INDUSTRIAL ATTACHMENT
IN
MAGPIE COMPOSITE TEXTILE LTD.
BY
Md. Ashiqul Islam
ID # 091-23-1334
This training is conducted in Partial Fulfillment of the requirements for the degree Bachelor of Science in Textile Engineering
SUPERVISED BY
Salima Sultana Shimo
Lecturer
Dept. of Textile Engineering (TE)
Faculty of Science & Information Technology
Daffodil International University

TEXTILE ENGINEERING
DAFFODIL INTERNATIONAL UNIVERSITY
DHAKA, BANGLADESH
OCTOBER 2013
DECLARATION

I hereby declare that, this Industrial Attachment has been done by me under the supervision of Salima Sultana Shimo, Lecturer, Department of TEDaffodil International University. I also declare that neither this report nor any part of this report has been submitted elsewhere for award of any degree or diploma.

Supervised by:

________________________
(Salima Sultana Shimo)
Lecturer
Department of TE
Daffodil International University

Submitted By

________________________
(Md. Ashiqul Islam)
ID: 091-23-1334
Department of TE
Daffodil International University
Dedicated to my parents
Acknowledgement

At first my gratefulness goes to Almighty Allah to give me strength and ability to complete the industrial training and this report. You have made my life more beautiful. May you name be exalted, honored and glorified.

Now I wish to take this excellent opportunity to thank a lot of people who have assisted and inspired me in the completion of my training period. Lecturer, Salima Sultana Shimo, my supervisor, I extremely indebted for her tremendous support and guidance throughout my training period. Being working with her I have not only earned valuable knowledge but was also inspired by her innovativeness which helped enrich my experience to a greater extent. Her ideas and way of working was truly remarkable.

I also express my gratitude to Professor Dr. S. M. Mahbub-Ul-Haque Majumdar, Dean, Faculty of Science & Information Technology, and Professor Dr. Mahbubul Haque, Head of the Department of Textile Engineering, for their support and continuum guidance throughout my long journey in Daffodil International University and the endometrial training.

I would like to thank the management of the Magpie Composite Textile Ltd. for giving me the opportunity to do the industrial training successfully and also their valuable suggestions. My deepest appreciation goes to especially Mr. H. M. Abdus Sahid General Manager Dyeing & Finishing section, Md. Atiqur Rahman Senior Executive Dyeing & Finishing Section Magpie Composite Textile Ltd. For their permission to conduct my industrial training without which it would be incomplete. The gene Rome support is greatly appreciated. I would also like to thank executives, senior executives and other officials Magpie Composite Textile Ltd. for helping me to complete industrial training successfully. My gratitude also goes to all the employees of Magpie Composite Textile Ltd. for their sincere co-operation, support and valuable advices.

Last but not least, thanks go to my presume family for their never ending love and inspire at every stages of my life. Without their continuous support me realize that me would not be a person me are right now.
**Introduction:**

Textile and garments sector is the biggest and fastest growing sector in Bangladesh. It is also the highest foreign currency earning sector in Bangladesh. Among this sector, Knit garment is growing very rapidly due to smaller investment requirement, greater backward linkage facility & higher profit than woven garments. That’s why export of knit garments is increasing steadily for last few years and up to now.

Textile education can’t be completed without industrial training. Because of this industrial training it minimizes the gap between theoretical and practical knowledge and make me accommodated to industrial environment. I got an opportunity to complete two-months long industrial training at Magpie Composite Textile Ltd, which is a 100% export-oriented composite Knit Garments. It has planned & equipped fabric dyeing-finishing and garments units in addition to facilitate knitting and knitwear manufacturing.
# TABLE OF CONTENTS

## CHAPTERS

### CHAPTER 1: COMPANY PROFILE

- Board of Directors
- Message of Managing Director
- Company Location
- Company Profile

### CHAPTER 2: KNITTING SECTION

- Organogram of knitting section
- Types of Raw Material
- Source of Yarn for Knitting
- Process Definition
- Classification of Knitting Section
- Flat Knitting section
- Machine Description of Circular Knitting Section
- Process Flow Chart of Knitting
- Description of Production Process
- Production Parameters
- Production Calculation
- Different Parts of Knitting Machine
- Photo Gallery
- Quality Standard
CHAPTER 3: BATCH SECTION

Definition
Object of batching
Proper batching criteria
Batch management
M/C’s in batch section
Machine Function

CHAPTER 4: LAB SECTION

Machineries used IN LAB
Definition
Objective of Lab Dip
Development of lab
Color measurement of standard sample
Preparation of stock solution for dyes and chemicals
Dyes and chemicals measurement formula for laboratory
Stock solution preparation
Salt, Soda and m:l ratio according to shade%
Some Important Test of dyeing lab
Color Fastness to Rubbing (met & dry)
Color Fastness to Washing: (ISO/05-CO6)
Shrinkage & Spirality Test
Procedure
Shrinkage Test
Spirality test
P/H Test
GSMTest

CHAPTER 5: DYEING SECTION

Organogram of dyeing
Types of Machine
Dyeing machineries used in magpie composite textile ltd
Raw materials for dyeing
Grey fabrics
Different Dyes used in Magpie Composite Textile Ltd
Chemicals used in Magpie Composite Textile Ltd
Flow chart for Knit dyeing process of M.C.T.L
Dyeing Machineries of Magpie Composite Textile Ltd
Recipe at Different Dyeing
Sample Attachment
Process curve for dark color shade
Dyeing Recipe for White Shade (100% cotton)
Different parameters in dyeing
Common faults and their remedies in knit dyeing

CHAPTER 6: FINISHING

Organogram of Finishing Section
Objective of Finishing
Types of Finishing
For Tubular form of fabric following m/c are required
For open form of fabric following m/c are required

For collar & cuff finishing following m/c are required

Description of Finishing m/c

Slitting M/C

Stentering M/C

Standard operating parameter for different fabric in Stenter

Compactor m/c

Checking parameters

Finished fabric inspection

Finishing Machineries of Magpie Composite Textile Ltd

CHAPTER 7: EFFLUENT TREATMENT PLANT (ETP)

Wastewater System Evaluation

Wastewater Characteristics

Details Of Existing Treatment Plan

Layout plan of etp in magpie composittextile ltd

Brief Description of ETP along with a Flow Chart

CHAPTER 8: MAINTANANC

Definition

Objectives of maintenance

Types of Maintenance

Manpower set-up for maintenance

Maintenance procedure

Maintenance tools & equipment’s
CHAPTER 9: UTILITY

Utility services
Water pumps
Natural water quality
Standard water quality for dye house
Water softening
Electricity
Steam
Air compressor
Air Dryer
GAS

CHAPTER 10: COMPLIANCE

Definition
List of compliance issues
Health
Toilet
Fire
Safety Guard
Others

CHAPTER 11: CONCLUSION

Conclusion
Some suggestions
Limitation of the report
CHAPTER-1

COMPANY PROFILE
BOARD OF DIRECTORS

Chairman
Alhajj Habibur Rahman

Managing Director
Arifur Rahman

Director
Afroz Al Mamun
MESSAGE OF MANAGING DIRECTOR

Bangladesh is the third largest garments exporter in the world but second largest in sweater export. In sweater, in Bangladesh, I have revolutionized with the largest number of computerized sweater knitting machines (250 sets) with latest version which are all multi gauge. Most of the machines are from Stoll, Germany which ensures high quality and makes huge volume of productivity of around 50,000 Dzn/m. “magpie group” is a vigorously growing company as it started its journey in 2003 in sweater manufacturing with only 300 hand driven machines.

In 2007, magpie added a new leaf setting magpie composite textiles. In composite, I am vertically set up from fabric knitting to dying and sewing. I have ETP plant to minimize environmental hazards and also am giving emphasis to develop re-cycling yarn to protect environment.

In 2011, I have taken over creative wool ware ltd. The factory contains 120 set of computerized knitting machine and 600 set of manual knitting machine. The merging of creative wool ware ltd. with "magpie group" unveils the new horizon of sweater sector in Bangladesh. I am now pioneer for sweater exporting in Bangladesh. I can take challenges to produce any kind of qualitative sweater to support buyer. I am the most contingent and fast expanding garment manufacturing group of Interties in Bangladesh. I am expanding by keeping my commitments and promises to maintain standards of my products "magpie group" has not only concentrated in modern machines but also enriched its management team with highly skilled, professional and experienced high level employees from home and abroad. We are very strong in making any kind of fancy yarn
and accessories to produce value added fashionable product. Theme in this growing market it has become one of the modern, stable and innovative company in the garments sector in Bangladesh.

As the Managing Director of "magpie group" I am determined to ensure high level of support and service and welcome valued buyers to visit Bangladesh to develop business here.

Thanks & best regards

**M. Arifur Rahman**
Managing Director
**magpie group**

**COMPANY LOCATION:**

Factory Address:
832/833, DewanEdris Road, Amtala, Kathgara, Savar, Dhaka, Bangladesh
**COMPANY PROFILE:**

<table>
<thead>
<tr>
<th>Company name</th>
<th>Magpie Composite Textile LTD.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Head Office</strong></td>
<td>House # 05, Road # 09, Sector # 4, Uttara, Dhaka-1230</td>
</tr>
<tr>
<td><strong>Tel No</strong></td>
<td>88-02-8962437, 8954194</td>
</tr>
<tr>
<td><strong>Fax</strong></td>
<td>88-02-8918574</td>
</tr>
<tr>
<td><strong>E-mail</strong></td>
<td><a href="mailto:dyeingmct@magpiegroupbd.com">dyeingmct@magpiegroupbd.com</a></td>
</tr>
<tr>
<td><strong>URL</strong></td>
<td><a href="http://www.magpiegroupbd.com">www.magpiegroupbd.com</a></td>
</tr>
<tr>
<td><strong>Factory</strong></td>
<td>832/833, Dewan Edris Road, Amtala, Kathgara, Savar</td>
</tr>
<tr>
<td><strong>Tel No</strong></td>
<td>88-02-7792265</td>
</tr>
<tr>
<td><strong>Fax No</strong></td>
<td>06662616914</td>
</tr>
<tr>
<td><strong>Location</strong></td>
<td>50~70 minutes’ drive from ZIA Airport to towards Ashulia.</td>
</tr>
<tr>
<td><strong>Contacted persons</strong></td>
<td>M. Arifur Rahman (Managing Director)</td>
</tr>
<tr>
<td></td>
<td>H. M. Abdus Sahid (GM Dyeing &amp; Finishing)</td>
</tr>
<tr>
<td><strong>Year of Establishment</strong></td>
<td>2007</td>
</tr>
<tr>
<td><strong>Business</strong></td>
<td>100% Export oriented Knit Fabrics &amp; Knit Garments manufacturer</td>
</tr>
<tr>
<td><strong>Production Capacity</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Knitting</strong> : 5 Tons/Day</td>
</tr>
<tr>
<td></td>
<td><strong>Dyeing &amp; Finishing</strong> : 6 Tons/Day</td>
</tr>
<tr>
<td></td>
<td><strong>Garments</strong> : 5,000 Pcs/Day</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SL. No.</th>
<th>Name of the Bank</th>
<th>Address</th>
</tr>
</thead>
</table>
| 1.      | Agrani Bank, Principal Branch | Motijheel C/A, Dhaka-1000, Bangladesh  
Tel:+88029563659  
Fax:+88029563662  
Swift: AG BK BD DH  
Tekex:642757 ABD BJ  
632549 ABD BJ |
TYPES OF RAW MATERIAL:

- Yarn
- Lycra

SOURCE OF YARN FOR KNITTING:

