



Daffodil
International
University

Faculty of Engineering
Department of Textile Engineering

REPORT ON
Industrial Attachment
At
Aman Tex Ltd.
Sreepur, Gazipur

Course Title: Industrial Attachment
Course Code: TE-431

Submitted By

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This Report Presented in Partial Fulfillment of the Requirements for the Degree of Bachelor of Science in Textile Engineering.

Advance in Apparel Manufacturing Technology
Duration: From September 10, 2018 to October 31, 2018

Declaration

We sincerely declare that:

This Industrial Attachment has been done by us. We also declare that neither this Industrial Attachment nor any part of this Industrial Attachment has been submitted elsewhere for award of any degree or diploma.

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Faculty of Engineering
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Approval Sheet

This report entitled ‘**Industrial Attachment at Aman Tex Ltd.**’ is prepared and submitted by **Hasinizzaman (ID# 151-23-4172) & Koushik Kirtania (ID# 151-23-4263)** in partial fulfillment of the requirement for the degree of BACHELOR OF SCIENCE IN TEXTILE ENGINEERING has been examined and hereby recommended for approval and acceptance.

Supervisor
Mr. Md. Abdullah Al Mamun
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Dedication

“To our dignified parents & teacher, may they live long”

Acknowledgement

All pleasure goes to the Almighty Allah to give us strength and ability to complete our two month long industrial attachment at Aman Tex Limited. It was a great opportunity for us to complete the industrial attachment with the assistance of persons employed in Aman Tex Limited. We feel grateful to our academic supervisor Mr. Md. Abdullah Al Mamun, Assistant Professor, Department of Textile Engineering, Faculty of Engineering, Daffodil international University as well as to Tanvir Ahammed Sdiddquee and Mozammel Haque, our factory supervisor for their continuously guiding us about the development and preparation of this training report. They have enriched us with sharing necessary theoretical and practical ideas and supervised us to complete this report on time. We would like to express our thanks to Prof. Dr. Md. Mahbubul Haque, Head, Department of Textile Engineering, Faculty of Engineering, Daffodil International University for his kind help to finish our training report. We also take the opportunity to express our sincerest gratitude to the management, administration & personnel of Aman Tex Ltd. for their kind assistance. Heartfelt thanks goes to Md Rafiqul Islam, Director, Aman Tex Ltd. for their permission & excellent cooperation during the period of our training. The generous support is greatly appreciated. We would also like to thank Production Officers, Senior Production Officer and other officials of Aman Tex Ltd. for helping us to complete industrial training successfully. Our gratitude also goes to all the employees of Aman Tex Ltd. for their sincere co-operation, support and valuable advices.

Finally, we would like to express a sense of gratitude to our beloved parents and friends for their mental support, strength and assistance throughout writing the training report.

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1. Executive Summary

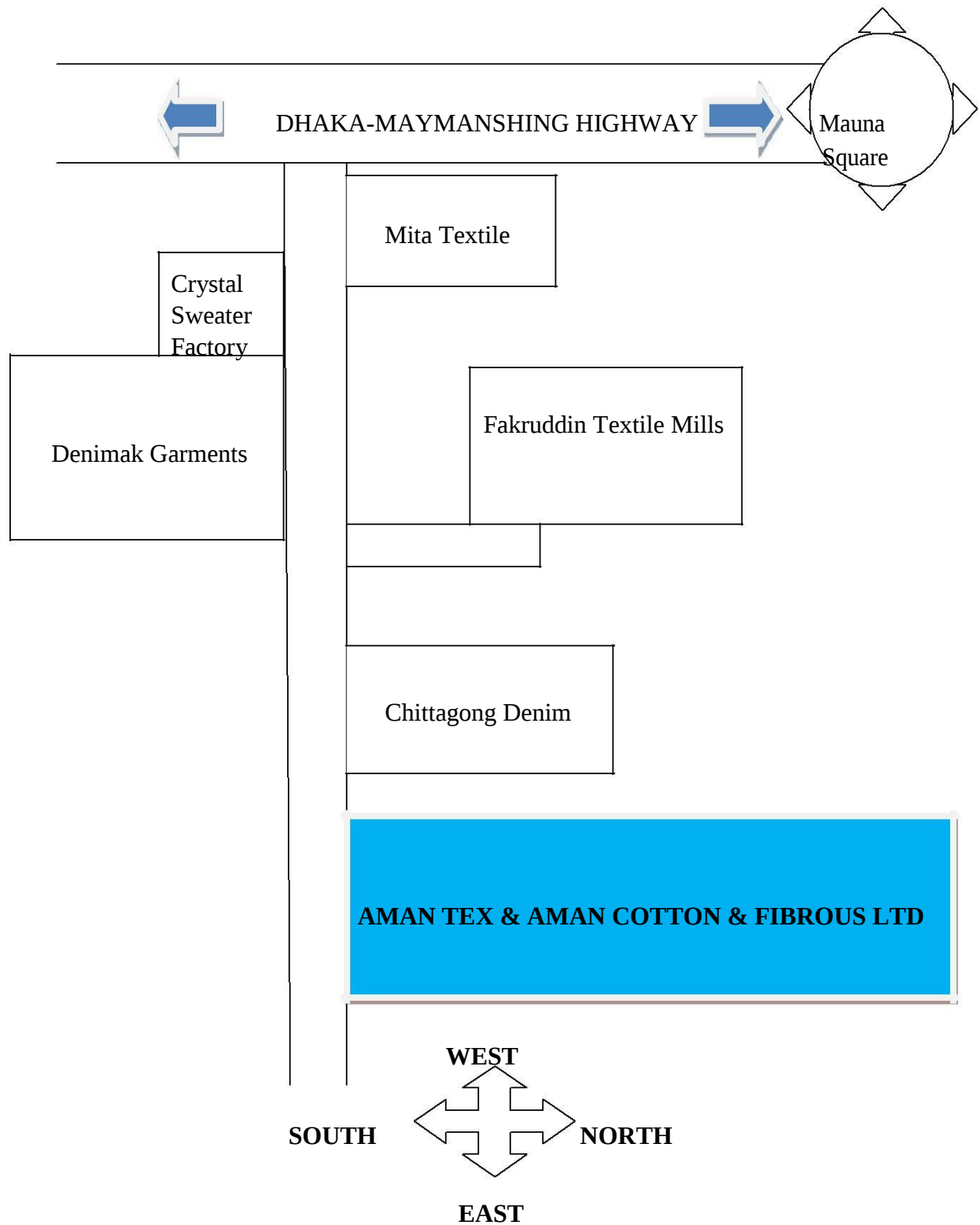
This report is titled “**Report on Industrial Attachment at Aman Tex Ltd.** By achieving practical knowledge from the industrial attachment it is possible to apply the theoretical knowledge in the technical field. For any technical education, practical experience is almost equally necessary in association with the theoretical knowledge. The industrial attachment is the most effective process of achieving the practical experiences. It provides sufficient practical knowledge about Production Management, Productivity, Evaluation, Work Study, Efficiency, Industrial Management, Production Planning & Controlling, Utilities and Maintenance of Machineries and their Operation Techniques etc. Aman Tex Ltd. is a modern textile industry based on knit garments production. The approach was to know and work with all the parameters of each section and practice with technical experts. As the academic advance study was in Garment Manufacturing Technology, emphasisment was in understanding and learning. Industrial attachment is an essential part of four years B.Sc. in Textile Engineering course of Daffodil International University. The opportunity to perform the industrial attachment with **Aman Tex Ltd.** During two months long, had studied the Knitting, Dyeing, Printing & Design, Embroidery, Sample, Cutting, Sewing, Washing, Merchandising and Planning, Grey Fabric Inspection, Finished Fabric Inspection, according to the studies in the whole chain of the factory have prepared the following report and would like to present as the internship report. B.Sc. in Textile Engineering is the combination of theoretical knowledge and the practical experiences. The main objective of this training is to comprehend the theoretical knowledge along with the practical knowledge. It also enabled to orient with the practical environment which is the place of future work.

2. Information

2.1 About Aman Tex

Aman Tex Limited is a dynamic Knit Garments industry. **Md Rafiqul Islam** is the chairman of Aman Tex ltd. Though incorporated in the year 2004 as a private limited company it came into existence in late December 2008. The mill being established in Boiragirchala, Sreepur, Gazipur, Bangladesh aspires to create a niche within a short period of time in highly competitive global market of Knit Garments. Promoted by a team of young & dynamic visionaries, Aman Tex is 100% export oriented Composite Knit Industries. It possesses all the latest machineries from the European Countries with few from United States of America, Japan & Taiwan. The entire plant has been installed & directed by foreign & local engineers jointly under the same roof. The total plant is located in a eight storied building in an area of more than 500,000 square feet. Other than the plant area an additional area of 20,500 square feet covered by an ETP & Supply Water plant. Total manpower of Aman Tex limited 6500. The main Building accommodate all the department Knitting, Dyeing, Finishing & the Utilities required for this with all the relevant sections of those departments to cater the needs of an inimitable garment manufacturing unit in totally meeting all the criteria of updated compliance.

2.2 Location of the factory

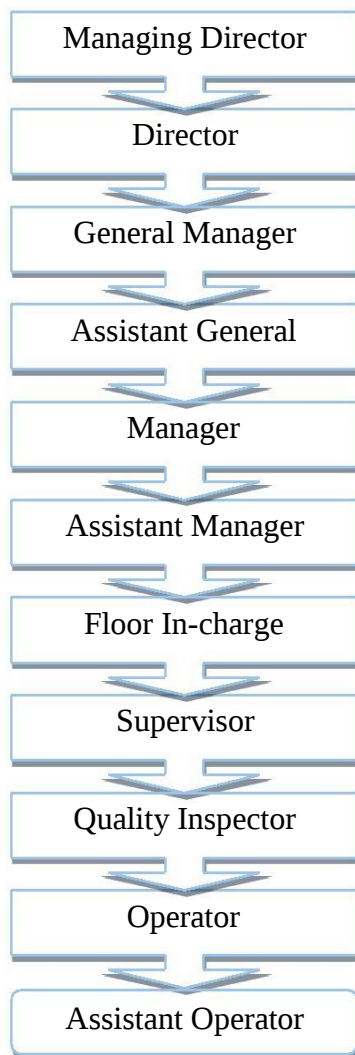


2.3 Total Factory layout



Fig 2.1: Factory layout

2.4 Organogram



2.5 Different Section of Aman Tex:

- a. Knitting Section:
 - Knitting
 - Inspection
- b. Dyeing section:
 - Batch section
 - Sample Section
 - Dyeing lab
 - Dye Section
 - Quality control

- Finishing.
- c. Garments section:
 - Merchandising
 - Sample
 - Cutting Section
 - Printing Section
 - Embroidery Section
 - Sewing Section
 - Finishing Section
- d. Maintenance section:
 - Electrical
 - Mechanical
- e. Store Section
- f. Administration Section
- g. Security Section
- h. Marketing Section
- i. PMC, Work Study & IE Department
- j. Human Resource & Development Section

2.5 Description of the factory Certification:

- ISO: 9001-2008(Quality management systems)
- ISO: 14001-2004 (Environmental management systems)
- WRAP (Worldwide Responsible Accredited Production)
- Oeko-Tex@ Standard 100(Confidence in Textile)
- URS (United Registrar of System)

Compliance:

Strict compliance is observed in the case of female workers in terms of any harassment. Gender equality is also mention in the factory. Child labor never allowed or employed. The mill strictly follows no policy of discrimination appointment of workers. Working hours follow as ILO convention.



Contact Details:

FACTORY NAME :	AMANTEX LIMITED
CORPORATE OFFICE:	2 , Ishakha Avenue, Sector-6 Uttara, Dhaka, 1230.
TEL:	88-02-7911691-3 88-02-8962297
FAX:	88-02-8921489
FACTORY:	Boiragirchala, Sreepur, Gazipur.
TEL:	06825-52790
FAX:	06825-52791
Mail:	info@amangroupbd.com

Table 2.1: Contact Detail

2.7 Top Buyer of Aman Tex Ltd.



Sweden



Germany



UK



Denmark



UK



Germany



UAE



Denmark

2.8 Vision & Mission

Vision

"To be a leader in fulfilling Country's basic needs through industrialization with total quality"

Mission

"Our mission is to establish labor intensive industries blending the latest technologies upholding ownership by the employees along with conservation of environment with precise commitment to the society and contribute substantially to GDP through sustainable growth"

Aman Group is a newly emerged conglomerate of industry and trading in horizon of Bangladesh. Since its inception it has engaged itself in executing social and philanthropic activities as a part of its social obligation to the society. These are:

CSR Activities

Residential Accommodation & Food Subsidies:

The Group has dormitories in many of its establishments. The prominent are in the RMG, Cement, Feed and Poultry & Hatchery Industry. In all the dormitories are foods provided at subsidized price with free accommodation.

