>
<td>Rib Cuttermachine</td>
</tr>
<tr>
<td>46</td>
<td>3.44</td>
<td>Bar tackmachine</td>
</tr>
<tr>
<td>47</td>
<td>3.45</td>
<td>Flat lock raw edgecuttermachine</td>
</tr>
<tr>
<td>48</td>
<td>3.46</td>
<td>Machine layout (T-shirt)</td>
</tr>
<tr>
<td>49</td>
<td>3.47</td>
<td>Machine layout</td>
</tr>
<tr>
<td>50</td>
<td>3.48</td>
<td>Finishing section</td>
</tr>
<tr>
<td>51</td>
<td>3.49</td>
<td>Finishing Work in Process</td>
</tr>
<tr>
<td>52</td>
<td>3.49</td>
<td>Maintenance section</td>
</tr>
<tr>
<td>53</td>
<td>3.50</td>
<td>Layout of printing section</td>
</tr>
<tr>
<td>54</td>
<td>3.51</td>
<td>Organogram of printing section</td>
</tr>
<tr>
<td>55</td>
<td>3.52</td>
<td>Printing process</td>
</tr>
<tr>
<td>56</td>
<td>3.53</td>
<td>Screen making process</td>
</tr>
<tr>
<td>57</td>
<td>3.54</td>
<td>ETP</td>
</tr>
<tr>
<td>58</td>
<td>3.55</td>
<td>Process of Bio-chemical ETP</td>
</tr>
</tbody>
</table>