<table>
<thead>
<tr>
<th>Name of the spinning Mills</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arif Knit Spinning Ltd.</td>
<td>Gazipur</td>
</tr>
<tr>
<td>The Delta Spinning</td>
<td>Kashimpur, Gazipur</td>
</tr>
<tr>
<td>Square yarn ltd.</td>
<td>Kashimpur, Gazipur</td>
</tr>
<tr>
<td>Bengol NFK Textile</td>
<td>Gazipur</td>
</tr>
<tr>
<td>NRG Spinning Mills</td>
<td>Gazipur</td>
</tr>
<tr>
<td>Prime Textile</td>
<td>Pagla, Narayngong</td>
</tr>
<tr>
<td>RSWM Ltd.</td>
<td>India</td>
</tr>
<tr>
<td>AA Kader synthetics</td>
<td>Narayngong</td>
</tr>
<tr>
<td>Shirin Spinning Ltd.</td>
<td>Shreepur, Gazipur</td>
</tr>
<tr>
<td>Hyosung Vietnam</td>
<td>South Korea</td>
</tr>
<tr>
<td>Malek Spinning</td>
<td>Valuka, Mymensingh</td>
</tr>
<tr>
<td>Sunny International</td>
<td></td>
</tr>
<tr>
<td>Aman Cotton Fabrics Ltd.</td>
<td></td>
</tr>
</tbody>
</table>
**PROCESS DEFINITION:**

Knitting is the interlocking of one or more yarns through a series of loops. The lengthwise columns of stitches, corresponding to the warp in woven cloth, are called Wales; the crosswise rows of stitches, corresponding to the filling in woven cloth, are called Courses. Filling Knits (Weft Knits) are those fabrics in which the course are composed of a single strand of yarn, while warp knits are those in which the Wales are composed of single strand of yarn. Gauge corresponds to the yarn in a woven fabric, and is defined as the number if needles of yarns in half inches of cloth. The higher the gauge, the more compact and finer is the cloth.

**CLASSIFICATION OF KNITTING SECTION:**

- Flat Knitting section
- Circular Knitting section
- Fabric inspection section

**FLAT KNITTING SECTION:**

Generally collar and cuff of knitting garments is produced in this section there are flat knitting machines of the same type. The specifications of this machine are given below:

<table>
<thead>
<tr>
<th>M/C Brand</th>
<th>M/C origin</th>
<th>No. of Machine</th>
<th>M/C dia in inch</th>
<th>Gauge</th>
<th>Total Needle</th>
<th>Run time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Matsuya</td>
<td>Japan</td>
<td>2</td>
<td>54</td>
<td>14</td>
<td>740x2</td>
<td>24</td>
</tr>
<tr>
<td>Flying Tiger</td>
<td>Taiwan</td>
<td>3</td>
<td>54</td>
<td>14</td>
<td>740x2</td>
<td>24</td>
</tr>
<tr>
<td>ShemaSiki</td>
<td>Japan</td>
<td>1</td>
<td>54</td>
<td>14</td>
<td>740x2</td>
<td>24</td>
</tr>
</tbody>
</table>
MACHINE DESCRIPTION OF CIRCULAR KNITTING

SECTION:

<table>
<thead>
<tr>
<th>Circular Knitting Machine</th>
<th>Single Jersey, Double Jersey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Jersey</td>
<td>08</td>
</tr>
<tr>
<td>Double Jersey</td>
<td>04</td>
</tr>
<tr>
<td>Total no of machine</td>
<td>12</td>
</tr>
</tbody>
</table>

PROCESS FLOW CHART OF KNITTING:

1. Sample Fabric
2. Design Analysis
3. Machine Selection
4. Set the Machine according to Specific design
5. Yarn in Cone Form
6. Feeding the Yarn Cone in the Creel
7. Feeding the Yarn in the Feeder
8. Tension Device
DESCRIPTION OF PRODUCTION PROCESS:

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

1. Firstly knitting manager gets a production shit from the merchandiser as according as consumer requirements then he informs or orders production officer about it.
2. Production officer informs technical in charge & knows about machine in which the production will be running.
3. Technical in charge calls for leader of mechanical fitter troops, they two take decision about machine for production considering machine condition, production capacity, maintenance complexity etc.
4. Production officer with experienced mechanical fitter adjusts required stitch length & grey GSM for required final GSM.
5. Supervisor checks daily production regularity & make operator conscious about finishing tin due time.
6. Operators operate machine in high attention as if there were no faults in the fabrics. If he thinks or sure about any fabrics faults then he calls for the mechanical fitters in duty. Mechanical fitter then fixes it if he can or he informs technical in charge. Then he comes in spot.
7. After required production & final inspection in 4- point system, they sent in dyeing section.
PRODUCTION PARAMETERS:

1. Machine diameter
2. Machine RPM
3. No. of feeds or feeders in use
4. Machine Gauge
5. Count of yarn
6. Required time (m/c running time)
7. Machine running efficiency

PRODUCTION CALCULATION:

Production/shift in Kg at 100% efficiency

\[
\text{RPM} \times \text{No. of feeder} \times \text{No. of Needle} \times \text{SL} = \frac{\text{3527.80 yarn count}}{}
\]

Production/shift in meter

\[
\frac{\text{Course / min}}{\text{Course / cm}} = \frac{\text{RPM} \times \text{No. of feeder} \times 60 \times 12 \times \text{efficiency}}{\text{Course / cm} \times 100}
\]

Fabric width in meter

\[
\frac{\text{Total no. of Wales}}{\text{Wales / cm} \times 100} = \frac{\text{Total no. of needle used in knitting}}{\text{Wales / cm} \times 100}
\]
DIFFERENT PARTS OF KNITTING MACHINE:

**Creel:** Creel is used to place the cone.

**Feeder:** Feeder is used to feed the yarn.

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

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

**Guide:** Guide is used to guide the yarn.

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

**Take Up roller:** Take up roller is used to take up the fabric.
PHOTO GALLERY:

Fig: Circular Knitting Machine
Fig: Circular Knitting Machine

Figure: Fabric Inspection Machine
QUALITY STANDARD:

PPC maintains the ISO: 9001:2000 standards in case of quality. Therefore, the four point system is followed to inspect the body & rib fabric. The defects found & points given against are recorded in the inspection sheet. Following table shows the four point grading system followed by inspection at PPC.

<table>
<thead>
<tr>
<th>Size of defects</th>
<th>Penalty</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 inches or less</td>
<td>1 point</td>
</tr>
<tr>
<td>Over 3 inch but not over 6 inch</td>
<td>2 point</td>
</tr>
<tr>
<td>Over 6 inch but not over 9 inch</td>
<td>3 point</td>
</tr>
<tr>
<td>Over 9 inch</td>
<td>4 point</td>
</tr>
</tbody>
</table>

FABRIC INSPECTION SECTION:

There is one machine in cloth inspection section. Specification of this machine is given below:

<table>
<thead>
<tr>
<th>Type</th>
<th>Cloth Inspection Machine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Country</td>
<td>China</td>
</tr>
<tr>
<td>Model No</td>
<td>YX-2400 A</td>
</tr>
<tr>
<td>Manufacturing date</td>
<td>2005</td>
</tr>
<tr>
<td>Speed</td>
<td>32 m/min</td>
</tr>
</tbody>
</table>

Remarks:

Production runs with the help of mechanical fitters. For any kind of mechanical fault of any machine the fix and work under technical in charge. Production officers take account of daily production by running after the supervisor & workers so on.
CHAPTER-3

BATCHING SECTION
DEFINITION

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

OBJECT OF BATCHING:

✔ To receive the grey fabric roll from knitting section or other smyce.
✔ Turn the grey fabric if required.
✔ To prepare the batch of fabric for dyeing according to the following criteria –
  • Order sheet (Received from buyer).
  • Dyeing shade (color or white, light or dark).
  • M/C capacity.
  • M/C available.
  • Type of fabrics (100% cotton, PE, PC, CVC).
  • Emergency.
✔ To send the grey fabric to the dyeing floor with batch card.
✔ To keep records for every previous dyeing.

PROPER BATCHING CRITERIA:

✔ To meet maximum capacity of existing dyeing m/c.
✔ To minimize the washing time or preparation time & m/c stoppage time.
✔ To keep the no. of batch as less as possible for same shade.
✔ To meet a particular m/c for dyeing same shade.

BATCH MANAGEMENT:

Primarily batching is done by dyeing manager taking the above criteria under consideration. Batch section in charge receives this primary batch plan from dyeing manager. Sometime planning is adjusted according to m/c condition or emergency.
**M/C’s IN BATCH SECTION:**

No. of M/c : 01

Machine Name : AIR TURNING M/C

Model : DNTA-400

Company Name: DONGO NAM CO LTD.

Origin : KOREA

**MACHINE FUNCTION:**

To turn out the fabric face side into back for avoiding visualization of spots on dyed fabric.

To transfer back side face of fabric to face side before dyeing.
### MACHINERIES USED IN LAB

<table>
<thead>
<tr>
<th>SL. NO</th>
<th>M/C NAME</th>
<th>MODEL</th>
<th>ORIGIN</th>
<th>CAPACITY(KGS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Sample dyeing m/c (F &amp; P)</td>
<td>HS-24 Srl-806121</td>
<td>China</td>
<td>Normal pressure 24 pots</td>
</tr>
<tr>
<td>02</td>
<td>Sample dyeing m/c (Rapid)</td>
<td>H-24 F A10001</td>
<td>China</td>
<td>High pressure 12 pots</td>
</tr>
<tr>
<td>03</td>
<td>Sample dyeing m/c (Rapid)</td>
<td>AD-24 Srl-80723</td>
<td>China</td>
<td>Normal pressure 8 pots</td>
</tr>
<tr>
<td>04</td>
<td>Fastness washing m/c STD ATLAS m-228</td>
<td>Rotawash A2288</td>
<td>UK</td>
<td>Normal pressure 8 pots</td>
</tr>
<tr>
<td>05</td>
<td>Dryer m/c (Tumbler)</td>
<td>Ariston AS-60V</td>
<td>USA</td>
<td>6 KG</td>
</tr>
<tr>
<td>06</td>
<td>Washing m/c</td>
<td>WD-10180</td>
<td></td>
<td>6 KG</td>
</tr>
<tr>
<td>07</td>
<td>Spectrophotometer X-rite</td>
<td>CF7000A</td>
<td>Macbeth USA</td>
<td></td>
</tr>
<tr>
<td>08</td>
<td>Pilliscope</td>
<td>STD Atlas W-1020</td>
<td>UK</td>
<td></td>
</tr>
<tr>
<td>09</td>
<td>Dryer (with incubator)</td>
<td>527021/2</td>
<td>UK</td>
<td>Sample 12 of 4x4”</td>
</tr>
<tr>
<td>10</td>
<td>Color Assessment cabinet</td>
<td>Dengyng</td>
<td>Taiwan</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Crockmeter</td>
<td>M 238AA</td>
<td>UK</td>
<td></td>
</tr>
</tbody>
</table>
DEFINITION

Lab Dip Development means the sample which is dyed according to buyer’s requirements (similar shade and so on). Depending on lab dip development sample dyeing and bulk production dyeing planning done.

OBJECTIVE OF LAB DIP

- The main objectives in lab dip are as follows. To calculate the recipe for sample dyeing.
- To compare dyed sample with swatch by light Box or Spectroflash.
- To calculate revise recipe for sample dyeing.
- Finally approved Lab dip (Grade: A B C).

DEVELOPMENT OF LAB

Lab Dip Development means the sample which is dyed according to buyer’s requirements (similar shade and so on). The following sequence need to produce a Lab Dip.