Human Resource Development:

Group at the Corporate level has instituted one Training & Organizational Development Department for imparting training and grooming the new recruits as well as to improvise the expertise of the old 8 employees to cope with the changing demands of the business & industries. The Group has also established a small training center in the RMG unit & recruitments of trainees are made directly. After successful training they placed in various sections of the RMG unit.

Donation for medical treatment & rehabilitation of victims of accident/death:

In case of accidents either inside or outside the mill-factories the Group extends medical assistance. In case of accidental or sudden death Group assist the family of the deceased with preference of employment for suitable family member.

Donation for Admission in Higher Educational Institution:

Group provides donation for the meritorious students of the worker-staff families for admission in higher classes.

Aman Foundation

In order to implement programs related to social causes with more dedication, the Group has established Aman Foundation. The aims of the foundation shall be to establish a residential university

for the pupils from poor families with financial assistance for making them self-sufficient through economic activities with health care facilities at nominal cost.

3. Details of the attachment

3.1 Knitting section



Fig 3.1.1: Single jersey circular Knitting M/C in knitting section.

Knitting:

The process of in which fabrics are produced by set of connected loops from a series of yarns is called knitting.

Types of knitting: Mainly knitting is two types,

- Warp knitting.
- Weft knitting.

3.1.1 Layout (5th floor) of knitting section in Aman Tex Ltd.:

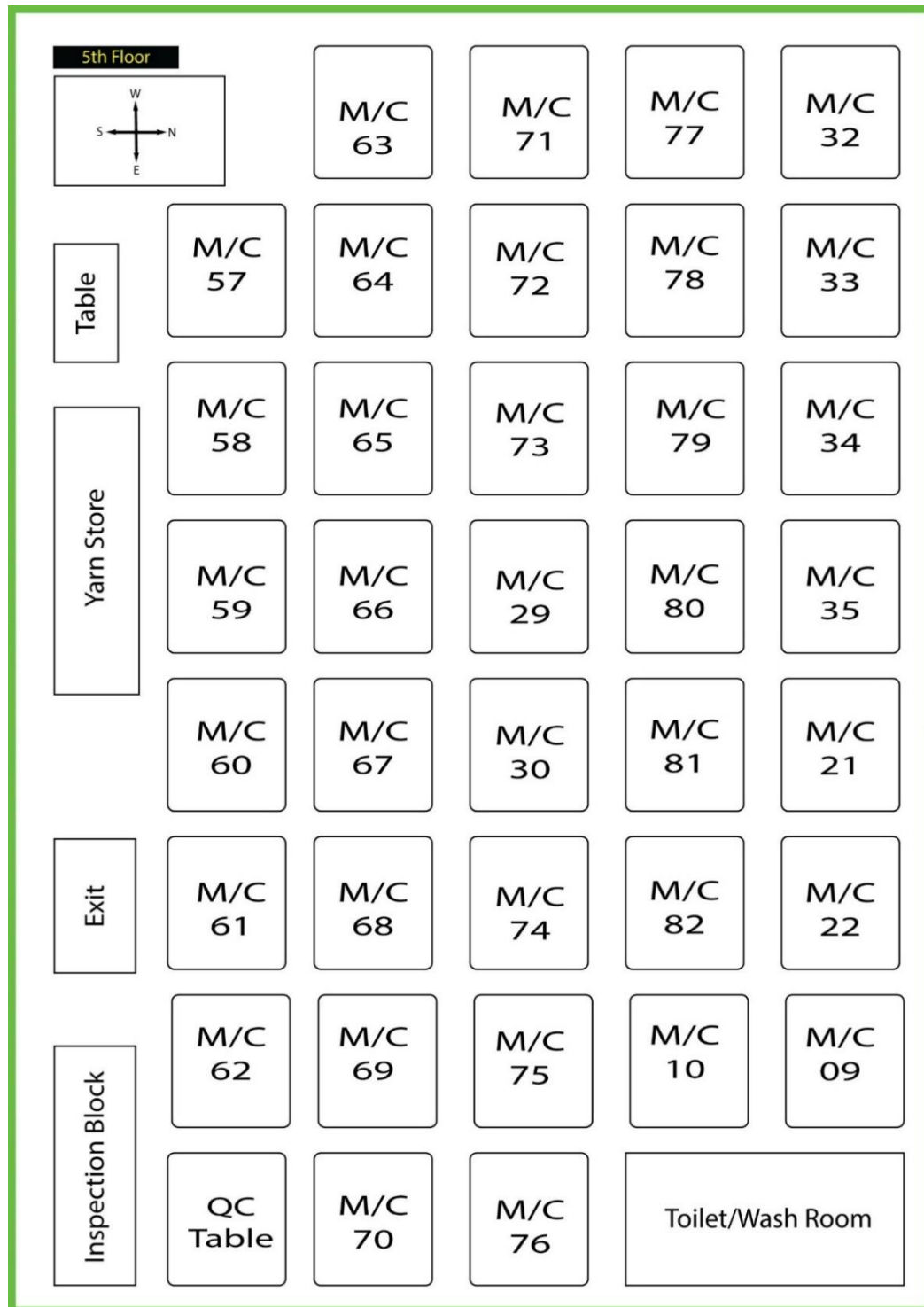
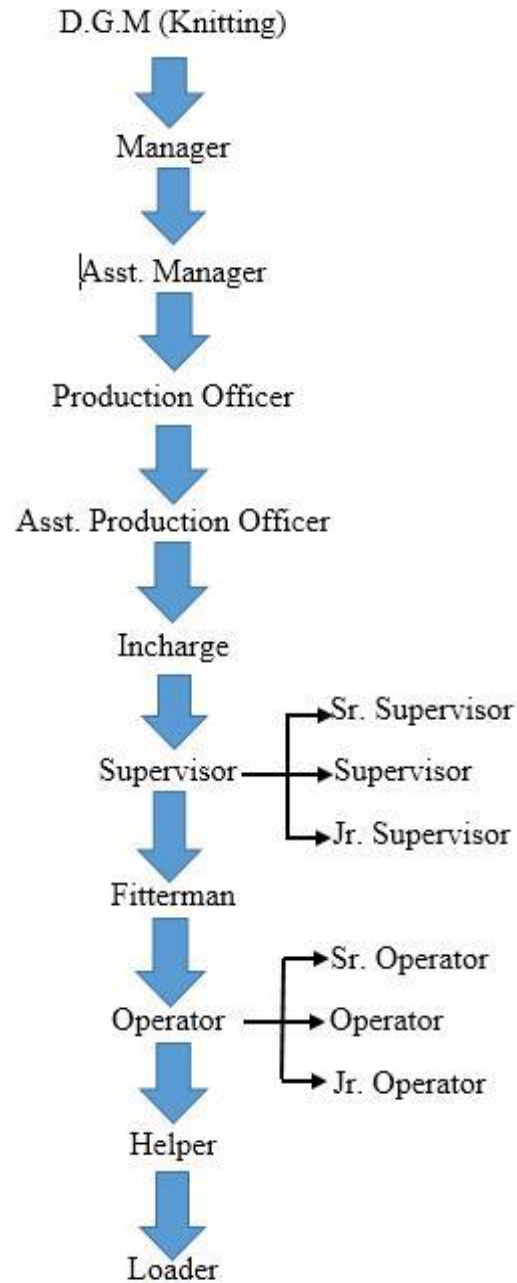
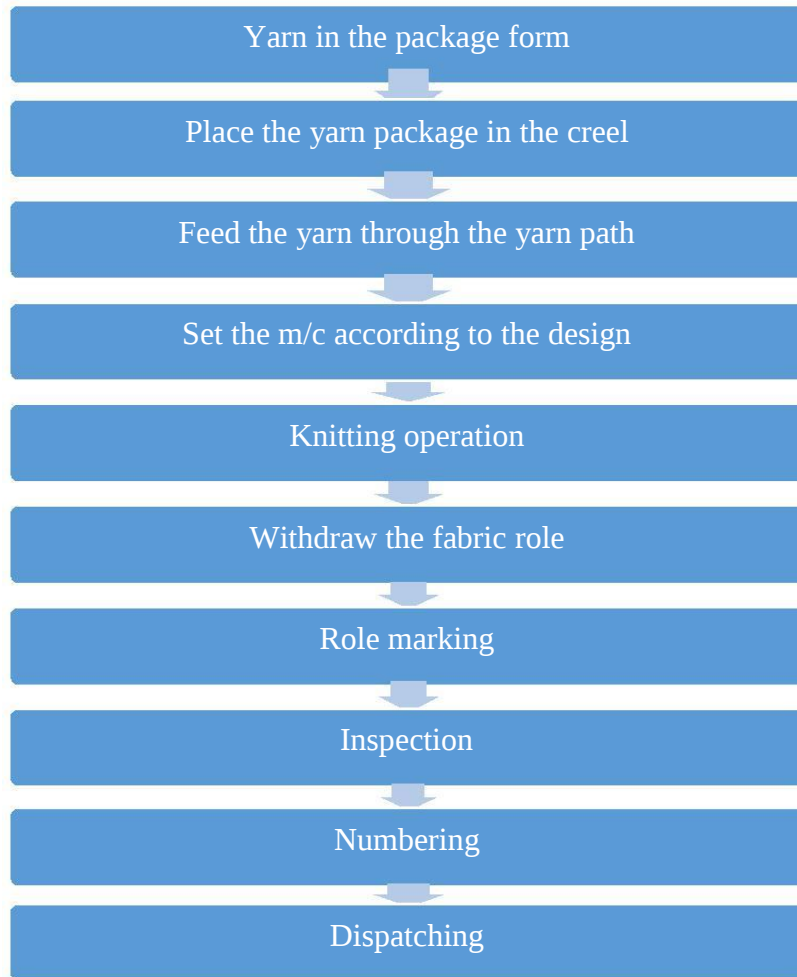


Fig 3.1.2: Layout of Knitting 5th Floor

3.1.2 Organogram of knitting section:



3.1.3 Working Flow Chart of knitting section:



3.1.4 Specification of the Machineries:

Machineries used in Knitting Section

- Single jersey circular knitting machine.
- Flat knit machine.
- Fabric Inspection machine.
- GSM cutter.
- Electric balance.