Merchandisers sent Swatch or Sample or Color Code

↓

Received Sample by Central Laboratory

↓

Compare Swatch with Self Shade or Spectrophotometer machine

↓

Take Recipe for Sample dyeing (More than one Recipe)
Take dyeing auxiliaries automatically and manually

↓

Sample Dyeing

↓

Dryer

↓

Compare Dyeing Sample with Light Box and Spectrophotometer machine

↓

If need Take correction for required shade manually and automatically

↓

Sample Dyeing

↓

Compare Dyeing sample with Swatch

↓

If Approved Sample

↓

Bulk production

**COLOR MEASUREMENT OF STANDARD SAMPLE:**

Color measurement is mainly done for the purpose of shade matching as perfectly as possible. Shade matching of the produced sample with the standard one is compulsory. Color measurement can be done by two methods –
In manual method, the std. sample’s color is measured by comparing it with previously produced samples of different tri-chromatic color combination. The sample with which the color of the std. matched, that sample’s color recipe is being taken for shade matching. This method’s accuracy completely depends on the vision of the person related to it but person meet to be needed gather experience about color matching.

The instrumental method is more reliable if it is operated accurately to do the work of color measurement. “Spectrophotometer” interfaced with a PC is meet for shade matching. This instrument works with the principle of reflectance measurement of light at different wave length. When the standard sample is being subjected under spectrophotometer, then the instrument suggest a recipe with required tri-chromatic colors within the tolerance limit of color difference. In this way, color measurement of the standard sample is carried out for the purpose of shade matching.

**PREPARATION OF STOCK SOLUTION FOR DYSES AND CHEMICALS:**

**Preparation of stock solution for dyes -**

Normally 0.1%, 0.5%, 1%, 1.5% and 2% stock solution of dyes are prepared in beakers for daily need.

**Preparation of stock solution for chemicals-**

Similarly 20% salt and 20% soda stock solutions are prepared in beakers for daily need.

**DYSES AND CHEMICALS MEASUREMENT FORMULA FOR LABORATORY:**

The amount of dye solution (ml) is calculated as follow -

\[
\text{Amount of dye sol}^n (\text{ml}) = \frac{\text{Fabric weight} \times \text{Shade} \%}{\text{Concentration of stock dye sol}^n \%}
\]
The amount of chemical soln (ml) is measured as follow -

Fabric wt. * M : L * g/l

Amount of chemical soln (ml) = 1000 * Conc. of stock soln%

Pipette made in dyeing lab:

0.1, 0.2, 0.5, 1, 2, 5, 10, 20 ml etc.

**STOCK SOLUTION PREPARATION:**

<table>
<thead>
<tr>
<th>SHADE %</th>
<th>STOCK SOLUTION %</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0001-0.009</td>
<td>0.01</td>
</tr>
<tr>
<td>0.10-0.99</td>
<td>0.5</td>
</tr>
<tr>
<td>1-1.99</td>
<td>1</td>
</tr>
<tr>
<td>2-3.99</td>
<td>2</td>
</tr>
<tr>
<td>4 TO MORE</td>
<td>4</td>
</tr>
</tbody>
</table>

**SALT, SODA AND M: L RATIO ACCORDING TO SHADE %:**

<table>
<thead>
<tr>
<th>SL. NO.</th>
<th>SHADE%</th>
<th>SALT</th>
<th>SODA</th>
<th>WATER</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>0.001-0.019</td>
<td>20</td>
<td>6</td>
<td>1:8</td>
</tr>
<tr>
<td>02</td>
<td>0.20-0.40</td>
<td>25</td>
<td>8</td>
<td>1:8</td>
</tr>
<tr>
<td>03</td>
<td>0.41-0.50</td>
<td>30</td>
<td>10</td>
<td>1:8</td>
</tr>
<tr>
<td>04</td>
<td>0.51-0.74</td>
<td>35</td>
<td>12</td>
<td>1:8</td>
</tr>
<tr>
<td>05</td>
<td>0.75-1.49</td>
<td>40</td>
<td>13</td>
<td>1:8</td>
</tr>
</tbody>
</table>
### SOME IMPORTANT TEST OF DYEING LAB

**Hardness test of water:**

**Required chemicals:**

1. Buffer → 5 drops
2. Indicator → 1 drops
3. EDTA → dropped until getting pink color.

**Procedure:**

- At first take 5 ml water in a biker
- Then add 5 drops buffer into the water
- Shake it for few minutes
- Then add 1 drops indicator
- After adding the indicator then adds EDTA solution until getting pink color with the help of a test tube.

**Result:**

If me saw 0.1 ml will required for obtain result then me multiply 0.1 with 300 and result is 30 then hardness is 30.

**Comments:** Water hardness below 50 is good but above 50 is not good.
Color Fastness to Rubbing (met & dry):

Procedure:

At first take a sample of size (14 × 5) cm at Wales & Cmyse wise. Put the crocking cloth on to the finger & stag by finger clip & run 10 times in 10 seconds manually & assess the crocking cloth with gray scale.

Place the crocking cloth on the water, it will sucked some water and then squeeze the crocking cloth. Then place the met rubbing cloth on to the finger and stag with finger clip and run 10 times in 10 seconds manually. Then assess the crocking cloth by gray scale for met rubbing. Met and dry rubbing are checked according to buyer’s requirement.

Color Fastness to Washing: (ISO 105-CO6):

Procedure:

1. Size of specimen: Cut sample & multifibre at (10 × 2) cm then stitch.

2. Detergent: 4g/l ECE detergent (WOB) + 1g/l sodium per borate put in distilled water & cooled at 20°C & measured pH (where necessary).

3. Run the program in the following way:

<table>
<thead>
<tr>
<th>Test no.</th>
<th>Temp°C</th>
<th>Liq.volume ml</th>
<th>Time min.</th>
<th>Steel balls</th>
<th>Adjust pH</th>
</tr>
</thead>
<tbody>
<tr>
<td>C2S</td>
<td>60°C</td>
<td>50</td>
<td>30</td>
<td>25</td>
<td>10.5±1</td>
</tr>
</tbody>
</table>

4. Rinse the sample twice with cold water.

5. Dry at 60°C by hanging or by flat iron pressing but temperature should not less more than 150°C.

Shrinkage & Spirality Test:

Buyer’s requirements:

Template size: 50cm & 35cm, 25.5cm & 18cm (meet after quick wash).

Shrinkage:  
- length wise--- 5%
- Width wise--- 5%

Spirality:  
- Left ------ 5%
- Right ------ 5%
Procedure:

At first take two ply of fabric & put the template (50cm) on to the fabric. The template has 8 holes. Both length & width wise the template holes can measure 35cm at 3 places. Then mark the 8 holes by permanent marker & also at the edges of the template.

Then sewn the fabric & it is given to the washing m/c for run at 60°C for 60 minutes with water. After that dry the sample & then measure the fabric

Spin speed --- 500r

Drum speed--500rpm

P\text{H} Test:

Procedure:

Take 2gm sample fabrics and cut into small pieces. Then put it conical flax with 100cc water (M: L -1:50). Then shake it 15 min, then place it in a shaker m/c for 1 hmy. Then check P^{\text{H}} by P^{\text{H}} meter.

GSM Test:

Procedure:

GSM is the most important factor. There is a GSM cutter. The sample cut by the GSM cutter and weighted in the electronic balance. The reading (in gm) from the balance is multiplied by 100 to get the value of GSM.
Types of Machine:

There are three types of machine are used for scouring, bleaching & dyeing the fabric:

- Fong’s Dyeing machine
- D.H. Dyeing Machine
- Kwang Dong Dyeing Machine
<table>
<thead>
<tr>
<th>Sr No</th>
<th>Machine Name</th>
<th>M/C Specification</th>
<th>NO of M/C</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Fong’s Dyeing Machine (Atmospheric)</td>
<td>M/c Model : ECO-38-4T Srl No:37030212 M/c Origin : SHENZHEN, CHINA M/c capacity : 800 kgs M/c Temp : 100 °C</td>
<td>01</td>
</tr>
<tr>
<td>02</td>
<td>D.H.® Dyeing Machine (Atmospheric)</td>
<td>M/c Model : DH 3500, DH3890 M/c Origin : SHEOL,KOREA M/c capacity : 700, 200 kgs M/c Temp : 100 °C</td>
<td>02</td>
</tr>
<tr>
<td>03</td>
<td>D.H EURO HI-TECH Dyeing Machine (High Temperature)</td>
<td>M/c Model : DH3950 M/c Origin : SHEOL,KOREA M/c capacity : 1000, 60, 300kgs M/c Temp : 130 °C</td>
<td>03</td>
</tr>
<tr>
<td>04</td>
<td>Kwan Dong Dyeing Machine (High Temperature)</td>
<td>M/c Model : ET-230, 1800T M/c Origin : KOREA M/c capacity : 250, 500 kgs M/c Temp : 130 °C</td>
<td>02</td>
</tr>
<tr>
<td>05</td>
<td>GM38 Dyeing Machine (High Temperature)</td>
<td>M/c Model : 07003, 07004 M/c Origin : TAIWAN M/c capacity : 600, 1000 kgs M/c Temp : 130 °C</td>
<td>02</td>
</tr>
</tbody>
</table>
06 | D.H EURO HI-TECH Sample Dyeing Machine (High Temperature) | M/c Origin : KOREA
M/c capacity : 10, 50 kgs
M/c Temp : 130 °C | 02

**RAW MATERIALS FOR DYEING:**

1. The raw materials for production - Grey Fabric
2. Dyes and Chemicals

**GREY FABRICS:**

Following types of grey fabrics are dyed –

- Single jersey
- Single jersey with lycra
- Polo pique
- Back Pique
- Single lacoste
- Double Lacoste
- Fleece
- Terry
- Mini Terry
- Interlock
- Rib
- Lycra rib
- 1 x 1 rib
- Collar & cuff
- Polyester fabrics etc.
### Different Dyes used in Magpie Composite Textile Ltd.