3.1.5 Specification of Circular Knitting Machine (5th floor):

Machine no	57
m/c type	Single Jersey
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	30
Gauge	28
Needle	2639
No of Feeder	96

Machine no	58
m/c type	Single Jersey
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	30
Gauge	24
Needle	2261
No of Feeder	98

Machine no	59
m/c type	Single Jersey
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	30
Gauge	24
Needle	2261
No of Feeder	98

Machine no	60
m/c type	Single Jersey
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	30
Gauge	24
Needle	2639
No of Feeder	98

Machine no	63
m/c type	Single Jersey
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	32
Gauge	24
Needle	2412
No of Feeder	106

Machine no	61
m/c type	Rib
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	36
Gauge	18
Needle	2036
No of Feeder	64

Machine no	64
m/c type	Single Jersey
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	32
Gauge	24
Needle	2412
No of Feeder	106

Machine no	62
m/c type	Single Jersey
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	36
Gauge	18
Needle	2036
No of Feeder	64

Machine no	65
m/c type	Single Jersey
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	36
Gauge	24
Needle	2710
No of Feeder	118

Machine no	66
m/c type	Single Jersey
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	36
Gauge	24
Needle	2713
No of Feeder	98

Machine no	69
m/c type	Rib
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	36
Gauge	18
Needle	2035
No of Feeder	64

Machine no	67
m/c type	Single Jersey
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	36
Gauge	24
Needle	2713
No of Feeder	118

Machine no	70
m/c type	Rib
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	36
Gauge	18
Needle	2035
No of Feeder	64

Machine no	68
m/c type	Single Jersey
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	36
Gauge	24
Needle	2713
No of Feeder	116

Machine no	71
m/c type	Single Jersey
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	36
Gauge	24
Needle	2713
No of Feeder	118

Machine no	72
m/c type	Single Jersey
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	36
Gauge	24
Needle	2713
No of Feeder	118

Machine no	30
m/c type	Single Jersey
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	26
Gauge	24
Needle	2035
No of Feeder	84

Machine no	73
m/c type	Single Jersey
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	36
Gauge	24
Needle	2713
No of Feeder	118

Machine no	74
m/c type	Single Jersey
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	36
Gauge	24
Needle	2374
No of Feeder	118

Machine no	29
m/c type	Single Jersey
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	26
Gauge	24
Needle	1959
No of Feeder	86

Machine no	75
m/c type	Single Jersey
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	36
Gauge	18
Needle	2261
No of Feeder	64

Machine no	76
m/c type	Rib
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	42
Gauge	18
Needle	2375
No of Feeder	72

Machine no	79
m/c type	Fleece
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	30
Gauge	20
Needle	1884
No of Feeder	98

Machine no	77
m/c type	Fleece
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	30
Gauge	20
Needle	1884
No of Feeder	98

Machine no	80
m/c type	Single Jersey
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	30
Gauge	20
Needle	1884
No of Feeder	98

Machine no	78
m/c type	Single Jersey
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	30
Gauge	20
Needle	1884
No of Feeder	98

Machine no	81
m/c type	Single Jersey
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	30
Gauge	20
Needle	1884
No of Feeder	98

Machine no	82
m/c type	Single Jersey
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	30
Gauge	20
Needle	1884
No of Feeder	98

Machine no	10
m/c type	Single Jersey
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	36
Gauge	24
Needle	2713
No of Feeder	64

Machine no	32
m/c type	Single Jersey
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	30
Gauge	10
Needle	942
No of Feeder	30

Machine no	33
m/c type	Single Jersey
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	30
Gauge	20
Needle	1884
No of Feeder	98

Machine no	34
m/c type	Terry
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	30
Gauge	20
Needle	1884
No of Feeder	30

Machine no	35
m/c type	Single Jersey
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	30
Gauge	10
Needle	942
No of Feeder	30

Machine no	21
m/c type	Single Jersey
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	34
Gauge	24
Needle	2562
No of Feeder	114

Machine no	22
m/c type	Single Jersey
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	34
Gauge	24
Needle	2562
No of Feeder	114

Machine no	09
m/c type	Single Jersey
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	36
Gauge	18
Needle	2035
No of Feeder	64

Table 3.1.1 All Knitting M/C specification

3.1.6 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 see & the machine stops when any problem occurs.

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

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

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

Rethom: These device is used in Electrical Auto Striper Knitting machine.

3.1.7 Lay out (6th floor) of knitting section in Aman Tex Ltd.:

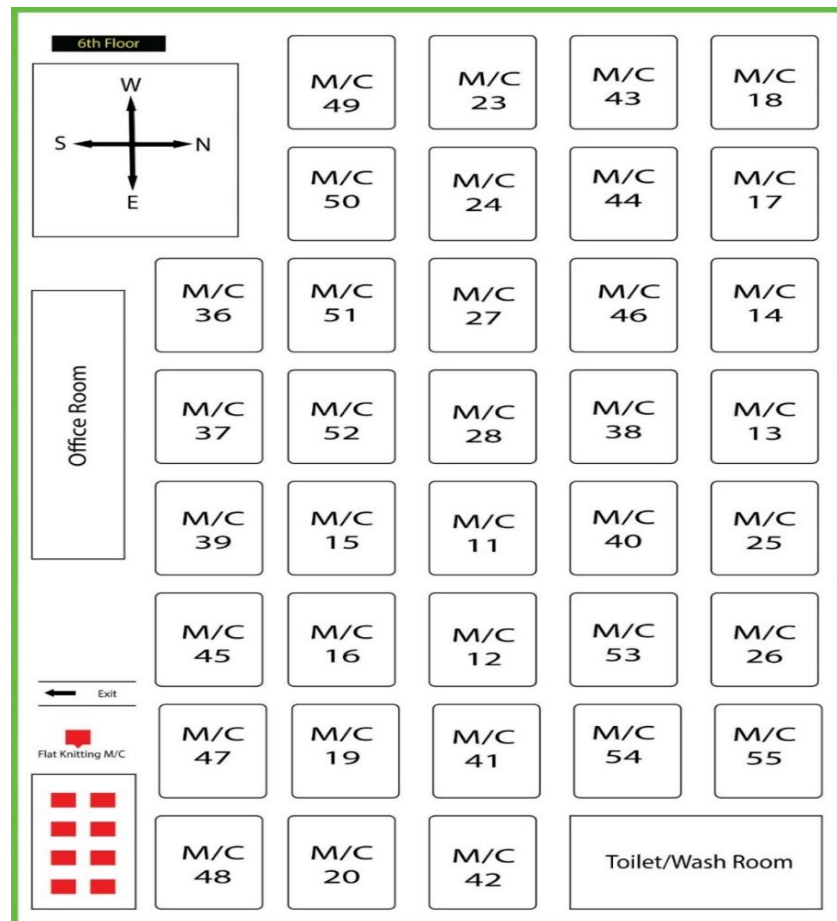


Fig 3.1 3: Layout plan of Knitting 6th floor

3.1.8 Specification of Circular Knitting Machine (6th floor)

Machine no	36
m/c type	Single Jersey
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	30
Gauge	28
Needle	2639
No of Feeder	96

Machine no	37
m/c type	Single Jersey
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	30
Gauge	28
Needle	2639
No of Feeder	96

Machine no	39
m/c type	Single Jersey
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	30
Gauge	28
Needle	2639
No of Feeder	96

Machine no	45
m/c type	Single Jersey
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	32
Gauge	28
Needle	2413
No of Feeder	102

Machine no	48
m/c type	Single Jersey
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	30
Gauge	28
Needle	2639
No of Feeder	96

Machine no	20
m/c type	Single Jersey
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	30
Gauge	28
Needle	2639
No of Feeder	96

Machine no	19
m/c type	Single Jersey
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	30
Gauge	28
Needle	2639
No of Feeder	96

Machine no	16
m/c type	Single Jersey
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	30
Gauge	28
Needle	2639
No of Feeder	96

Machine no	15
m/c type	Single Jersey
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	30
Gauge	28
Needle	2639
No of Feeder	96

Machine no	52
m/c type	Single Jersey
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	30
Gauge	28
Needle	2639
No of Feeder	96

Machine no	51
m/c type	Single Jersey
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	30
Gauge	28
Needle	2639
No of Feeder	96

Machine no	50
m/c type	Single Jersey
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	30
Gauge	28
Needle	2639
No of Feeder	96

Machine no	49
m/c type	Single Jersey
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	30
Gauge	28
Needle	2639
No of Feeder	96

Machine no	23
m/c type	Single Jersey
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	30
Gauge	28
Needle	2639
No of Feeder	96

Machine no	24
m/c type	Single Jersey
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	30
Gauge	28
Needle	2639
No of Feeder	96

Machine no	28
m/c type	Single Jersey
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	30
Gauge	28
Needle	2639
No of Feeder	96

Machine no	11
m/c type	Single Jersey
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	32
Gauge	24
Needle	2413
No of Feeder	102

Machine no	12
m/c type	Single Jersey
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	32
Gauge	24
Needle	2413
No of Feeder	102

Machine no	41
m/c type	Single Jersey
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	32
Gauge	24
Needle	2413
No of Feeder	102

Machine no	42
m/c type	Single Jersey
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	32
Gauge	24
Needle	2413
No of Feeder	102

Machine no	54
m/c type	Single Jersey
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	34
Gauge	24
Needle	2564
No of Feeder	108

Machine no	53
m/c type	Single Jersey
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	34
Gauge	24
Needle	2564
No of Feeder	108

Machine no	40
m/c type	Single Jersey
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	30
Gauge	28
Needle	2639
No of Feeder	96

Machine no	38
m/c type	Single Jersey
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	34
Gauge	24
Needle	2564
No of Feeder	108

Machine no	46
m/c type	Single Jersey
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	32
Gauge	24
Needle	2413
No of Feeder	102

Machine no	44
m/c type	Single Jersey
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	32
Gauge	24
Needle	2413
No of Feeder	102

Machine no	43
m/c type	Single Jersey
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	32
Gauge	24
Needle	2413
No of Feeder	102

Machine no	18
m/c type	Rib
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	30
Gauge	18
Needle	1696
No of Feeder	56

Machine no	17
m/c type	Rib
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	36
Gauge	18
Needle	1696
No of Feeder	56

Machine no	14
m/c type	Rib
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	36
Gauge	18
Needle	1696
No of Feeder	56

Machine no	13
m/c type	Rib
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	36
Gauge	218
Needle	1696
No of Feeder	56

Machine no	25
m/c type	Rib
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	36
Gauge	18
Needle	1696
No of Feeder	56

Machine no	26
m/c type	Rib
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	36
Gauge	18
Needle	1696
No of Feeder	56

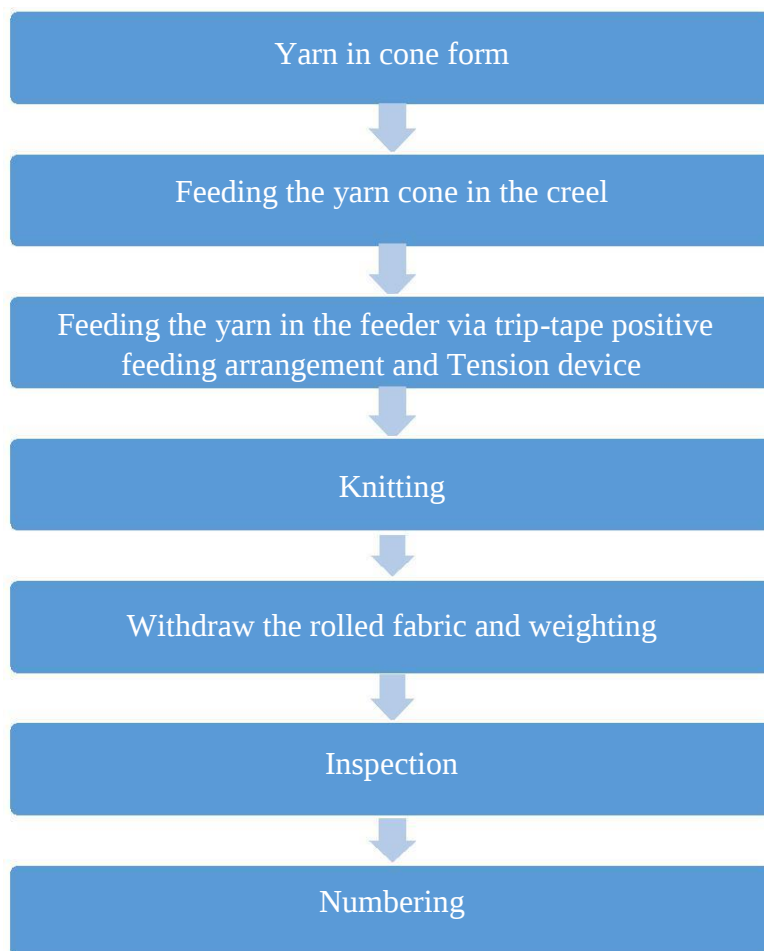
Machine no	47
m/c type	Single Jersey
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	30
Gauge	28
Needle	2639
No of Feeder	96

Machine no	27
m/c type	Single Jersey
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	30
Gauge	28
Needle	2639
No of Feeder	96

Machine no	55
m/c type	Single Jersey
Brand Name	Fukuhara
Origin	Japan
Cylinder Dia	34
Gauge	24
Needle	2564
No of Feeder	108

Table 3.1.2: All knitting m/c specification of 6th floor

3.1.9 Process flow chart of knitting



3.1.10 Raw materials use for knitting

Type of yarn	Count
Cotton Yarn	16 ^s , 20 ^s , 22 ^s , 24 ^s , 26 ^s , 28 ^s , 30 ^s , 34 ^s , 40 ^s
Polyester Yarn	75D, 100D, 150D
Spandex yarn	20D, 40D, 70D
Grey Mellange (C-90% V-10%)	20 ^s , 22 ^s , 24 ^s , 26 ^s , 30 ^s , 34 ^s
PC (65% Polyester & 35% cotton)	24 ^s , 26 ^s , 28 ^s , 30 ^s
CVC	24 ^s , 26 ^s , 28 ^s , 30 ^s

Table 3.1.3: Raw materials use for knitting with counts

3.1.11 Considerable points to produce knitted fabrics

When a buyer orders for fabric then they mention some points related to production and quality. Before production of knitted fabric, these factors are needed to consider. Those are as follows-

- Finished G.S.M.
- Type of Fabric or design of Fabric.
- Yarn count
- Types of yarn (combed or carded)
- Diameter of the fabric.
- Stitch length
- Color depth.