<table>
<thead>
<tr>
<th>No</th>
<th>Dyes Brand Name</th>
<th>Types</th>
<th>Smyce</th>
<th>Origin</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Remazol Yellow 3GL</td>
<td>Reactive Dye</td>
<td>Dyestar</td>
<td>India</td>
</tr>
<tr>
<td>2</td>
<td>Remazol Blue BB</td>
<td>Reactive Dye</td>
<td>Dyestar</td>
<td>India</td>
</tr>
<tr>
<td>3</td>
<td>Remazol Yellow 3RS</td>
<td>Reactive Dye</td>
<td>Dyestar</td>
<td>India</td>
</tr>
<tr>
<td>4</td>
<td>Reactive Yellow RR</td>
<td>Reactive Dye</td>
<td>Dyestar</td>
<td>India</td>
</tr>
<tr>
<td>5</td>
<td>Reactive Red RR</td>
<td>Reactive Dye</td>
<td>Dyestar</td>
<td>India</td>
</tr>
<tr>
<td>6</td>
<td>White 4BK</td>
<td>Reactive Dye</td>
<td>Dyestar</td>
<td>India</td>
</tr>
<tr>
<td>7</td>
<td>Brighten RT-1015</td>
<td>Reactive Dye</td>
<td>Dyestar</td>
<td>India</td>
</tr>
<tr>
<td>8</td>
<td>Megaperse Yellow YNA</td>
<td>Reactive Dye</td>
<td>Dyestar</td>
<td>India</td>
</tr>
<tr>
<td>9</td>
<td>Megaperse Blue F2RL</td>
<td>Reactive Dye</td>
<td>Dyestar</td>
<td>Germany</td>
</tr>
<tr>
<td>10</td>
<td>Megaperse Navy NNA</td>
<td>Reactive Dye</td>
<td>Dyestar</td>
<td>Germany</td>
</tr>
<tr>
<td>11</td>
<td>Megaperse Blue FBL</td>
<td>Reactive Dye</td>
<td>Dyestar</td>
<td>Germany</td>
</tr>
<tr>
<td>12</td>
<td>Megaperse Yellow 3RHXF</td>
<td>Reactive Dye</td>
<td>Dyestar</td>
<td>Germany</td>
</tr>
<tr>
<td>13</td>
<td>Novacron Yellow FN-2R</td>
<td>Reactive Dye</td>
<td>Dyestar</td>
<td>Germany</td>
</tr>
<tr>
<td>14</td>
<td>NovacronBright Red FN-3GL</td>
<td>Reactive Dye</td>
<td>Dyestar</td>
<td>Germany</td>
</tr>
<tr>
<td>15</td>
<td>NovacronBlue -FNR</td>
<td>Reactive Dye</td>
<td>Dyestar</td>
<td>Germany</td>
</tr>
<tr>
<td>16</td>
<td>NovacronTurquoise-HNG</td>
<td>Reactive Dye</td>
<td>Dyestar</td>
<td>Germany</td>
</tr>
<tr>
<td>17</td>
<td>Novacron Yellow S-3R</td>
<td>Reactive Dye</td>
<td>Dyestar</td>
<td>Germany</td>
</tr>
<tr>
<td>18</td>
<td>Novacron deep Red S-B</td>
<td>Reactive Dye</td>
<td>Dyestar</td>
<td>Germany</td>
</tr>
<tr>
<td>19</td>
<td>Novacron Red FN2BL</td>
<td>Reactive Dye</td>
<td>Dyestar</td>
<td>Germany</td>
</tr>
<tr>
<td>20</td>
<td>Novacron Orange FN-R</td>
<td>Reactive Dye</td>
<td>Clariant</td>
<td>Germany</td>
</tr>
<tr>
<td>21</td>
<td>Novacron Navy FN-BN</td>
<td>Reactive Dye</td>
<td>Clariant</td>
<td>Germany</td>
</tr>
<tr>
<td>22</td>
<td>Novacron Ruby S3B</td>
<td>Reactive Dye</td>
<td>Clariant</td>
<td>Germany</td>
</tr>
<tr>
<td>23</td>
<td>Novacron Navy WB</td>
<td>Reactive Dye</td>
<td>Clariant</td>
<td>Germany</td>
</tr>
<tr>
<td>24</td>
<td>Novacron Ocean SR</td>
<td>Reactive Dye</td>
<td>Clariant</td>
<td>Germany</td>
</tr>
<tr>
<td>25</td>
<td>Drima TURQUISE CL-B</td>
<td>Reactive Dye</td>
<td>Clariant</td>
<td>Germany</td>
</tr>
<tr>
<td>26</td>
<td>Drima Navy CL-R</td>
<td>Reactive Dye</td>
<td>Clariant</td>
<td>Germany</td>
</tr>
<tr>
<td>27</td>
<td>Drima Blue –HF2B</td>
<td>Reactive Dye</td>
<td>Clariant</td>
<td>Germany</td>
</tr>
<tr>
<td>28</td>
<td>Imcozin Red E-3BF</td>
<td>Reactive Dye</td>
<td>Impo color</td>
<td>Germany</td>
</tr>
<tr>
<td>29</td>
<td>Imcozin Yellow E-3R</td>
<td>Reactive Dye</td>
<td>Impo color</td>
<td>Germany</td>
</tr>
<tr>
<td>30</td>
<td>Imcozin Blue E-NR</td>
<td>Reactive Dye</td>
<td>Impo color</td>
<td>Germany</td>
</tr>
<tr>
<td>31</td>
<td>Imcozin Orange E-2R</td>
<td>Reactive Dye</td>
<td>Impo color</td>
<td>Germany</td>
</tr>
<tr>
<td>32</td>
<td>Imcozin Navy blue E-RB</td>
<td>Reactive Dye</td>
<td>Impo color</td>
<td>Germany</td>
</tr>
<tr>
<td>33</td>
<td>Imcozin Blue –ERL</td>
<td>Reactive Dye</td>
<td>Impo color</td>
<td>Germany</td>
</tr>
<tr>
<td>34</td>
<td>Imcozin Navy Blue –E2G</td>
<td>Reactive Dye</td>
<td>Impo color</td>
<td>Germany</td>
</tr>
<tr>
<td>35</td>
<td>Imcozin Blue V-3 R 150%</td>
<td>Reactive Dye</td>
<td>Impo color</td>
<td>Germany</td>
</tr>
<tr>
<td>36</td>
<td>Imcozin Black VB</td>
<td>Reactive Dye</td>
<td>Impo color</td>
<td>Germany</td>
</tr>
<tr>
<td>37</td>
<td>Imcozin Yellow V4GL</td>
<td>Reactive Dye</td>
<td>Impo color</td>
<td>Germany</td>
</tr>
<tr>
<td>38</td>
<td>ImcozinTurquoise Blue VG</td>
<td>Reactive Dye</td>
<td>Impo color</td>
<td>Germany</td>
</tr>
<tr>
<td>39</td>
<td>Imcozin BR Blue VR(SPE)</td>
<td>Reactive Dye</td>
<td>Impo color</td>
<td>Germany</td>
</tr>
<tr>
<td>40</td>
<td>ImcozinGol Yellow VRNL</td>
<td>Reactive Dye</td>
<td>Impo color</td>
<td>Germany</td>
</tr>
<tr>
<td>41</td>
<td>Imcozin BRI Red V –F3B</td>
<td>Reactive Dye</td>
<td>Impo color</td>
<td>Germany</td>
</tr>
<tr>
<td>42</td>
<td>Ciba Navy NFB</td>
<td>Reactive Dye</td>
<td>HANNSMAN</td>
<td>MEA</td>
</tr>
<tr>
<td>43</td>
<td>Ciba Red FB</td>
<td>Reactive Dye</td>
<td>HANNSMAN</td>
<td>MEA</td>
</tr>
<tr>
<td>44</td>
<td>Ciba Yellow FN-2R</td>
<td>Reactive Dye</td>
<td>HANNSMAN</td>
<td>MEA</td>
</tr>
<tr>
<td>45</td>
<td>Cibacron Red –FN-3G</td>
<td>Reactive Dye</td>
<td>HANNSMAN</td>
<td>MEA</td>
</tr>
<tr>
<td>46</td>
<td>Cibacron Super Black –G</td>
<td>Reactive Dye</td>
<td>HANNSMAN</td>
<td>MEA</td>
</tr>
<tr>
<td>47</td>
<td>Liva Amber –CA</td>
<td>Reactive Dye</td>
<td>Dyestar</td>
<td>Germany</td>
</tr>
<tr>
<td>48</td>
<td>Liva Blue –CA</td>
<td>Reactive Dye</td>
<td>Dyestar</td>
<td>Germany</td>
</tr>
<tr>
<td>49</td>
<td>Liva Red –CA</td>
<td>Reactive Dye</td>
<td>Dyestar</td>
<td>Germany</td>
</tr>
<tr>
<td>50</td>
<td>Solacion Yellow HE-XL</td>
<td>Reactive Dye</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Chemicals used in Magpie Composite Textile Ltd.

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Category</th>
<th>Brand Name</th>
</tr>
</thead>
</table>
| 1 | Acid | Acetic Acid  
| | | Sirrafix – NE  
| | | ECO Acid R  
| | | Green Acid  
| | | Core Neutracid – 100  
| | | Cametic soda  

---

---
<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
</table>
| 2 | Alkali | Soda Ash  
|   |     | Chemtech – ALF |
| 3 | Salt  | Glauber Salt  
|   |     | Common Salt |
| 4 | Enzyme | Forylase DLS 255  
|   |     | Biozymes-ECX  
|   |     | Bio Polish – B II  
|   |     | Mega – PH -20 |
| 5 | Detergent | Sandoclean – PCLF |
| 6 | Sequesteren | Ledegen – QC  
|   |     | Heptol – EMG  
|   |     | Ladiquest – 1097  
|   |     | Lanapex – HTS  
|   |     | Iglazyne Acid MAX  
|   |     | Jintexalate SQ - 117  
|   |     | Texchehelate - 46  
|   |     | Na –Thio-Sulphite |
| 7 | Per-oxide-Killer | Peroclean 50L Extra  
|   |     | Jitter – Qak |
| 8 | Soaping Agent | Dekol – SN |
|   |     | Jipsoap - RYK |
|   |     | Eriopon – R |
| 9 | Anti-foam | Antimmepl - HTS |
| 10 | Anti - Crease | Breviol–PAM-N  
|   |     | Depsolube-ACA  
|   |     | Albafluid-C  
|   |     | Primasol-JET  
|   |     | Ciba fluid-C  
|   |     | Lubrifil-TFV |
| 11 | Dispersing agent | Satamol WS  
|   |     | Palegal SFD |
|   |     | Univadine -BIF |
| 12 | Stabilizer | Lanapex – HPST  
|   |     | Stabilizer- B  
| 13 | pH buffer | Eulysin S |
| 14 | Fixing agent | Cyclanon ERL  
|   |     | Cyclanon - FIA  
|   |     | Optfix F (Direct) |
| 15 | Reducing agent | Hydros |
| 16 | Bleaching agent | Hydrogen per Oxide(35%) |
| 17 | Levelling agent | Drimagin E2R  
<p>|   |     | IrgasolCO NEW |
| 18 | Oil remover | Lanaryl - RK |</p>
<table>
<thead>
<tr>
<th></th>
<th>Starch (Stiffening Agent)</th>
<th>Parapret VAS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Non ionic Softener</td>
<td>Softamine CL</td>
</tr>
<tr>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Cat ionic Softener</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Basosoft F-EUK</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ceranine KWL</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Texamina C/SAL FLAKES</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sapamine – CWS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sapamine KL</td>
</tr>
<tr>
<td></td>
<td>Adasil – ME-135</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Adasil – SM-1930</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dowsil HMS</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dowsil DCS</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SolmeoftWA</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sandoperm ME</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dowsil ME</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mesoft – MASE</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mesoft – CRC</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dowsil MAX</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tubiguard SR-Ultra</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tubicoat FIX – FC</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tubicoat Fix Nano</td>
<td></td>
</tr>
</tbody>
</table>

**Flow chart for Knit dyeing process of M.C.T.L:**

Turn over Machine Grey Knit Fabric
↓
Batching
↓
Scouring & Bleaching
↓
Dyeing
↓
De-watering / Squeezing m/c
↓

----------------------------------------------
If tube form
↓
Dryer m/c
↓
Stenter m/c
↓
Tube Compactor m/c
↓
Finished

If open form
↓
Slitting m/c
↓
Open compactor m/c
↓
Finished
**Dyeing Machineries of Magpie Composite Textile Ltd.**

High Temperature Dyeing machine

High Temperature Dyeing machine
High Temperature Dyeing machine

Atmospheric Dyeing machine
Atmospheric Dyeing machine

Atmospheric Dyeing machine
Sample Dyeing Machine
RECIPE AT DIFFERENT DYEING:

Recipe for machine’s heavy wash:
Detergent (Meteril ADW) = 0.5 gm/L
Caustic = 1 gm/L
Hydrous = 2 gm/L
60 minutes at 100 °C

For machine neutralization:
Acetic acid = (As required) gm/L

Recipe for scouring and bleaching: (For cotton)
Wetting agent (Invatex CRA) = 1 gm/L
Detergent (Meteril ADW) = 0.5 gm/L
Anti creasing agent (Albafluid C) = 1 gm/L
Sequestering agent (Sirix 2Ud) = 0.5 gm/L
Caustic = 2-3.5 gm/L
Stabilizer (Clarite-CBB) = 0.20 gm/L
Hydrogen peroxide (H2O2) = 2-4 gm/L
60 minutes at 100 °C

Recipe for hot (cotton black):
Wetting agent (Invatex CRA) = 1.5 gm/L
Acid (acetic acid) = 1.0 gm/L
Caustic Soda = 1.5 gm/L
30 minutes at 100 °C

Recipe for enzyme treatment: (For cotton)
Detergent (MeterilADW) = 0.5 gm/L
Acid (acetic acid) = 0.5 gm/L
Enzyme (Enzyme SFR) = 0.5-1.0 gm/L
60 minutes at 55 °C

Recipe for leveling: (For cotton)
Leveling agent (Albatex DBC) = 1.0 gm/Anticreasing Agent (Albafluud C) = 0.25 gm/L
10 minutes at 40°C

Recipe for softening:
Acid (acetic acid) = 0.10 gm/L
Softener (Sapamine CWS) = 20 gm/L
30 minutes at 50°C
Common Dyeing Process for Light, Medium & Dark Shade of 100% Cotton Fabric:

Machine Wash:
- Hydrose (2g/L) + Caustic (2g/L) + Foaming Agent (0.5g/L)
  - 30 min at 90°C
  - Machine Washed
  - A. Acid (0.7g/L)
  - 20min at 70°C
  - M/C Neutralized

Demineralization:
- Detergent (1g/L)
- Sequestering Agent (.5 g/L)
- Anti creasing Agent (.5 g/L)
  - 20min at 80°C

Scouring & Bleaching:
- Detergent (1 g/L)
- Sequestering Agent (.5 g/L)
- Stabilizer (.8 g/L)
- Caustic (3 g/L)
- H2O2 (3 g/L)
  - 60min at 98°C

Neutralizations (After Scouring & Bleaching):
- H2O2 Killer (.8 g/L)
- A. Acid (1 g/L)
  - 20min at 80°C
Enzyme Wash:

A.Acid (1 g/L)
Enzyme (1%)

55 min at 50°C, pH = 4.5

Dyeing:

Ant creasing Agent (.5 g/L)
Leveling Agent (1 g/L)
A.Acid (.2 g/L)
Dyes (According to shade %)
G.Salt (According to shade %)
Soda Ash (According to shade %)

60 min at 60°C

Neutralization: (Dyeing)

A.Acid (1 g/L)

10 min at 40-50°C

Soaping:

Soaping Agent (.5 g/L)

20 min at 70-80°C

Fixing & Softening:

Fixing Agent (.5 g/L)

15 min at 40°C

A.Acid (.5 g/L)

Softener (1.5 g/L)

20 min at 40°C

Bath Drain
Process curve for dark color shade:

Fig: Process curve for scouring & Bleaching

Fig: Process curve for neutralization

1. Wetting agent
2. Sequestering agent
3. Stabilizer
4. Anti foaming agent
5. Anti creasing agent
6. Caustic
7. Hydrogen peroxide
8. Peroxide killer
9. Acetic acid
10. Enzyme
Process curve for dyeing:

1. Leveling agent
2. salt
3. color
4. Soda
5. Acetic acid
6. Softener
### Dyeing Recipe for White Shade (100% cotton)

<table>
<thead>
<tr>
<th>Type of chemicals</th>
<th>Name of chemical</th>
<th>Below 180 GSM</th>
<th>Above 180 GSM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detergent agent</td>
<td>LFD CONC</td>
<td>0.10 g/l</td>
<td>0.1 g/l</td>
</tr>
<tr>
<td></td>
<td>P-100</td>
<td>1.50 g/l</td>
<td>2.00 g/l</td>
</tr>
<tr>
<td>Anticreaseing agent</td>
<td>P-100</td>
<td>1.50 g/l</td>
<td>2.00 g/l</td>
</tr>
<tr>
<td>Acitic Acid</td>
<td>A/Acid</td>
<td>0.3-0.50 g/l</td>
<td>0.3-0.50 g/l</td>
</tr>
<tr>
<td>Bio-polishing agent</td>
<td>enzyme B-12</td>
<td>0.3-0.50 g/l</td>
<td>0.3-0.50 g/l</td>
</tr>
<tr>
<td>Detergent agent</td>
<td>LFD Conc</td>
<td>0.4 g/l</td>
<td>0.5-0.6 g/l</td>
</tr>
<tr>
<td></td>
<td>P-100</td>
<td>1.00 -1.50</td>
<td>2.00 g/l</td>
</tr>
<tr>
<td>Anticreaseing agent</td>
<td>P-100</td>
<td>1.00 -1.50</td>
<td>2.00 g/l</td>
</tr>
<tr>
<td>Stabilizer</td>
<td>ARGAPREP</td>
<td>1.00 g/l</td>
<td>1.00 g/l</td>
</tr>
<tr>
<td></td>
<td>MSS Conc</td>
<td>1.00 g/l</td>
<td>1.00 g/l</td>
</tr>
<tr>
<td>Sequestering agent</td>
<td>GS Conc</td>
<td>0.30 g/l</td>
<td>0.30 g/l</td>
</tr>
<tr>
<td>Cametic soda</td>
<td>NaOH</td>
<td>2.50 g/l</td>
<td>2.50 g/l</td>
</tr>
<tr>
<td>Optical Brightner</td>
<td>H2O2-50%</td>
<td>2.5-5.00 g/l</td>
<td>2.5-5.00 g/l</td>
</tr>
<tr>
<td>Hydrogen peroxide</td>
<td>H2O2-35%</td>
<td>3.50-7.00 g/l</td>
<td>3.50-7.00 g/l</td>
</tr>
<tr>
<td>Acitic acid</td>
<td>A/ACID</td>
<td>1.0 g/l</td>
<td>1.00 g/l</td>
</tr>
<tr>
<td>Softening agent</td>
<td>Sapamine CWS</td>
<td>0.3-1.50 g/l</td>
<td>0.30 -0.50 g/l</td>
</tr>
</tbody>
</table>
**Dyeing Sequence for White Shade:**

Fabric Loading at normal temp.

↓

W.A+S.A+St.+A.F.A+A.C.A (Inject at 40°C)

↓

Caustic (dosing at 60°C & dosing time 10min)

↓

Run Time (10 min at 60°C)

↓

Temperature increase 70°C at 10 min

↓

Whitening agent (4BK) mixed with highly hot water & dosing at 100°C dosing time 40 min

↓

Run time 1 hr

↓

Drain

↓

Hot wash at 80°C

↓

Drain

↓

Shade check

↓

Acetic Acid (dosing at 60°C) for PH Check

↓

Drain

↓

Cool wash
Enzymes wash at 55°C
↓
Run Time 60min at 55°C
↓
Drain
↓
Hot wash at 80°C
↓
Drain
↓
Cold wash
↓
Drain
↓
Softener dosing at 50°C
↓
Run time 15 min
↓
Fabric unload

**Process curve for White color:**

Fig: Process curve for scouring & Bleaching
Fig: Process curve for whitening

1. Wetting agent
2. Sequestering agent
3. Stabilizer
4. Anti foaming agent
5. Anti creasing agent
6. Caustic
7. Hydrogen peroxide
8. Whitening
9. Acetic acid

DIFFERENT PARAMETERS IN DYEING:

**pH Levels for Different Stages of Cotton Dyeing:**

1. Initial Bath pH
   \[ 6.5 \text{~} 7.0. \]
2. Before Enzyme, bath pH
   \[ 4.5 \text{~} 4.7. \]
3. After Enzyme & Aquachoron, pH
   \[ 5.5 \text{~} 6.0. \]
4. Before Scmying & Bleaching, pH (With Enzyme)
   \[ 5.5 \text{~} 5.8. \]
5. Before Scmying & Bleaching, pH (Without Enzyme)
   \[ 5.5 \text{~} 5.8. \]
6. Scmying & Bleaching, bath pH
   \[ 10.0 \text{~} 10.5. \]
7. After Scmying & Bleaching, pH
   \[ 8.5 \text{~} 9.0. \]
8. Before Leveling Chemicals, pH
   \[ 6.5 \text{~} 7.0. \]
9. After Leveling Chemicals, pH
   pH 6.7~7.0.
10. After Adding Dyes, pH
    pH 6.2~6.35.
11. After Addition of Salt, pH
    pH 7.5~8.0.
12. After Addition of Soda, pH
    pH 10.5~11.0.
13. Before Hot Wash, Bath pH
    pH 6.8~7.2.
14. Hot Wash, bath pH
    pH 8.5~8.7.
15. Before Softener, bath pH
    pH 7.2~7.8.
16. After Softener Addition, bath pH
    pH 6.5~6.8.

**pH Levels for Different Stages of Polyester Dyeing:**

1. Initial bath pH
   pH 6.5~7.0.
2. Scmying, bath pH
   pH 10.0~11.5.
3. After Scmying, bath pH
   pH 8.5~9.0.
4. Before Addition of Leveling Chemicals, pH
   pH 6.0~6.5.
5. After Addition of Leveling Chemicals, pH
   pH 4.5~4.7.
6. After Addition of Colors, bath pH
   pH 4.2~4.3.
7. During Reduction Clearing, bath pH
   pH 10.5~11.5.
8. Before Softener, bath pH
   pH 6.3~6.8.
9. After Softener Addition, bath pH
   pH 5.8~6.2.

<table>
<thead>
<tr>
<th>Temperature</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>For cotton scmying</td>
<td>95-110°C</td>
</tr>
<tr>
<td>For cotton cold wash</td>
<td>40-50°C</td>
</tr>
<tr>
<td>For cotton hot wash</td>
<td>70-80°C</td>
</tr>
<tr>
<td>For cotton acid wash</td>
<td>60-70°C</td>
</tr>
<tr>
<td>For cotton dyeing</td>
<td>80°C (For hot brand)/60°C (For cold brand)</td>
</tr>
</tbody>
</table>

**Table: Temperature at different Stage**

<table>
<thead>
<tr>
<th>Time</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>For scmying and bleaching</td>
<td>60-90 mins</td>
</tr>
<tr>
<td>For reactive dyeing</td>
<td>60-90 mins</td>
</tr>
<tr>
<td>For disperse dyeing</td>
<td>60-90 mins</td>
</tr>
</tbody>
</table>

**Table: Time at different Stage**
COMMON FAULTS AND THEIR REMEDIES IN KNIT DYEING

1. Crack, rope & crease marks:

Causes:

- Poor opening of the fabric rope
- Shock cooling of synthetic material
- Incorrect process procedure
- Higher fabric speed

Remedies:

- Pre-Heat setting
- Lomer rate rising and cooling the temperature
- Reducing the m/c load
- Higher liquor ratio
- Running at a slightly higher nozzle pressure

2. Fabric distortion and increase in width:

Causes:

- Too high material speed
- Low liquor ratio

Remedies:

- By decreasing both nozzle pressure & winch speed

3. Pilling:

Causes:

- Too high mechanical stress on the surface of the fabric
- Excess speed during processing
- Excess foam formation in the dye bath

Remedies:

- By meing of a suitable chemical lubricant
4. Running problem:

A. Ballooning:

Causes:

- Seam joining with too densely sewn

Remedies:

- By cutting a vertical slit of 10-15 cm in length for escaping the air.