3.1.12 Production calculation

A. Production/shift in kg at 100% efficiency

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

B. Production/shift in meter

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

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

Fabric width in meter:

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

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

3.1.13 Production parameter

1. Machine Diameter
2. Machine rpm (revolution per minute)
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

3.1.14 faults, causes & their remedies in knitting

1. Hole Mark Causes:

- Holes are the results of yarn breakage or yarn cracks.
- During loop formation the yarn breaks in the rejoin of the needle hook.
- If the yarn count is not correct on regarding structure, gauge, course and density.
- Badly knot or splicing. Yarn feeder badly set.

Remedies:

- Yarn strength must be sufficient to withstand the stretch as well as uniform.
- Use proper count of yarn. Correctly set of yarn feeder.
- Knot should be given properly.

2. Needle Mark

Causes:

- When a needle breaks down then needle mark comes along the fabrics.
- If a needle or needle hook is slightly bends, then needle mark comes on the fabrics.

Remedies:

- Needle should be straight as well as from broken latch.

3. Sinker Mark

Causes:

- When sinker corrode due to abrasion then sometimes cannot hold a new loop as a result sinker mark comes.
- If sinker head bend, then sinker mark comes.

Remedies:

- Sinker should be changed.

4. Star

Causes:

- Yarn tension variation during production.

- Buckling of the needle latch.
- Low G.S.M fabric production.

Remedies:

- Maintain same Yarn tension during production.
- Use good conditioned needles.

5. Drop Stitches

Causes:

- Defective needle.
- If yarn is not properly fed during loop formation i.e. not properly laid on to the needle hook.
- Take-down mechanism too loose.
- Insufficient yarn tension.
- Badly set yarn feeder.

Remedies:

- Needle should be straight & well.
- Proper feeding of yarn during loop formation.
- Correct take up of the fabric & correct fabric tension.
- Yarn tension should be properly

6. Oil stain

Causes:

- When oil lick through the needle trick then it pass on the fabrics and make a line.

Remedies:

- Ensure that oil does not pass on the fabrics.
- Well maintenance as well as proper oiling.

7. Rust stain

Causes:

- If any rust on the machine parts.

Remedies:

- If any rust on the machine parts then clean it.
- Proper maintenance as well as proper oiling.

8. Pin hole

Causes:

- If any rust on the machine parts.

Remedies:

- Change the needle

9. Grease stain

Causes:

- Improper greasing.
- Excess greasing.

Remedies:

- Proper greasing as well as proper maintenance.

10. Cloth fall- out

Causes:

- Cloth fall- out can occur after a drop stitch especially when an empty needle with an empty needle with closed latch runs into the yarn feeder and remove the yarn out of the hook of the following needles.

Remedies:

- Make sure all the latches of needle are closed with feeding yarn after a drop stitch.

11. Barre

A fault in weft knitted fabric appearing as light or dark course wise (width wise) Stripe.

Causes:

- This fault comes from yarn fault. If different micro near value of fiber content in yarn.
- Different lusture, dye affinity of fiber content in yarn.
- During spinning different similar classes of fiber is mixed specially in carded yarn & these fibers have similar characteristics.
- In draw fame different similar classes sliver is mixed and make one sliver.

Remedies:

- We can use this fabric in white color.

12. Fly dust:

Causes:

- In knitting section too much lint is flying to and fro that are created from yarn due to low twist as well as yarn friction. This lint may adhere or attaches to the fabric surface tightly during knit fabric production.

Remedies:

- Blowing air for cleaning and different parts after a certain period of time. By cleaning the floor continuously. By using ducting system for cleaning too much lint in the floor. Over all ensure that lint does not attach to the fabric.

13. Yarn contamination

Causes:

- If yarn contains foreign fiber then it remains in the fabric even after finishing, If lot, count mixing occurs.

Remedies:

- By avoiding lot, count mixing. Fault less spinning.

14. Yarn Faults:

- Neps.

- Slubs.
- Yarn count variations.
- Thick/Thin place in yarn.
- Hairiness.

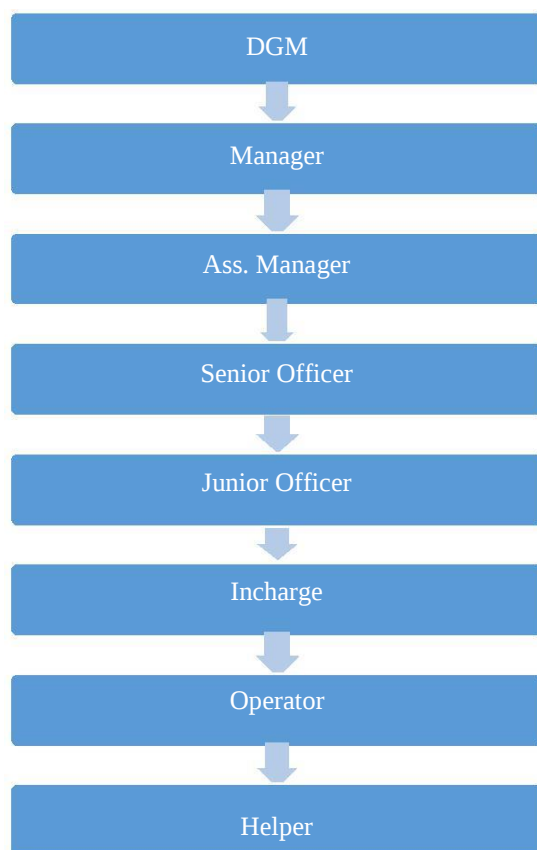
3.2 Dyeing Section

3.2.1 Dyeing Floor layout:



Fig 3.2.1: Floor layout of dying section.

3.2.2 Dyeing organogram



3.2.3 Machineries in physical Lab section:

1. Digital balance
2. GSM cutter
3. Crock master
4. Incubator
5. Distil water
6. Shaker
7. Washing machine
8. Color fastness to washing
9. Dryer
10. Color fastness to water
11. pH meter
12. stress and recovery
13. Bursting strength and dimension
14. Pilling machine
15. ICI pilling box
16. Hugo/Thermograph.

3.2.4 Machineries in chemical Lab section:

1. Chemical mixture
2. Electronic balance
3. Polyester dyeing machine
4. Data color dyeing machine
5. Padder
6. Curing
7. Light box
8. Lab dispenser

3.2.5 Laboratory Machineries with its Specification:

M/c	Bursting Strength Tester
No. of m/c	01
Name of the m/c	True Burst
Brand Name	James H Helal
Origin	U.K

M/c	Pilling & Snagging Resistant Tester
No. of m/c	01
Brand Name	SDL ATLAS
Origin	U.K

M/c	Data color M/c
No. of m/c	01
Brand Name	Ahiva-600
Origin	U.S.A

M/c	Rota Wash m/c
No. of m/c	02

Brand Name	Colorfastness to Washing, Dry cleaning
Origin	U.K
Test Method	ISO105-C06, ISO105-D02

M/c	Eltrolux wascator.
No. of m/c	02
Brand Name	SDL ATLAS
Test Name	Dimensional Stability, Spirally, Appearance after washing.
Test Method	ISO 6330, ISO 26330
Origin	U.K

M/c	01
No. of m/c	Crock Master
Brand Name	James H Helal
Test Name	Colorfastness to Rubbing tester
Origin	U.K

M/c	Datacolor AutoLab TF Gravimetric Lab dispenser
No. of m/c	01
Brand Name	Ahiva-600
Origin	U.S.A

M/c	Lab Dip m/c
No. of m/c	02
Brand Name	Ahiba Nuance Lab Dip Dyeing m/c
Origin	U.S.A

Table 3.2.1: All Dyeing Laboratory M/C

3.2.7 Different m/c in laboratory:



Lab Dip M/C



Pilling Test M/C



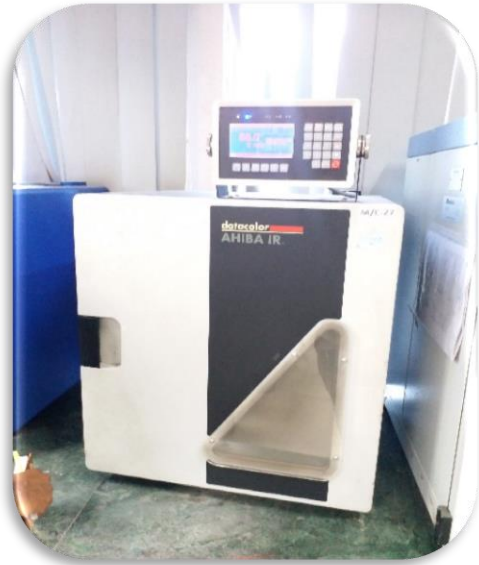
Rubbing test M/C



Washing M/C



TruBurst M/C



Data Color M/C



Wash Fastness Tester



PH tester M/C



Lab Dispenser machine

Fig 3.2.2: All Laboratory machineries

3.2.8 Some test procedure

1. Color fastness to rubbing (wet & dry):

Procedure:

At first take a sample of size (14×5) cm at Wales & Course 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 have sucked some water and then squeeze the crocking cloth. Then place the wet 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 wet rubbing. Wet and dry rubbing are checked according to buyer's requirement.

2. Color fastness to washing. (ISO/05-CO6):

Procedure:

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

- Detergent: 4g/l ECE detergent (WOB) + 1g/l sodium per borate put in distilled water & cooled at 20°C & measured P^H(where necessary).
- Run the program in the following way: -

Test no.	Temp°C	Liq. volume ml	Time min.	Steel balls	Adjust pH
C2S	60°C	50	30	25	10.5±1
- Rinse the sample twice with cold water.
- Dry at 60°C by hanging or by flat iron pressing but temperature should not less more than 150 °C.

3.Pilling test:

Procedure:

Cut the fabric 12.5 x 12.5cm & balance mark should be 10cm by using template. Then sewn the fabric so that it can be firmly fit in the tube a moulded polyurethane tubes. Then four tubes are placed in a box & start 60±2 rev/min for 5 hrs or according to buyer requirement. Here mainly used 3hrs (1100 cycle). Then assess the pilling by putting tested specimen on the viewing cabinet & compare with standard photographs.

Buyer's requirements:

Template size: 50cm & 35cm, 25.5cm & 18cm (use 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 we 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 60minutes with water. After that dry the sample & then measure the fabric

Spin speed --- 500 rpm
Drum speed --500 rpm

Calculation:

Shrinkage Test:

Lengthwise:

$$= \frac{\text{After wash} - \text{Before wash}}{\text{Before wash}} \times 100$$

Width wise:

$$= \frac{\text{After wash} - \text{Before wash}}{\text{Before wash}} \times 100$$

4. Color fastness to water (ISO 105 EO1& EO 2):

1. Sample size: Cut the specimen & multi-fiber at 10×2cm & sewn together.
2. Solution: Wet in distilled water at room temperature & it will suck water.
3. Place it in acrylic resin plates & put the weight on to the plates.
4. Keep it in oven & keep the temperature at 37± 2°C for 4hrs.
5. Open the specimen & dry it in the air hot exceeding 60°C.
6. Assess the staining & shade change with gray scale.

5. Color fastness to perspiration Alkaline & Acid solution (Method: ISO 105 E04):

Procedure:

Cut the specimen & multifibre at 10×2cm & sewn together.