B. Intensive foaming:

Causes:

- Pumping a mixture of air and water

Remedies:

- By meing antifoaming agent

5. Uneven dyeing:

Causes:

- Uneven pretreatment (uneven scmying, bleaching & mercerizing)
- Uneven heat-setting in case of synthetic fibres
- Quick addition of dyes and chemicals
- Lack of control of dyeing m/c

Remedies:

- By ensuring even pretreatment
- By ensuring even heat-setting in case of synthetic fibres
- By slow addition of dyes and chemicals
- Proper controlling of dyeing m/c
6. Shade variation (Batch to batch):

Batch to batch shade variation is common in exhamet dyeing which is not completely avoidable. Even though, to ensure a consistent batch to batch production of shade the following matters should be controlled carefully:

- Use standard dyes and chemicals
- Maintain the same liquor ratio
- Follow the standard pretreatment procedure
- Maintain the same dyeing cycle
- Identical dyeing procedure should be followed for the same depth of the shade
- Make sure that the operators add the right bulk chemicals at the same time and temperature in the process.
- The pH, hardness and sodium carbonate content of supply water should be checked daily.

7. Dye spot:

Causes:

- Improper mixing of dyestuff in the solution, in right amount of water, at the temperature.

Remedies:

- Me should pass the dissolved dyestuff through a fine stainless steel mesh strainer when adding it to the chemical tank, so that the large un-dissolved particles are removed.

8. Patchy dyeing:

Causes:

- Uneven heat in the machine.
- Improper impregnation of dye liquor due to the low wetting property of the fabric.
- Dye migration during intermediate dyeing.

Remedies:

- By proper pretreatment.
By adding extra metting agent.

Heat should be same throughout the dye liquor.

9. Specky dyeing:

Causes:

- Excessive foam in the dye bath.
- Fall of water droplets on fabric surface before or after dyeing.
- Insufficient after treatment.

Remedies:

- By meing antifoaming agent.
- Sufficient after treatment.
- By meing a good metting agent in the dye bath.

10. Roll to roll variation or Meter to Meter variation:

Causes:

- Poor migration property of dyes.
- Improper dyes solubility.
- Hardness of water.
- Faulty m/c speed, etc

Remedies:

- Mee standard dyes and chemicals.
- Proper m/c speed.
- Mee of soft water

11. Crease mark:

Causes:

- Poor opening of the fabric rope
- Shock cooling of synthetic material
- If pump pressure & reel speed is not equal
Due to high speed m/c running

Remedies:

- Maintaining proper reel speed & pump speed.
- Lomer rate rising and cooling the temperature
- Reducing the m/c load
- Higher liquor ratio

12. Dye spot:

Causes:

- Improper Dissolving of dye particle in bath.
- Improper Dissolving of cametic soda particle in bath.

Remedies:

- By proper dissolving of dyes & chemicals
- By passing the dissolved dyestuff through a fine stainless steel mesh strainer, so that the large un-dissolved particles are removed

13. Softener Mark:

Causes:

- Improper mixing of the Softener.
- Improper running time of the fabric during application of softener.
- Entanglement of the fabric during application of softener

Remedies:

- Maintaining proper reel speed & pump speed.
- Proper Mixing of the softener before addition.
- Prevent the entanglement of the fabric during application of softener.
CHAPTER-6

FINISHING
ORGANOGRAM OF FINISHING SECTION:

- General Manager (Dyeing & Finishing)
- Sr. Executive
- Production officer
- Shift in charge
- Floor in charge
- Supervisor
- Operator
- Helper
**Objective of Finishing:**

Improving the appearance – Lmeter, whiteness etc of the fabric.

- Improving the fell which depends on the handle of the material & its softness.
- Mearing qualities, non-soiling, anti crease, anti shrink, etc
- Special properties required for particular mees, such as water-proofing, flame-proofing, etc
- Increase the weight of the cloth

**Types of Finishing:**

**Chemical finishing**

- Chemical reaction of auxiliaries with fibres
- Application of the handle modifying products/additives

**Mechanical Finishing:** Mechanical treatment with m/c

**Finishing effects:**

- Easy-care
- Crease recovery
- Dimensional stability
- Good abrasion resistance
- Improve tear resistance
- Good sew ability
- Soft or stiff handle
- Shine or luster
For Tubular form of fabric following m/c are required:

Hydro-extractor/Dewatering
  ↓
  Dryer
  ↓
  Tubular Compactor

For open form of fabric following m/c are required:

Hydro-extractor/Dewatering
  ↓
  Slitter
  ↓
  Dryer
  ↓
  Stenter
  ↓
  Open compactor

For collar & cuff finishing following m/c are required:

Dewatering
  ↓
  Softening M/C
  ↓
  Dryer

Description of Finishing m/c:

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

**Dewatering m/c:**
- **Manufacturer:** Alkan (china)
- **Function:**
  - Reduce water content
  - Apply chemical
  - Open the fabric from rope form
Controlling Parameters:

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

Chemical application:
Softener: To soften the fabric.

Equipment meed: Following equipment are meed for relax drying process:

a) Alkan(China)
   • Gas burner heated.
   • 2 Chamber
b) Alkan (China)
   • Steam heated
   • 2 chamber

Slitting M/C:

ALKAN Slitter m/c (Turkey)

Slitting:
Slitting is a process that is applied for cutting the tubular fabric through the intended break Wales line on lengthwise direction prior to stenter processing.

Machine parts:

1. Rotary blade: To cut the fabric through break Wales line.
2. Ring: To help cutting.
4. Plaiting: To plait the fabric.
5. Sensor: Sense for cutting through break Wales line.

Stentering M/C:

Machine specification

ALKAN Stenter M/C

Upper feed roller rpm-80 max
Lower feed roller rpm-80 max
Burner -7*2=14
**Function of Stenter:**

- Heat setting.
- Width control, finishing chemical application.
- Loop control.
- Moisture control.
- Spirility control.
- GSM control
- Drying
- Shrinkage control

**Standard operating parameter for different fabric in Stenter:**

<table>
<thead>
<tr>
<th>Fabric Type</th>
<th>GSM</th>
<th>Dia</th>
<th>Temperature</th>
<th>Over Feed</th>
<th>Padder Pressure</th>
<th>Speed (rpm)</th>
<th>Blomer rpm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single jersey</td>
<td>115-150</td>
<td>2”+</td>
<td>110-140</td>
<td>40-45%</td>
<td>2 bar</td>
<td>30-35</td>
<td>1100-1300</td>
</tr>
<tr>
<td>Single jersey</td>
<td>160-220</td>
<td>2”+</td>
<td>120-170</td>
<td>40-45%</td>
<td>2.5 bar</td>
<td>25-30</td>
<td>1200-1400</td>
</tr>
<tr>
<td>Lycra Single jersey</td>
<td>160-200</td>
<td>4”+</td>
<td>130-160</td>
<td>50%</td>
<td>2 bar</td>
<td>25-30</td>
<td>1200-1400</td>
</tr>
<tr>
<td>Lycra Single jersey</td>
<td>200-250</td>
<td>4”+</td>
<td>140-160</td>
<td>50%</td>
<td>2 bar</td>
<td>24-28</td>
<td>1200-1400</td>
</tr>
<tr>
<td>Pique</td>
<td>160-200</td>
<td>3”+</td>
<td>130-160</td>
<td>40-45%</td>
<td>1.5-2bar</td>
<td>25-30</td>
<td>1200-1400</td>
</tr>
<tr>
<td>Lycra Pique</td>
<td>190-220</td>
<td>4”+</td>
<td>130-160</td>
<td>50%</td>
<td>2 bar</td>
<td>20-25</td>
<td>1200-1400</td>
</tr>
<tr>
<td>Fleece/Terry</td>
<td>260-300</td>
<td>4”+</td>
<td>140-170</td>
<td>40-45%</td>
<td>2 bar</td>
<td>20-25</td>
<td>1300-1400</td>
</tr>
<tr>
<td>1x1 Rib</td>
<td>160-220</td>
<td>2”+</td>
<td>130-160</td>
<td>45%</td>
<td>2 bar</td>
<td>24-28</td>
<td>1300-1400</td>
</tr>
<tr>
<td>2x2 Rib</td>
<td>190-220</td>
<td>2”+</td>
<td>140-160</td>
<td>45%</td>
<td>2 bar</td>
<td>20-25</td>
<td>1200-1400</td>
</tr>
<tr>
<td>Interlock</td>
<td>190-220</td>
<td>3”+</td>
<td>130-160</td>
<td>50%</td>
<td>2 bar</td>
<td>20-25</td>
<td>1200-1400</td>
</tr>
</tbody>
</table>

*S/J fabric feed at 3-5 degree angle.
*Others fabric feed, straight.
Checking parameters:

- Shade Check
- width Check
- height Check
- Fault Check

Compactor m/c:

Equipment need:

- Confident tubular compactor m/c (USA)
- Confident open compactor m/c (Turkey)

M/C set up: m/c set up for Compactor is given below:

<table>
<thead>
<tr>
<th>M/C parameter</th>
<th>Set-up value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature setting</td>
<td>90°C-110°C</td>
</tr>
<tr>
<td>Steam pressure</td>
<td>4-6 bar</td>
</tr>
<tr>
<td>M/C speed</td>
<td>3-35 m/min</td>
</tr>
<tr>
<td>Over feed</td>
<td>(-10-+40%)</td>
</tr>
<tr>
<td>Air pressure</td>
<td>5 bar</td>
</tr>
<tr>
<td>Cooling fan motor</td>
<td>Auto</td>
</tr>
</tbody>
</table>

Fig- Tubular compactor m/c  Fig. - Open compactor m/c

Checking parameters:

- Shade Check
- width Check
- height Check
- Fault Check
Squeezer:
To squeeze the dyed fabric with the help of squeezer. Here excess water is removing from dyed fabric, sometime here mee softener for more hand filling.

Machine-Dong Nam Balloning Squeezer M/C(Korea)

Dryer:
To dry the fabric by dryer m/c. Sometime here control the shade of the dyed fabric

Machine: TENSIONLESS DRYER M/C
Model : DNTD 2400(3L, 3CH)
Serial : DN 0642
Capacity: 1200-1500 kgs/day
Heat : 95-130°C

Back Sewing M/C
To back sewing open fabrics for dyeing or washing.

Machine: JIUH SHUENN M/C (Taiwan)
Model: JS-AESM 188
Air pressure: 7-8 kg/cm²

SWEDING M/C:

Machine: Laser-Turk (Turkey)
Model: CSMEV0111
Serial: 3CSM042-T

FINISHED FABRIC INSPECTION:
The following defects are found in the final inspection.

1. Uneven shade
2. Oil spot
3. Neps
4. Crease mark
5. Machine Stoppage mark
6. Listing
7. Line mark
8. Pick missing
9. Double yarn
10. Dead cotton
11. Bowing
12. Fly yarn contamination
Finishing Machineries of Magpie Composite Textile Ltd.

Figure: Back Sewing M/C
Figure: Squeezer M/C
Sliting M/C

Hydro Extractor
Wastewater System Evaluation

Name of Industry: MAGPIE COMPOSIT TEXTILE LTD.

Address: 832/833, DEWAN EDRIS ROAD, AMTALA, KATHGARA, SAVAR, DHAKA, BANGLADESH.

Phone: 88-02-8962437
dyeingmct@magpiegroup.com

Contact Person: M. Arifur Rahman

Type of Industry: TEXTILE BASED

Products manufactured: KNIT FABRICS

Ratio of organic to inorganic waste

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Untreated wastewater</th>
<th>Treated wastewater (out of secondary)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow m³/day</td>
<td>1200-1400</td>
<td>1200-1400</td>
</tr>
<tr>
<td>pH</td>
<td>9.5</td>
<td>6.5-8.5</td>
</tr>
<tr>
<td>BOD (mg/lit)</td>
<td>400</td>
<td>&lt;30</td>
</tr>
<tr>
<td>COD (mg/lit)</td>
<td>1200</td>
<td>&lt;150</td>
</tr>
<tr>
<td>Total Dissolved Solids (mg/lit)</td>
<td>5000 (± 10%)</td>
<td></td>
</tr>
<tr>
<td>Total Suspended Solids (TSS)</td>
<td>100</td>
<td>&lt;30</td>
</tr>
<tr>
<td>Heavy metal (mg/lit)</td>
<td>NIL</td>
<td>NIL</td>
</tr>
<tr>
<td>Oil &amp; Grease (mg/lit)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phenol (mg/lit)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sulphide (mg/lit)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chlorides (mg/lit)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ammonical Nitrogen (mg/lit)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Details Of Existing Treatment Plant**

<table>
<thead>
<tr>
<th>Component</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equalization tank capacity in m³</td>
<td>650</td>
</tr>
<tr>
<td>pH and type of mixing in Equalization tank</td>
<td>9.5 COARSE BUBBLE  AIR  MIXING</td>
</tr>
<tr>
<td>Neutralization tank capacity in m³</td>
<td>125</td>
</tr>
<tr>
<td>Type of mixing in Neutralization tank</td>
<td>AIR  MIXING</td>
</tr>
<tr>
<td>Primary Clarifier tank capacity in m³</td>
<td></td>
</tr>
<tr>
<td>Additives added in the primary</td>
<td>LIME, FeSO₄, POLYMER</td>
</tr>
</tbody>
</table>

**Biological treatment**

<table>
<thead>
<tr>
<th>Component</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anaerobic tank</td>
<td>Yes</td>
</tr>
<tr>
<td>Aerobic tank</td>
<td>√ Yes</td>
</tr>
<tr>
<td>Capacity</td>
<td>500 m³</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Component</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of Aeration tanks</td>
<td>02</td>
</tr>
<tr>
<td>Aeration tanks capacity in m³</td>
<td>500 m³</td>
</tr>
<tr>
<td>HP &amp; No. of Aerators</td>
<td>30 Kw   28 SETS IN EACH TANK</td>
</tr>
<tr>
<td>Dissolved Oxygen (DO) maintained</td>
<td></td>
</tr>
<tr>
<td>Percentage Recirculation of sludge in the secondary</td>
<td></td>
</tr>
<tr>
<td>Frequency and quantum of sludge wasting from secondary</td>
<td>ONCE IN TWO DAYS</td>
</tr>
<tr>
<td>Mixed Liquor Suspended Solids (MLSS) maintained</td>
<td></td>
</tr>
<tr>
<td>Secondary Clarifier tank capacity in m³</td>
<td>NOT THERE</td>
</tr>
<tr>
<td>Nutrients added in the secondary</td>
<td>NIL</td>
</tr>
</tbody>
</table>
LAYOUT PLAN OF ETP IN MAGPIE COMPOSITE TEXTILE LTD.:
Brief Description of ETP along with a Flow Chart:

TREATMENT SCHEME

1. Raw Waste water
2. Manual Bar Screen
3. Equalization Tank
4. Chemical Coagulation
   (Lime, FeSO₄ and Poly Electrolyte)
5. Primary Inclined Plate Clarifier
6. Sequencing Batch Reactor
7. Aerobic Digester Tank
8. Filter Press
9. Disposal of Treated Water
   (By Client Scope)
10. Sludge Disposal
    (By Client Scope)
11. Excess Supernatant
CHAPTER-8

MAINTENANCE
DEFINATION:

Machine, Buildings and other facilities are subjected to deterioration due to their use and exposure to environmental condition process of deterioration, if unchecked, culminates in rendering these service facilities unserviceable and brings them to a standstill. In Industry, therefore has no choice ut to attend them from time to time to repair and recondition them so as to elongate their life to the extent it is economically and physically possible to do so.

OBJECTIVES OF MAINTENANCE:

1. To keep the factory plants, equipments, machine tools in an optimum working condition.

2. To ensure specified accuracy to product and time schedule of delivery to customer.

3. To keep me downtime of machines to me minimum must to have control over me production program.

4. To keep the production cycle within the stipulated range.

5. To modify the machine tools to meet the need for production.
TYPES OF MAINTENANCE:

Preventive maintenance:
Preventive maintenance is a predetermined routine actively to ensure on time inspection/checking of facilities to uncover conditions that may lead to production break downs or harmful description.

Break down maintenance:
In this case, repairs are made after the equipment is out of order and it can not perform its normal functions.

Routine Maintenance:
Maintenance of different machines are prepared by expert engineer of maintenance department. Normally in case of dyeing machine maintenance after 30 days complete checking of different important parts are done.
MANPOWER SET-UP FOR MAINTENANCE:

- **A Shift**: 8 AM - 8 PM
- **B Shift**: 8 PM - 8 AM
- **General Shift**: 9 AM - 6 PM

MAINTENANCE PROCEDURE:

Normally preventive maintenance should be done. During maintenance procedure following points should be checked.

**Check List of Different Parts:**

**Maintenance**: Mechanical

**Machine**: Dyeing machine
<table>
<thead>
<tr>
<th>Sl No</th>
<th>Items need to be checked &amp; Serviced</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Crease the M/C bearing.</td>
</tr>
<tr>
<td>02</td>
<td>Complete cleaning of machine.</td>
</tr>
<tr>
<td>03</td>
<td>Cleaning of drain valves, replace seals if required.</td>
</tr>
<tr>
<td>04</td>
<td>Check air supply filters, regulators auto drain seals</td>
</tr>
<tr>
<td>05</td>
<td>Clean filters element and blow out.</td>
</tr>
<tr>
<td>06</td>
<td>Greasing of unloading roller bearing.</td>
</tr>
<tr>
<td>07</td>
<td>Checking of oil level and bolts of unloading roller gearbox.</td>
</tr>
<tr>
<td>08</td>
<td>Checking of unloading roller coupling and packing.</td>
</tr>
<tr>
<td>09</td>
<td>Checking &amp; cleaning (if required) of main vessel level indicator.</td>
</tr>
<tr>
<td>10</td>
<td>Check the oil level of pump bearing and refill if required.</td>
</tr>
<tr>
<td>11</td>
<td>Check the function of heat and cool modulation valves</td>
</tr>
<tr>
<td>12</td>
<td>Check all door seals</td>
</tr>
</tbody>
</table>

**Maintenance:** Electrical

**Machine:** Dyeing machine

<table>
<thead>
<tr>
<th>Sl No</th>
<th>Items need to be checked &amp; Serviced</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Check &amp; clean fluff and dirt at dirt at all motor fan covers.</td>
</tr>
<tr>
<td>02</td>
<td>Check all motor's terminals</td>
</tr>
<tr>
<td>03</td>
<td>Check main panels (by using compressed air)</td>
</tr>
<tr>
<td>04</td>
<td>Check panel cooling fan &amp; clean its filter</td>
</tr>
<tr>
<td>05</td>
<td>Clean main pump inverter and its cooling fan.</td>
</tr>
<tr>
<td>06</td>
<td>Check all circuit breaker, magnetic conductors and relays.</td>
</tr>
<tr>
<td>07</td>
<td>Check current setting of all circuit breaker &amp; motor over load.</td>
</tr>
<tr>
<td>08</td>
<td>Visual checking of all power &amp; control cables.</td>
</tr>
<tr>
<td>09</td>
<td>Check all pressure switches.</td>
</tr>
<tr>
<td>10</td>
<td>Check calibration of main vessel &amp; all addition tank.</td>
</tr>
<tr>
<td>11</td>
<td>Check all pneumatic solenoids</td>
</tr>
<tr>
<td>12</td>
<td>Check calibration of heating / cooling modulation value</td>
</tr>
<tr>
<td>13</td>
<td>Check setting of tangle sensor.</td>
</tr>
<tr>
<td>14</td>
<td>Check setting &amp; operation of lid safely switches</td>
</tr>
<tr>
<td>15</td>
<td>Check all emergency switches</td>
</tr>
<tr>
<td>16</td>
<td>Check all indication lamps</td>
</tr>
<tr>
<td>17</td>
<td>Check all on/off switches</td>
</tr>
<tr>
<td>18</td>
<td>Check all signal isolators</td>
</tr>
</tbody>
</table>
MAINTENANCE TOOLS & EQUIPMENTS:

1. Combination tools / spanner
   Function: Tightening & loosening of nuts & bolts.

2. Socket ratchet set
   Function: Tightening of nuts & bolts

3. Slide Range
   Function: Tightening & loosening of nuts & bolts

4. Monkey pliers
   Function: Tightening & loosening of nuts & bolts

5. Pipe threat cutting tools
   Function: To cut the threat in pipe.

6. Bearing puller
   Function: To assist the opening of bearing from shaft.

7. Pipe range
   Function: Tightening & loosening of pipe joint

8. Pipe cutting tools
   Function: for pipe cutting.

9. Hole punch
   Function: Punching the hole.
10. Divider
Function: For circle making on metal & wood.

11. Easy opener
Function: To open the broken head bolt.

12. External threat die
Function: For external threat cutting.

13. Heavy scissor
Function: Cutting of gasket & steel sheet.

14. Pipe threat cutting tools
Function: To cut the threat in pipe.

15. Drill machine and drill bit.
Function: for drilling.

16. Grease gun
Function: For greasing of moving parts of M/C.

17. Grinding M/C
Function: For grinding & cutting of mild steel.

18. Welding M/C
Function: For welding & cutting.
19. Spirit leveler
Function: For perfect leveling.

20. File
Function: For smoothing the surface.

21. Hammer
Function: For scaling & Right angling.

22. Circlip tools
Function: Circlip opening & closing.

23. Hacksaw blade
Function: For metal cutting.

24. Handsaw (wood)
Function: For wood cutting.

25. Grinding stone
Function: For smooth finishing.

26. Grinding paste
Function: For easy cutting of metal.

**REMARKS:**

Maintenance of M/C’s are very essential to prolong the M/C life and good maintenance is important consideration. It is necessary to check that all routine maintenance is being done regularly and properly otherwise efficiency of each department will be reduced.
UTILITY SERVICES

Here the following utility services are available-

1. Water
2. Electricity
3. Steam
4. Gas
5. Compress air

WATER

WATER PUMPS:

<table>
<thead>
<tr>
<th>Centrifugal Pump for water supply to Dyeing &amp; Others Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>4</td>
</tr>
<tr>
<td>5</td>
</tr>
<tr>
<td>6</td>
</tr>
<tr>
<td>7</td>
</tr>
</tbody>
</table>

NATURAL WATER QUALITY:

Water for a textile plant may come from various sources. These include surface water from rivers and lakes, and subterranean water from wells. In PPC they collect water from Underground. Natural and pretreated water may contain a variety of chemical species that can influence textile wet processing in general, and dyeing in particular.

The various salts present in water depend on the geological formations through which the water has flowed. These salts are mainly the carbonates (CO₃²⁻), hydrogen carbonates or bi-carbonates (HCO₃⁻), Sulphates (SO₄²⁻) and chlorides (Cl⁻) of calcium (Ca²⁺), magnesium (Mg²⁺). Although calcium and magnesium carbonates in limestone are relatively insoluble in water. So in this reasons, water hardness can be divided into two ways-

1) **Temporary hardness**: Ca(HCO₃)₂, Mg(HCO₃)₂, Fe(HCO₃)₂.

2) **Permanent hardness**: CaCl₂, CaSO₄, Ca(NO₃)₂, MgCl₂, MgSO₄, Mg(NO₃)₂.
This water hardness causes some serious consequences in a textile dyeing and finishing industries and these are -

- Precipitation of soaps.
- Redeposition of dirt and insoluble soaps on the fabric being washed, this can cause yellowing and lead to uneven dyeing and poor handle.
- Precipitation of some dyes as calcium and magnesium salts.
- Scale formation on equipment and in boilers and pipelines.
- Reduction of the activity of the enzymes used in washing.
- Incompatibility with chemicals in finishing recipes and so on.