Prepare solution:

Alkaline Solution:

- 0.5g/l of 1-histadine mono hydrochloride monohydrate.
- 5 g/l of sodium chloride

This solution is brought to pH -8 with 0.1 mole/l caustic solution.

Acid solution:

- 0.5 g/l of 1-histadine monohydrochloride monohydrate
- 5 g/l of sodium chloride.
- 2.2 g/l of sodium dihydrogen orthophosphate dehydrate.

This solution is brought to pH-5.5 with 0.1 mole/l caustic solution.

M:L = 1: 50

Wet the specimen in flat dish containing acid & alkaline solution & keep for 30min. Then take the specimen & squeeze the excess solution by two glass rods.

- Put the specimen in to the acrylic resin plates & put wt. on the plates.

- Keep it in the woven at $37^{\circ}\text{C} \pm 2^{\circ}\text{C}$ for 4hrs.
- Open the specimen 6 multi fibre & dry separately in the air temperature not exceeding 60°C .
- Assess the staining & shade change with grey scale.

6. P^H Test:

Procedure:

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

7. GSM test:

Procedure:

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

3.2.9 Specification of Sample Dyeing Machine:

Machine no.	01
Machine name:	Thie's (High temperature machine)
Origin :	Germany
Capacity:	60 kg
Max. Variable Temperature :	160°C
Max. Operating Pressure:	400 Kpa

Machine no.	02
Machine name:	Thie's (High temperature machine)
Origin :	Germany

Capacity:	30kg
Max. Variable Temperature :	160°C
Max. Operating Pressure:	400 Kpa

Machine no.	03
Machine name:	Thie's (High temperature machine)
Origin :	Germany
Capacity:	10kg
Max. Variable Temperature :	160°C
Max. Operating Pressure:	400 Kpa

Machine no.	04
Machine name:	Thie's (High temperature machine)
Origin :	Germany
Capacity:	10kg
Max. Variable Temperature :	160°C
Max. Operating Pressure:	400 Kpa
Machine no.	05
Machine name:	Thie's (High temperature machine)
Origin :	Germany
Capacity:	10kg
Max. Variable Temperature :	160°C
Max. Operating Pressure:	400 Kpa

Machine no.	06
Machine name:	Thie's (High temperature machine)
Origin :	Germany
Capacity:	20kg
Max. Variable Temperature :	160°C
Max. Operating Pressure:	400 Kpa

Table 3.2.2: All Sample Dyeing M/C specification

3.2.5 Dyeing Machine Specification:

Machine no.	01
Machine name:	Thie's (High temperature machine
Origin :	Germany
Capacity:	250 kg
Number of nozzle:	One (01)
Max. Variable Temperature :	140°C
Working Pressure:	0.35 Mpa
Test pressure:	0.55 Mpa

Machine no.	02
Machine name:	Thie's (High temperature machine).
Origin :	Germany
Capacity:	250 kg
Number of nozzle:	One (01)
Max. Variable Temperature :	140°C
Working Pressure:	0.35 Mpa
Test pressure:	0.55 Mpa

Machine no.	03
Machine name:	Thie's (High temperature machine).
Origin :	Germany
Capacity:	500 kg
Number of nozzle:	One (01)
Max. Variable Temperature :	140°C
Working Pressure:	0.35 Mpa
Test pressure :	0.55 Mpa

Machine no.	04
Machine name:	Thie's (High temperature machine).
Origin :	Germany
Capacity:	500 kg
Number of nozzle:	One (01)
Max. Variable Temperature :	140°C
Working Pressure:	0.35 Mpa
Test pressure:	0.55 Mpa

Machine no.	05
Machine name:	Thie's (High temperature machine).
Origin :	Germany
Capacity:	500 kg
Number of nozzle:	One (01)
Max. Variable Temperature :	140°C
Working Pressure:	0.35 Mpa
Test pressure:	0.55 Mpa

Machine no.	06
Machine name:	Thie's (High temperature machine).
Origin :	Germany
Capacity:	500 kg
Number of nozzle:	One (01)
Max. Variable Temperature :	140°C
Working Pressure:	0.35 Mpa
Test pressure:	0.55 Mpa

Machine no.	07
Machine name:	Thie's (High temperature machine).
Origin :	Germany
Capacity:	750 kg
Number of nozzle:	Three (03)
Max. Variable Temperature :	140°C
Working Pressure:	0.35 Mpa
Test pressure:	0.55 Mpa

Machine no.	08
Machine name:	Thie's (High temperature machine).
Origin :	Germany
Capacity:	750 kg
Number of nozzle:	Three (03)
Max. Variable Temperature :	140°C
Working Pressure:	0.35 Mpa
Test pressure:	0.55 Mpa

Machine no.	09
Machine name:	Thie's (High temperature machine).
Origin :	Germany
Capacity:	750 kg
Number of nozzle:	Three (03)
Max. Variable Temperature :	140°C
Working Pressure:	0.35 Mpa
Test pressure:	0.55 Mpa

Machine no.	10
Machine name:	Thie's (High temperature machine).
Origin :	Germany
Capacity:	750 kg
Number of nozzle:	Two (02)
Max. Variable Temperature :	140°C
Working Pressure:	0.35 Mpa
Test pressure:	0.55 Mpa

Machine no.	11
Machine name:	Thie's (High temperature machine).
Origin :	Germany
Capacity:	1000 kg
Number of nozzle:	Three (03)
Max. Variable Temperature :	140°C
Working Pressure:	0.35 Mpa
Test pressure:	0.55 Mpa

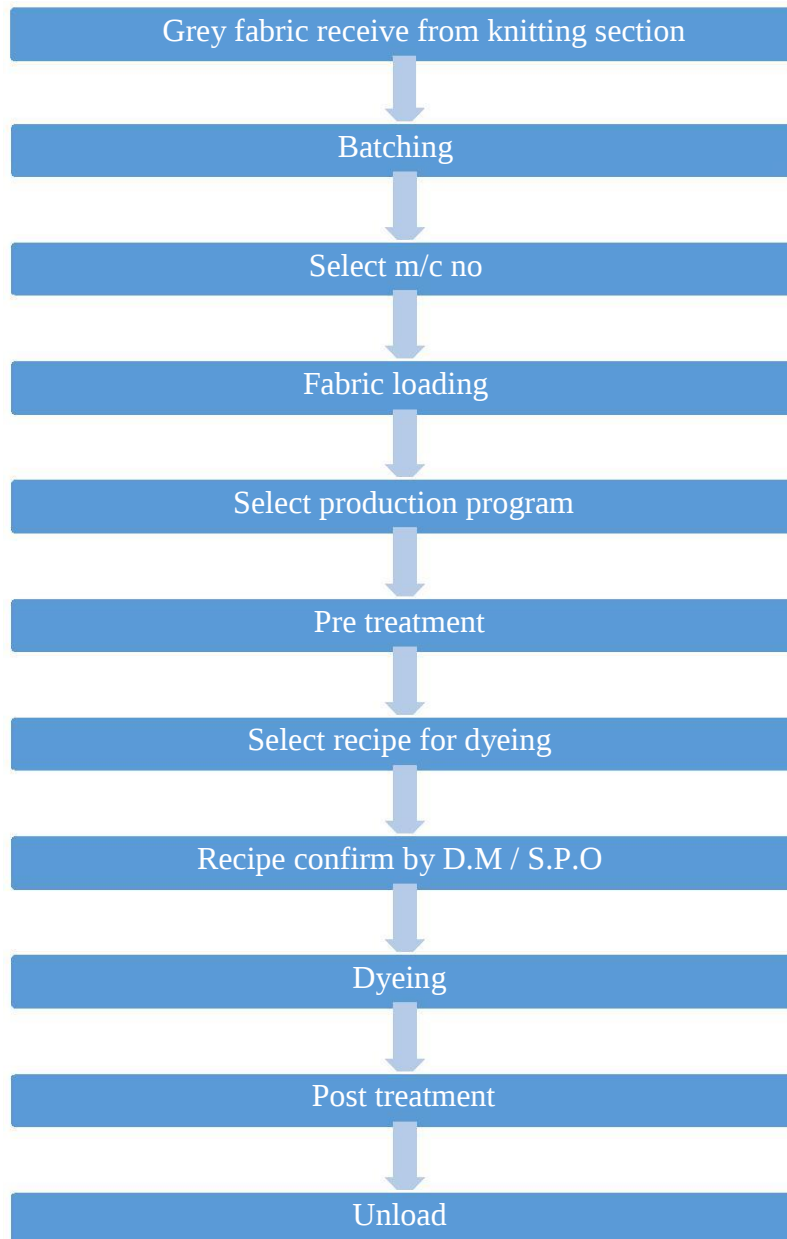
Table 3.2.3: Specification of sample dyeing machine

3.2.10 Raw materials for dyeing

Raw materials used in the dyeing section are:

1. Grey fabrics.
2. Dyes.
3. Chemicals

3.2.11 Flow Chart for Dyeing



3.2.12 Common dyeing faults with their remedies

1. Uneven dyeing:

Causes:

- Uneven pretreatment (uneven scouring & bleaching).
- Improper color dosing.
- Using dyes of high fixation property.
- Uneven heat-setting in case of synthetic fibers.
- Lack of control on dyeing m/c.

Remedies:

- By ensuring even pretreatment.
- By ensuring even heat-setting in case of synthetic fibers.
- Proper dosing of dyes and chemicals.
- Proper controlling of dyeing m/c.

2. Batch to Batch Shade variation:

Causes:

- Fluctuation of Temperature.
- Improper dosing time of dyes & chemicals.
- Batch to batch weight variation of dyes and chemicals.
- Dyes lot variation.
- Improper reel speed, pump speed, liquor ratio. - Improper pretreatment.

Remedies:

- 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 check daily.

3. Patchy dyeing effect:

Causes:

- Entanglement of fabric.
- Faulty injection of alkali.
- Improper addition of color.
- Due to hardness of water.
- Due to improper salt addition.
- Dye migration during intermediate dyeing.
- Uneven heat in the machine, etc

Remedies:

- By ensuring proper pretreatment.
- Proper dosing of dyes and chemicals.
- Heat should be same throughout the dye liquor. - Proper salt addition.

4. 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:

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

5. 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.
- Lower rate rising and cooling the temperature
- Reducing the m/c load
- Higher liquor ratio

6.Dye spot:

Causes:

- Improper Dissolving of dye particle in bath.
- Improper Dissolving of caustic 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

7.Wrinkle mark:

Causes:

- Poor opening of the fabric rope.
- Shock cooling of synthetic material.
- High temperature entanglement of the fabric.

Remedies:

- Maintaining proper reel speed & pump speed.
- Lower rate rising and cooling the temperature.
- Higher liquor ratio.

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.

3.2.13 Finishing Section

Machine List of Finishing Section:

Machine Name	Machine Quantity
Dryer	02
Stenter	02
Open Compactor	01
Tube Compactor	01
Single Drum Raising m/c	01
Double Drum Raising m/c	01
Sueding m/c	01

Table 3.2.4: Machine List of Finishing Section

3.2.14 Function of Different Finishing M/C

Objectives of De-Watering M/C:

- Remove excess Water
- Application Of GSM
- To control the crease mark of the fabric.

Hydro Extractor M/C:

- To extract excess water.

Slitting M/C:

- To open tube fabric according to specific needle mark.

Dryer M/C:

- To dry the fabric.
- To control the overfeed system
- To control the vibration which increase the GSM

Compactor M/C:

- Shrinkage control

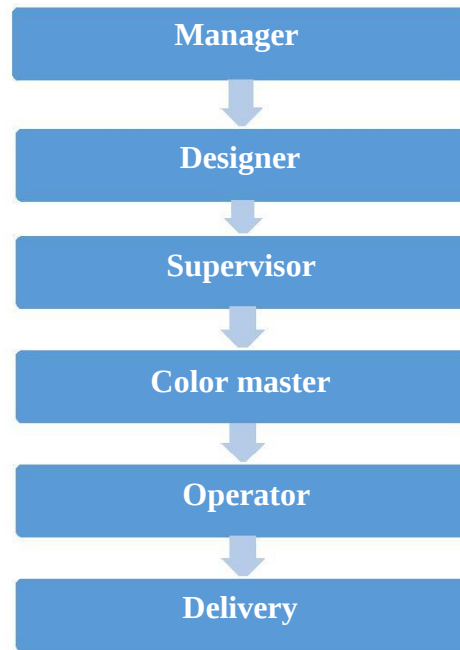
- Width control

Stenter M/C:

- Heat setting
- Width control, Finishing chemical application
- Loop control
- GSM control
- Drying
- Shrinkage control

3.3 PRINTING SECTION

3.3.1 Organogram



3.3.2 Printing layout

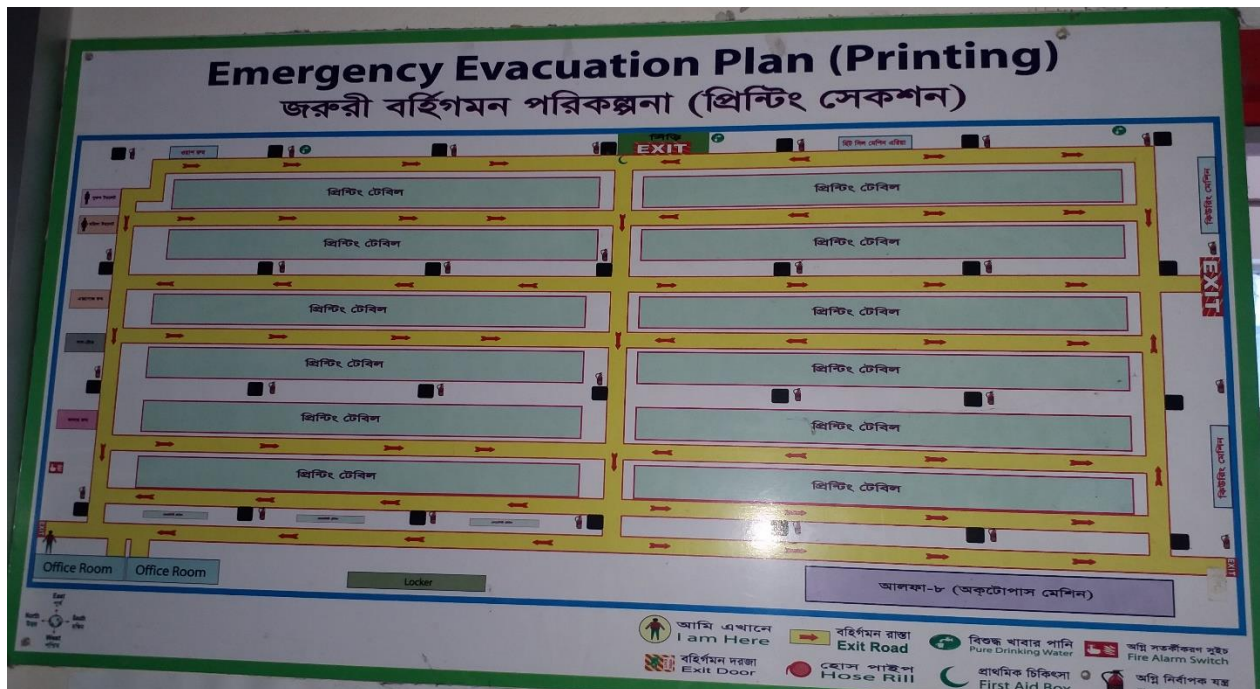


Fig 3.3.1: Printing layout

3.3.3 Different Types of Printing

1. Pigment Printing
2. Rubber Printing
3. Flocking Printing
4. Glitter Printing
5. Emboss Printing
6. Screen Printing
7. 3D printing
8. Photo print
9. Foam reflective
10. Gel Printing
11. Foam Gel
12. Reflective print
13. Sunlight print
14. Camo metallic

3.3.4 Chemical Used in printing

Thickener (PG): It is a main compound for making a paste.

Binder: Hold color on to the fabric surface.

Pigment: It is a coloring substance.

3.3.5 Pigment Printing recipe

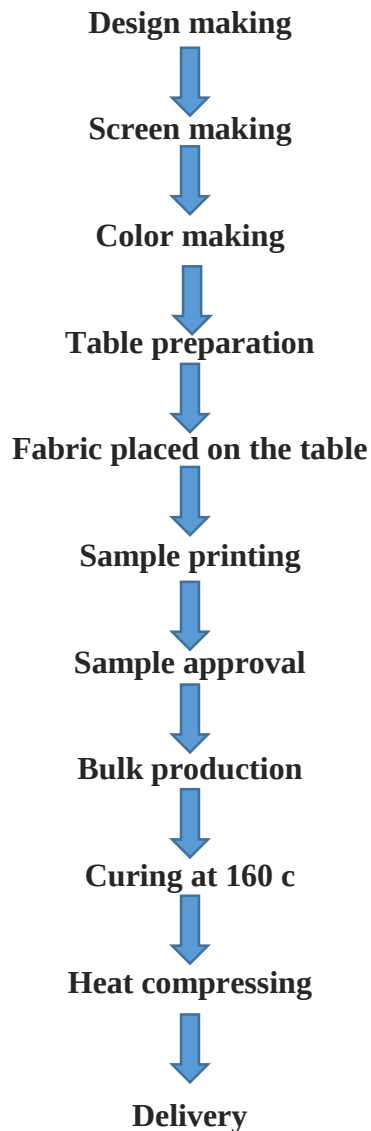
Thickener-2 %

Binder-8 %

Fixer-2 %

Water-90 %

3.3.6 Printing Process Sequence



3.3.7 Faults in Printing

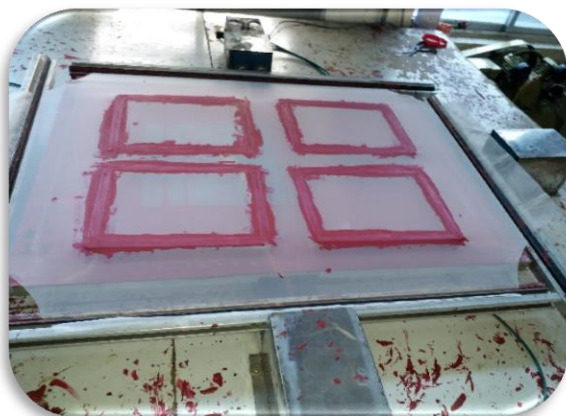
1. **Fatting:** If the pigment printed fabric is fatted (on printed portion) after washing, then this fabric is rejected. So it is a major fault in printing.
2. **Cracking:** If the rubber printed fabric is braking (on printing portion) after elastration.
3. **Setting Problem:** If the screen doesn't place in right area in the table.
4. **Measurement Problem:** If the print does over the area will be printed.
5. **Color Mistake:** If worker uses wrong color in printing.
6. **Color spot:** In mistake color is come out the area of printing.

3.3.8 Machine Used in Printing Section

Machine Name	Brand	Origin	Machine Quantity
Tunnel Dryer	Sujou-Yuhui	China	01
IR dryer	Sujou-Yuhui	China	04
Exposer	Sujou-Yuhui	China	01
Heat press M/C	Sujou-Yuhui	China	03
Screen Frame Binder	Sujou-Yuhui	China	01
Mixture M/C	Sujou-Yuhui	China	01

Table 3.3.1: M/C List of printing section

3.3.9 Printing pictures gallery



Making of Print Screen



Auto Printing Dryer



Printing Table



Print screen making using film paper in the exposé room



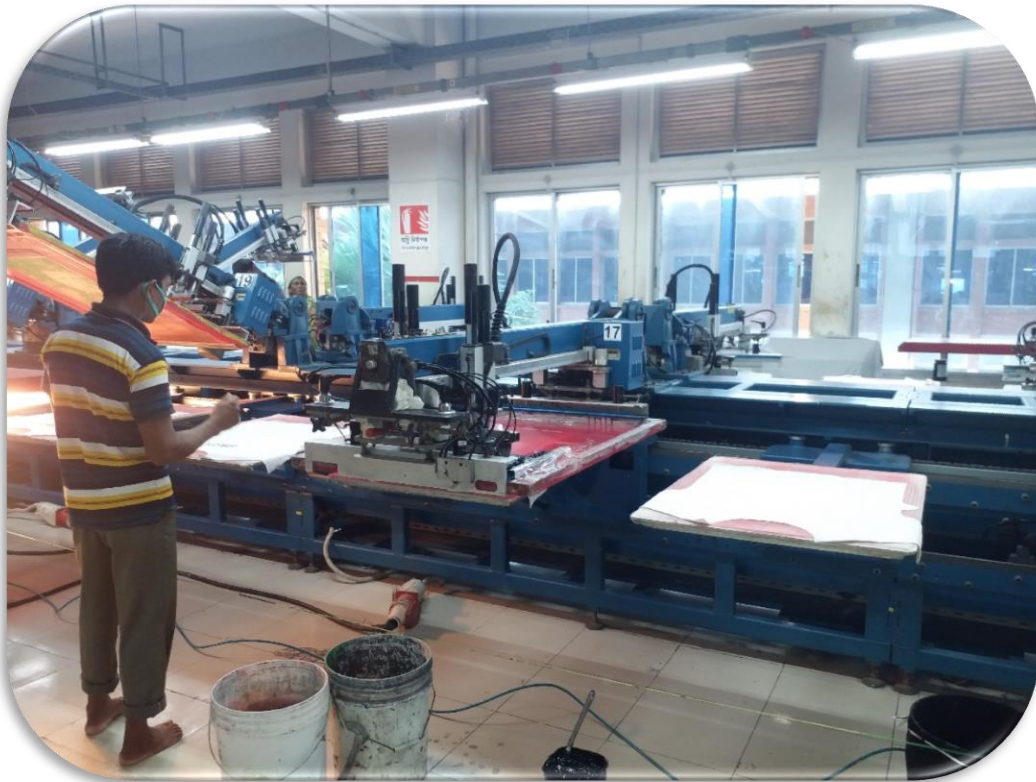
Rubber print on a T-shirt



Curing Machine



Auto print labeling M/C



Automatic printing by Auto Alfa M/C

Fig 3.3.2: Printing Machine Gallery

3.4 Embroidery Section

3.4.1 Embroidery:

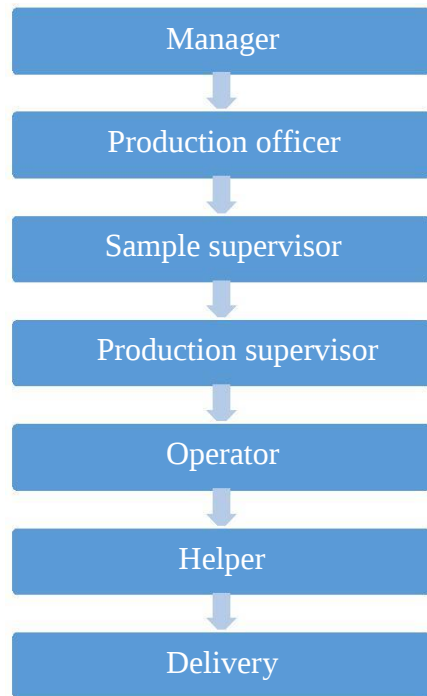
Embroidery is a decorative pattern superimposed on an existing fabric by machine stitching using polyester, cotton or rayon threads, or hand needlework using linen, cotton, and wool, silk, gold, or silver thread. Two types of embroidery thread dominate the machine embroidery market: polyester and rayon. Both are continuous filament threads with high luster and can carry bright colors.