Hardness expressed by parts per million (ppm) of CaCO\(_3\) which is standard hardness scale and it is also called American hardness. The hardness of raw water is 100 ppm or more. To use it in dyeing and in boiler this water must need to soft & foreign materials needs to remove.

**STANDERD WATER QUALITY FOR DYE HOUSE:**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Permissible concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Color</td>
<td>Color less</td>
</tr>
<tr>
<td>Smell</td>
<td>No bad smell</td>
</tr>
<tr>
<td>Water Hardness</td>
<td>&lt;5 ppm</td>
</tr>
<tr>
<td>PH value</td>
<td>7-8 (Neutral)</td>
</tr>
<tr>
<td>Dissolve solid</td>
<td>&lt; 1 ppm</td>
</tr>
<tr>
<td>Inorganic salt</td>
<td>&lt; 500 ppm</td>
</tr>
<tr>
<td>Iron(Fe)</td>
<td>&lt; 0.1 ppm</td>
</tr>
<tr>
<td>Manganese(Mn)</td>
<td>&lt; 0.01 ppm</td>
</tr>
<tr>
<td>Copper (Cu)</td>
<td>&lt;0.005 ppm</td>
</tr>
<tr>
<td>Nitrate(NO3)</td>
<td>&lt; 50 ppm</td>
</tr>
<tr>
<td>Nitrate(NO2)</td>
<td>&lt; 5 ppm</td>
</tr>
</tbody>
</table>
WATER SOFTENING:

There is ion exchange methods by which hardness of water is removed.

The flow chart of water treatment plant is given below -

![Flow chart of water treatment plant](image)

ELECTRICITY:

<table>
<thead>
<tr>
<th>Sl. no</th>
<th>Machine description</th>
<th>Origin</th>
<th>No. Of Machine</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Chidong Gas Generator</td>
<td>China</td>
<td>1 No.</td>
<td>500 KW</td>
</tr>
<tr>
<td>2</td>
<td>Warsila gas Generator</td>
<td>France</td>
<td>1 No.</td>
<td>952 KW</td>
</tr>
<tr>
<td>3</td>
<td>Leroy somer Generation</td>
<td>India</td>
<td>1 No</td>
<td>640 KW</td>
</tr>
<tr>
<td>4</td>
<td>Sub – Station, Power Development Board(PDB)</td>
<td>Bangladesh</td>
<td>1 No</td>
<td>1000KVA</td>
</tr>
</tbody>
</table>

CHIDONG GAS GENERATOR:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Brand name</td>
<td>CHIDONG</td>
</tr>
<tr>
<td>Origin</td>
<td>China</td>
</tr>
<tr>
<td>Model</td>
<td>12V190ZDT-2</td>
</tr>
<tr>
<td>Standby Voltage</td>
<td>400 V, 795 KVA</td>
</tr>
<tr>
<td>Prime Voltage</td>
<td>500 Kw, 1208 KvA</td>
</tr>
<tr>
<td>Phase</td>
<td>3</td>
</tr>
<tr>
<td>Weight</td>
<td>12000 kg</td>
</tr>
</tbody>
</table>
### DIESEL GENERATOR

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Origin</td>
<td>India</td>
</tr>
<tr>
<td>Brand Name</td>
<td>LEROY SOMER</td>
</tr>
<tr>
<td>Model</td>
<td>LSA49.11L9</td>
</tr>
<tr>
<td>SL No.</td>
<td>L49.110022</td>
</tr>
<tr>
<td>Standby voltage</td>
<td>640 Kw, 750 KvA</td>
</tr>
<tr>
<td>Prime Voltage</td>
<td>640 Kw, 800 KvA</td>
</tr>
<tr>
<td>Frequency</td>
<td>50 Hz</td>
</tr>
<tr>
<td>Phase</td>
<td>3</td>
</tr>
<tr>
<td>Weight</td>
<td>3800 kg</td>
</tr>
</tbody>
</table>

![Generator Image]

### STEAM

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Brand name of boiler</th>
<th>Origin</th>
<th>No. Of Machine</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Standard Kessel</td>
<td>Germany</td>
<td>1</td>
<td>12 Ton</td>
</tr>
<tr>
<td>2</td>
<td>Cleaver Brooks</td>
<td>USA</td>
<td>1</td>
<td>3 Ton</td>
</tr>
<tr>
<td>3</td>
<td>Cleaver Brooks</td>
<td>USA</td>
<td>1</td>
<td>10 ton/hr</td>
</tr>
<tr>
<td>4</td>
<td>Hurst</td>
<td>USA</td>
<td>1</td>
<td>470Kg/Hr</td>
</tr>
</tbody>
</table>

### BOILER:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brand Name</td>
<td>KOMATSU</td>
</tr>
<tr>
<td>Origin</td>
<td>Singapore</td>
</tr>
<tr>
<td>Model</td>
<td>EGS 630-3</td>
</tr>
<tr>
<td>SL No.</td>
<td>30112</td>
</tr>
<tr>
<td>Standby voltage</td>
<td>440 Kw, 550 KvA</td>
</tr>
<tr>
<td>Max. Pressure</td>
<td>200 PSI</td>
</tr>
</tbody>
</table>
### AIR COMPRESSOR:

<table>
<thead>
<tr>
<th>Description of Machine</th>
<th>No. Of Machine</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kaeser Screw compressor, Model AS44, 30 KW, 4 M³/Min each Origin – Germany</td>
<td>2 Units</td>
<td>8.00 M³/Min</td>
</tr>
<tr>
<td>AIR PLUS. Screw Compressor. (LG Com.) Gms-37-52, Made in Korea</td>
<td>1 Unit</td>
<td>50.10 M³/Min</td>
</tr>
<tr>
<td>Ingersoll-Rand, Air Discharge - 8 M³/Min, Model No. 55R, ML-50, 57.5 KW</td>
<td>1 Unit</td>
<td>8.00 M³/Min</td>
</tr>
<tr>
<td>Kaeser Screw Compressor, Origin – Germany Model – CSD 102 Sl no. 9_5700_06_E</td>
<td>1 Unit</td>
<td>8.00 M³/Min</td>
</tr>
<tr>
<td>Atlas Copco ROTARY SCREW Compressor, GA 37-10, 10 BAR, India</td>
<td>2 units</td>
<td>75 Hp/55 Kw</td>
</tr>
</tbody>
</table>

### Air Dryer:

<table>
<thead>
<tr>
<th>Description of Machine</th>
<th>No. Of Machine</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>KAESER Air Dryer Machine, Model TE121, 5KW Years of Manufacture, 1998, Made in Germany</td>
<td>1 Unit</td>
<td>13.00 M³/Min</td>
</tr>
<tr>
<td>JUCAI Air Dryer Machine, Model No. 100A</td>
<td>1 Unit</td>
<td>13.00 M³/Min</td>
</tr>
<tr>
<td>Ingersoll-Rand Air Dryer, Model TMS 80.30 KW</td>
<td>1 Unit</td>
<td>6.00 M³/Min</td>
</tr>
<tr>
<td>Ingersoll-Rand Air Dryer, Model TMS 30.20 KW</td>
<td>1 Unit</td>
<td>3.00 M³/Min</td>
</tr>
<tr>
<td>Kaeser Air Dryer, Origin – Germany Mode TE – 141</td>
<td>1 Unit</td>
<td>13.00 M³/Min</td>
</tr>
<tr>
<td>Act 80 T, Italy</td>
<td>2 unit</td>
<td>9000 L/min</td>
</tr>
</tbody>
</table>
Compressor

**GAS:**

PPCes natural gas from Titas Gas Transmission Company. Gas is used as the fuel of Boiler, Generator and also used for heating dryer, Stenter and compactor m/cs etc.
DEFINITION:

Compliance means conformity of certain standard. PPC maintain a moderate working condition for their employees. Though it is well established project, there is some lacking of proper compliance issues.

LIST OF COMPLIANCE ISSUES:

Here is the list of compliance in which some points are maintained fully and some are partially.

- Compensation for holiday
- Leave with wages
- Health register
- Time care
- Accident register
- Workman register
- Equal remuneration
- National festival holiday
- Overtime register
- Labor welfare
- Weekly holiday fund
- Sexual harassment policy
- Child labor abolition policy
- Anti-discrimination policy
- Zero abusement policy
- Working hour policy
- Hiring/recruitment policy
- Environment policy
- Security policy
- Buyers code of conduct
- Health and safety committee
- Canteen

HEALTH:

- Drinking water at least 4.5 L/day/employee
- Cup availability
- Drinking water supply
- Water cooler,heater available in canteen
- Drinking water signs in Bangla and English locate min. 20 feet away from work place
- Drinking water vassal clean at once in a week
- Water reserve at least once a week
- Water center in charge person with cleanliness
- Suggestion box register

TOILET:

- Separate toilet for women and men
- A seat with proper privacy and lock facility
- Urinal accommodation
- Effective water sewage system
- Soap toilet
- Water tap
- Dust bins
- Toilet white washed one in every four month
- Daily cleaning log sheet
- No-smoking signs
- Ladies /gents toilet signs both in bangle and English
- Deposal of wastes and effluent

**FIRE:**
- Sufficient fire extinguisher and active
- Access area without hindrance
- Fire signs in both languages
- Fire certified personal photo
- Emergency exit

**SAFETY GUARD:**
- Metal glows on good conditions
- Rubber mats & ironers
- First aid box one
- Ironers wearing sleepers
- First trained employees
- Motor/needle guard
- Eye guard
- Nurse
- Doctor
- Medicine
- Medicine issuing register
- Welfare officer

**OTHERS**
- Room temperature
- Lighting facilities

![Picture-33: Doctor](image1)
![Picture-34: First aid box](image2)
![Picture-35: Fire training](image3)
CHAPTER 11

CONCLUSION
Conclusion:

MAGPIE COMPOSIT TEXTILE LTD. is a well-planned versatile project. The administrations, management, chain of command – all are well organized. They are devoted to satisfy the customer by their activities. However, some of the point we want to mention for the good of MAGPIE COMPOSIT TEXTILE LTD.

SOME SUGGESTIONS:

- During the transport of the fabric in the dyeing floor and also during the loading of the M/C, fabrics are soiled for the contact with floor. This makes the fabric / part of the fabric dirty. It may require more scouring/bleaching agent or may create stain making it faulty.
- The dyeing floor is water most of the time: it should be cleaned all the time.
- The illumination of the dyeing shade should be enhanced. It may exert the worker fatigue ness
- More skilled labour should be used in a project as MAGPIE COMPOSIT TEXTILE LTD. Many times the dosing pipelines are clogged due to the careless dosing of chemicals.
- The M/C stoppage time should be analysed and minimized. The maintenance should be carried out when the M/C is out of action.

LIMITITON OF THE REPORT:

- Because of secrecy act the data on costing and marketing activities has not been supplied & hence this report excludes these chapters.
- We had a very limited time in spite of our willing to study more details it was not possible to do so.
- Some of the points in different chapter are not described as these were not available.
- The whole process is not possible to bind in such a small frame as this report, hence our effort spent on summarizing them.

LASTLY:

What special in this report is that the information, data & description very much subjective & practical. So, one can easily have an idea about the whole dyeing unit of MAGPIE COMPOSIT TEXTILE LTD. at a single look on it. The newcomer can use this report for further detailed study or can know MAGPIE COMPOSIT TEXTILE LTD. without much work. But what
should be remembered the chemical, some process steps may be modified within the pined this papers goes the reader.