3.4.2 Layout of Embroidery:



Fig 3.4.1: Layout of Embroidery

3.4.3 Organogram of Embroidery:



3.4.4 Embroidery Machine Specification:

No. of Embroidery m/c	4 M/C of 20 Head, 1 M/C of 6 Head
Brand	Tajima
Country	Japan
Model	TFGn-920
No. of needle	6 & 9

Table 3.4.1: Embroidery M/C Specification



Fig 3.4.2: Embroidery M/C (6 Head) & Embroidery M/C (20 Head)



Fig 3.4.3: Embroidery on Garment

3.4.5 Embroidery stitching type:

- ❖ Shirting Stitch
- ❖ Tatami Stitch
- ❖ Run Stitch
- ❖ Motif run

3.4.6 Embroidery Faults:

- ❖ Stitch gap
- ❖ Bobbin out[□]
- ❖ Oil spot[□]
- ❖ Miss thread[□]
- ❖ Measurement
- ❖ Up-down[□]
- ❖ Needle Hole

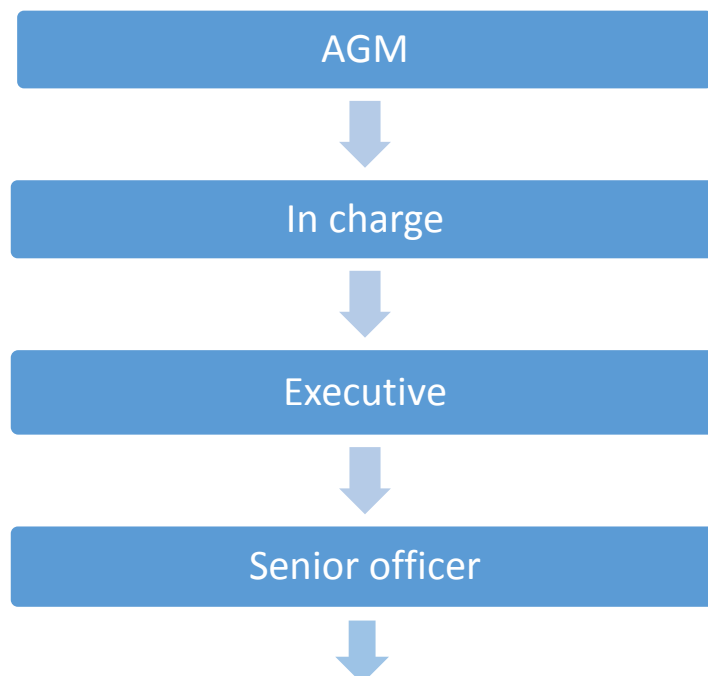
3.5 Sample Section

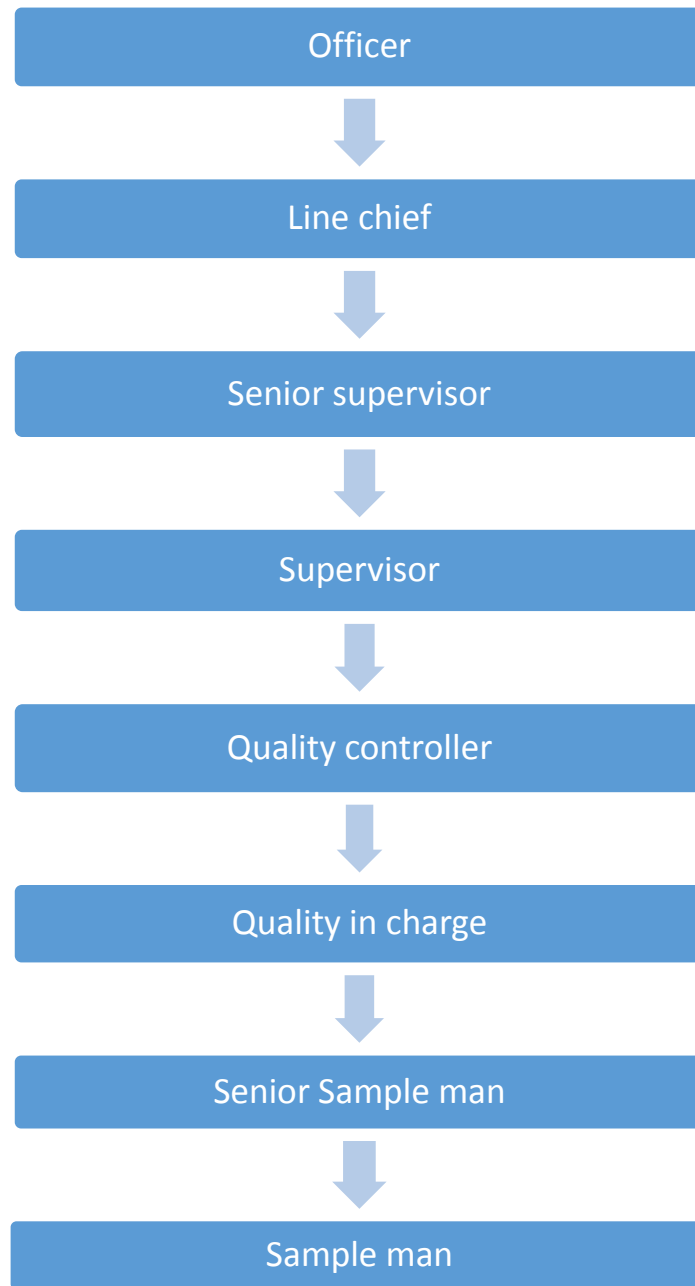
3.5.1 Layout of Sample Section:



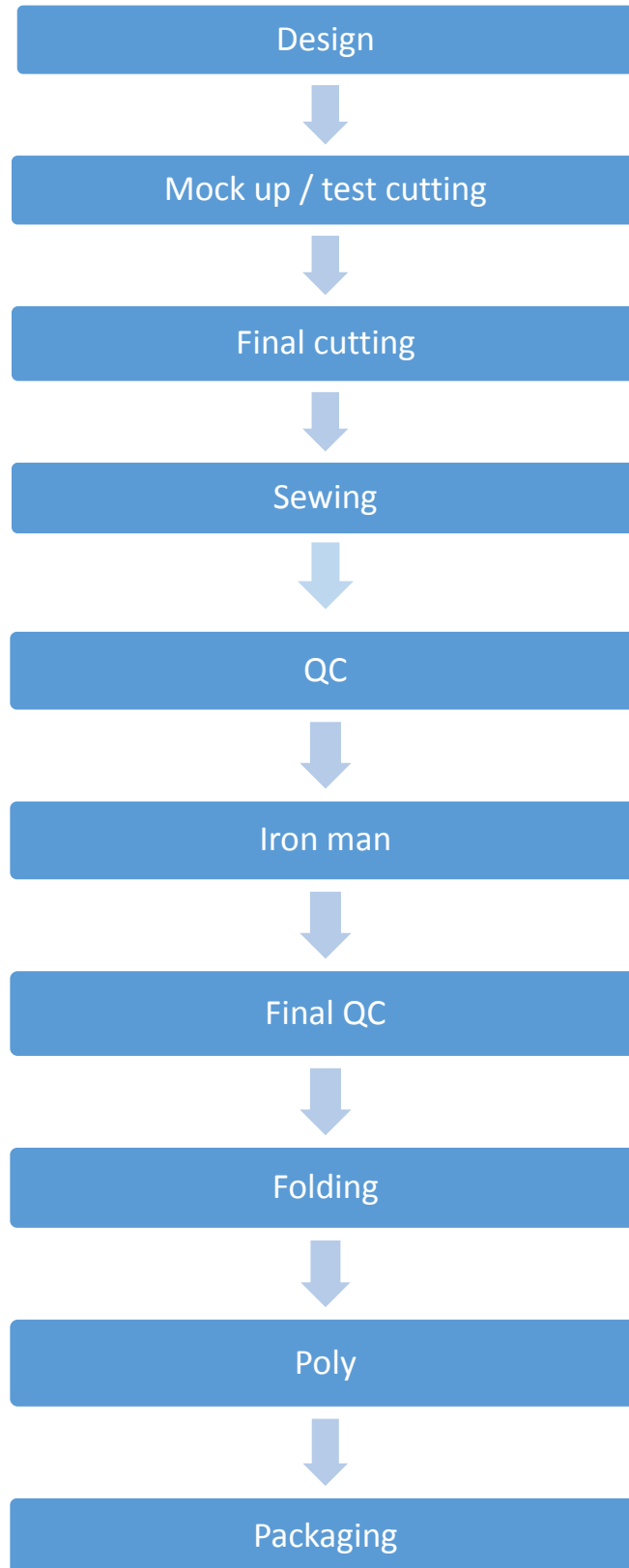
Fig 3.5.1: Layout Plan of Sample Section

3.5.2 Organogram of Sample:





3.5.3 Process Sequence:



3.5.4 Types of Sample produce:

1. Design development

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

2. Proto Sample:

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

3. Fit sample:

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

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

4. Photo shoot sample:

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

5. Sales man / Marketing /Showroom sample:

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

6. Size set sample / Back seal Sample:

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

7. Pre- production sample: (PP sample):

- ❖ PP sample is considered to be a contract between the buyer and the factory.
- ❖ It has to be made in original fabric and trims.
- ❖ Washing, embroidery and printing should match to actual.

- ❖ PP Sample is the standard for production and bulk production garments should be identical to PP sample.
- ❖ The factory can start the production of bulk garment only after the approval of preproduction sample.
- ❖ PP sample sends in only one size 1-2 samples or specified by buyer.

8. Wash sample:

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

9. TOP sample (Top of Production):

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

10. Shipment sample:

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

3.5.5 Running sewing machine in sample section:

1. Plain stitch
2. Tow needle plain stitch
3. One needle chain stitch
4. Flat lock stitch
5. Flat lock f set
6. Flat lock d set

7. Flat lock compressor
8. Button holing
9. Button attaching
10. Bartech
11. Flat steam
12. P.M.D
13. Snap button
14. Over lock stitch
15. Rib cutter
16. Re cone

3.5.6 Special type of sewing machine:

1. Feed of the arm
2. Re cone
3. Rib cutter
4. Snap button
5. L-z machine
6. Belt topsil
7. Flat lock

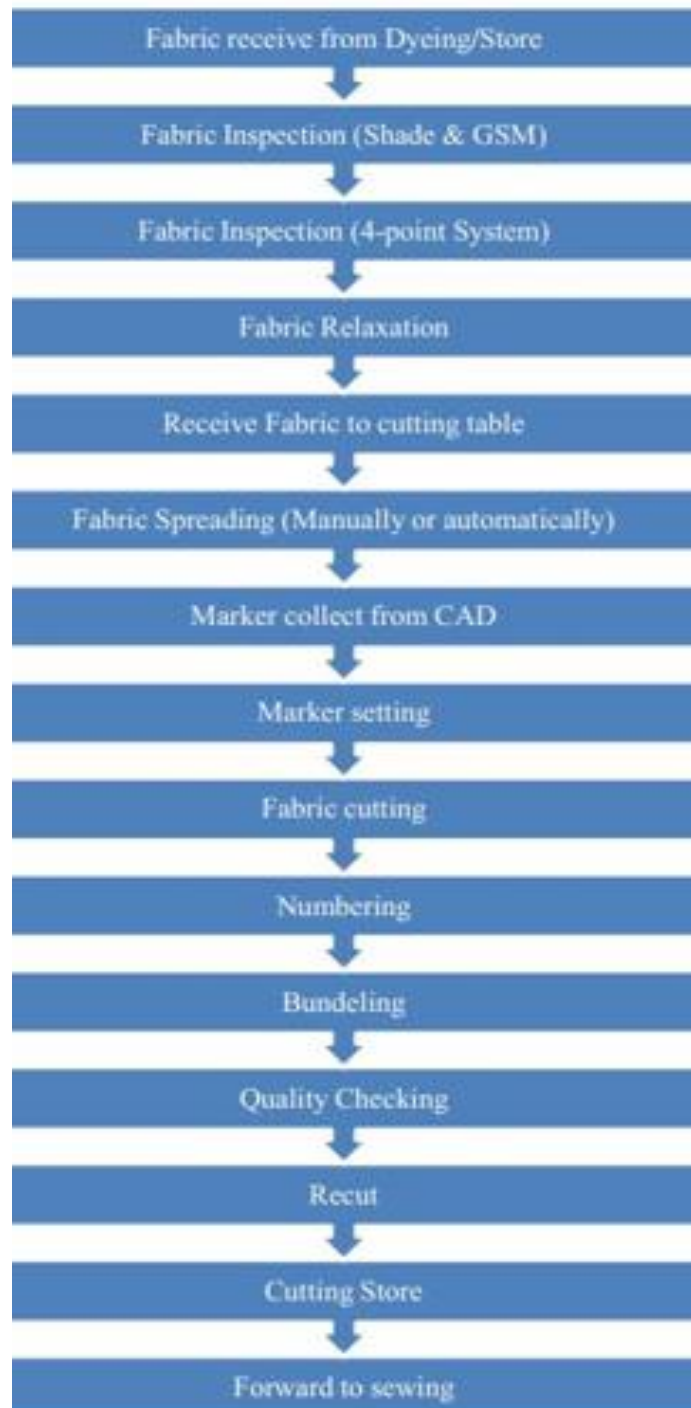
3.6 Cutting Section

3.6.1 Layout of Cutting Section:



Fig 3.6.1: Layout of Cutting Section

3.6.2 Process Sequence of Cutting Section:



3.6.3 Fabric Inspection:



Fig 3.6.2: Fabric inspection

3.6.4 Fabric Relaxation time:

Types of Fabric	Relaxation time
100% Cotton single jersey, pique, 1x1 Rib, Interlock	24 hours
Lycra single jersey, Lycra pique, Lycra Rib, Lycra Interlock	36 hours
Any kind of viscose	36 hours
Terry , Fleece	12 hours
Polyester fabric	36 hours

Table 3.6.1: Fabric Relaxation time

3.6.5 Fabric Spreading:

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

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

Types of Fabric Spreading:

1. Automatic Spreading
2. Manual Spreading

3.6.6 M/C Specification:

Auto Spreader

M/C No.	01
Brand Name	Jutex
Country	Germany
Year of Manufacturing	2006

Table 3.6.2: Auto spreader specification



Fig 3.6.3: Auto Spreader

Hand Cutter-

Brand Name	Mack
Country	Japan
Speed	3000/3600
Volt	220
Frequency	50/60 Hz
Blade	Straight bar blade

Table 3.6.3: Hand Cutter M/C Specification

3.6.7 Requirements of fabric spreading:

Spreading must achieve a number of specific objectives:

- ❖ Alignment of fabric ply.
- ❖ Correct ply tension
- ❖ Matching checks and stripes.
- ❖ Fabric must be flat.
- ❖ Easy separation of cut lay into bundles.
- ❖ Elimination of fabric flaws.
- ❖ Elimination of static electricity.
- ❖ Avoidance of fusion of plies during cutting.
- ❖ Correct ply direction and stability.
- ❖ Avoidance of distortion in Spread.

3.6.8 Marker making:

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

Objects of marker making:

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

Types of marker making:

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

1. Manual Method of Marker
2. Computerized Method

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

- I. **Full size marker:** Full size marker is made for production purpose.
- II. **Miniature type marker:** Miniature type marker is sometime made and its purposes are to plan or schedule and learn or study i.e. for planning and learning purposes.

2. **Computerized Method of Marker:** Now the commonly used system of marker making is computerized method. In this system, a man performs it by himself using computer software (CAD and CAM) and it requires considerably less time than manual system. Among of those procedure Aman tex use Computerized marker making method.

3.6.9 Specification of Marker making machine:

M/c brand	Algotex
Model	Tune.205.2A
Serial	7134f11
origin	Spain
Cartridge no	2

Table 3.6.4: Specification of Marker making machine

3.6.10 Factors considered during marker making:

The important factors considered during marker making are –

I. Nature of the Fabric:

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

II. Lay planning of patterns:

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

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

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

IV. Requirements of cutting:

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

V. Production planning:

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

VI. Size of marker:

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

VII. Marker Efficiency:

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

Marker Efficiency (η) = (Total areas of the pattern pieces/Total area of the Marker paper) $\times$ 100

3.6.11 Factors which influence the marker efficiency:

- ❖ Manufacturers of the marker.
- ❖ Size of pattern pieces.
- ❖ Length of the marker.
- ❖ Pattern Engineering.
- ❖ Nature of the fabric.

- ❖ Method of marker making.
- ❖ Marker width.
- ❖ Kinds or design of garments



Fig 3.6.4: Marker setting



Fig 3.6.5: Fabric Cutting

3.6.12 Methods of Fabric Cutting:

Fabric cutting methods are as follows:

1. Manual Method:

1. Scissor.
2. Straight knife.
3. Band knife.
4. Round knife.
5. Die cutting
6. Notcher
7. Drill etc.

2. Computerized Method:

1. Straight knife cutting (GERBER Cutter).
2. Water jet cutting.
3. Laser beam cutting.
4. Plasma torch cutting

Mainly three methods of manual cutting are used in factory:

1. Auto cutter machine (GERBER Cutter).
2. Straight knife.
3. Scissor

Numbering:

In this stage sticker is attached with all part of cutting part for shade matching. The sticker number maintains cutting number, size number, serial number. Striker machine: 10 pcs.

Bundling

Prepare bundling card according to fabric lay report this card maintains

- ❖ Date.
- ❖ Style No.
- ❖ Size Number.
- ❖ Quantity.
- ❖ Color.

- ❖ Lot Number

3.6.13 Quality Check (Panel check)

- ❖ Oil spot
- ❖ Dirty spot
- ❖ Crease mark
- ❖ Needle mark
- ❖ Foreign yarn
- ❖ Slub
- ❖ Contamination Hole

Cutting store:

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

3.6.14 Machine & Equipment:

01	Straight Knife Machine
02	Bend Knife Machine
03	Auto cutter machine
04	Spreading Machine
05	Drilling Machine
06	Inkjet Printers
07	Cutting Table
08	Cutting Gloves

Table 3.6.5: Machine & Equipment used in cutting section.

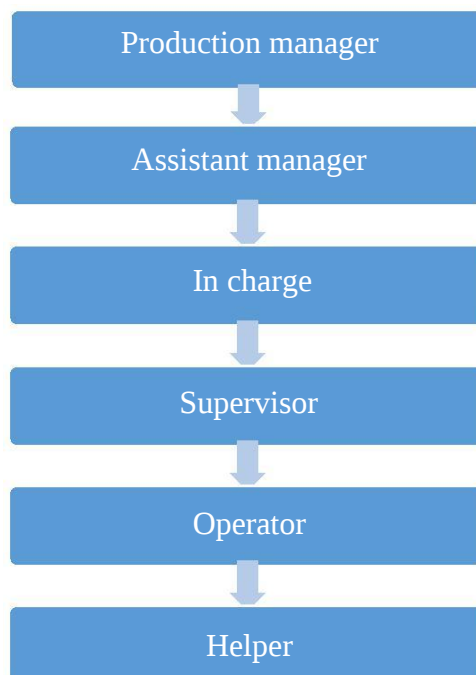
3.7 Sewing Section

3.7.1 Layout of Sewing Section:



Fig 3.7.1: Layout of Sewing section

3.7.2 Organogram of Sewing Section:



There are 54 sewing line under three sewing unit in Aman Tex. All the sewing machine in Aman Tex are Juki brand which origin is Japan. The whole set-up work for the production of 100% export oriented knit product.

3.7.3 Machine List that used in the Factory:

Sl. No.	Name of Machine	Brand
1	1 needle Lock Stitch	JUKI
2	Over Lock 6 Thread	JUKI
3	Over Lock 4 Thread	JUKI
4	Over Lock 3 Thread	JUKI
5	Over Lock 5 Thread	JUKI
6	Flat Lock	JUKI
7	Zig Zag	JUKI
8	Back Top	JUKI
9	Snap Button	JUKI
10	Button Stitch	JUKI
11	Button Hole	JUKI
12	4 Needle Feed of the arm	JUKI
13	Plain M/C	JUKI

Table 3.7.1: Sewing M/C list

3.7.4 Sewing Sequence of Basic T-Shirt in AmanTex:

Serial	Operation	Machine used
1	Front part gathering	Plain M/C (2)
2	Solder Joint	Over lock M/C (1) Thread no.4
3	Neck rib make	Plain M/C (1)
4	Neck joint	Over lock M/C (1)
5	Main + Size level joint	Plain M/C (1)

6	Level joint	Plain M/C (1)
7	Sleeve gathering	Plain M/C (2)
8	Sleeve joint	Plain M/C (2)
9	Side seam	Over lock M/C (2)
10	Cuff rib make	Over lock M/C (2)
11	Bottom make	Plain M/C (1)
12	Bottom joint	Over lock M/C (1)
13	Loop make	Plain M/C (1)
14	Loop top seam	Over lock M/C (1)
15	Loop attachment	Plain M/C (3)

Table 3.7.2: Sewing sequence of basic t-shirt

3.7.5 Sewing Sequence of Long Sleeve T-Shirt in AmanTex:

Serial	Operation	Machine used
1	Solder joint	Over lock Machine.
2	Neck rib tuck.	Plain Machine.
3	Neck rib loose stitching.	Plain Machine.
4	Neck rib joint.	Over lock Machine.
5	Size + main level joint.	Plain Machine.
6	Back tape joint.	Plain Machine.
7	Back tape top stitch.	Plain Machine.
8	Neck top stitch.	Flat lock Machine.
9	Sleeve joint.	Over lock Machine.
10	Sleeve top stitch.	Flat lock Machine.
11	Side seam.	Over lock Machine.
12	Sleeve hem.	Flat lock Machine.
13	Body hem.	Flat lock Machine.

Table 3.7.3: Sewing sequence of long sleeve t-shirt

3.7.6 SMV related formula:

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

3.7.7 Sewing Quality checking points:

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

- ❖ Stripe up- down
- ❖ Open seam
- ❖ Four point up-down
- ❖ Shading etc.

3.7.8 Sewing Line Quality Check List:

1. Buyer Approved Sample & Measurement Sheet Check.
2. Sample Wise Input Check.
3. Buyer Approved Trims Card Check.
4. Buyer Approved Sample Wise Style Check.
5. All Machine Thread Tension Check.
6. Style Wise Print & Embroidery Placement Check.
7. All Process Measurement Check.
8. All Machine Oil Spot Check.
9. All Process S.P.I Check as Per Buyer Requirement.
10. Input Time Shading, Bundle Mistake & Size Mistake Check.
11. Buyer Approved Wise Contrast Color Check.
12. As per Buyer Requirement Wise Styling Check.
13. All Machine Stitch Tension Balance Properly.

3.7.9 Sewing Table Quality Check List:

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

8. All Process Alter Check.
9. Any Fabric Fault /Rejection Check.

3.7.10 Sewing Defects:

- ❖ Needle Hole
- ❖ Skip Stitch
- ❖ Thread Breakage
- ❖ Broken Stitch
- ❖ Seam Puckering
- ❖ Pleated Seam
- ❖ Joint Stitch
- ❖ Uncut Thread
- ❖ Un even Stitch
- ❖ Measurement Problem

3.7.11 Sewing problems in factory:

1. Input problem
2. Shortage of skilled operator
3. To achieved the overtime, they worked slowly
4. If any problem will create during production then-
 - ❖ Nobody will take the responsibility,
 - ❖ Nobody will give the instant decision.
5. Sewing line production may be depended on in charge.
6. Needle hole
 - ❖ Due to friction
 - ❖ Needle eye is to large
 - ❖ Mistake of needle selection
7. Measurement problem- from cutting section
8. Seam Pucker
 - ❖ Due to unequal tension of feed dog and pressure foot on two plies of fabric.

- ❖ Due to unequal thread tension.
- ❖ Shrinkage of either fabric or sewing thread.

9. Broken stitch

- ❖ Due to tension variation between needle & bobbin thread.
- ❖ Tension of needle thread is more.
- ❖ Low quality sewing thread.
- ❖ Needle heating or hook heating.
- ❖ Sharp edge of throat plat, hook plate, bobbin cage, needle groove etc.
- ❖ Faulty fitting of bobbin cage.
- ❖ Sharp edge of bobbin cage, looper eyes and spring.

10. Skipped/ Slipped stitch

- ❖ If the timing between needle & looper or bobbin is not proper.
- ❖ Needle thread loop is not picked up by bobbin thread loop when required.
- ❖ If the loop of needle becomes smaller in size, slipped stitch occurs.
- ❖ Unequal tension between sets of threads.
- ❖ Deflection or vibration of needle.

11. Variable stitch density

- ❖ If fabric cannot move forward properly due to lack of pressure of pressure foot.
- ❖ Due to faulty feed mechanism.

3.7.12 Garments Finishing:

After complete a garments it sends to the finishing section. Here all garments pass some finishing process that required to make ready for shipment.

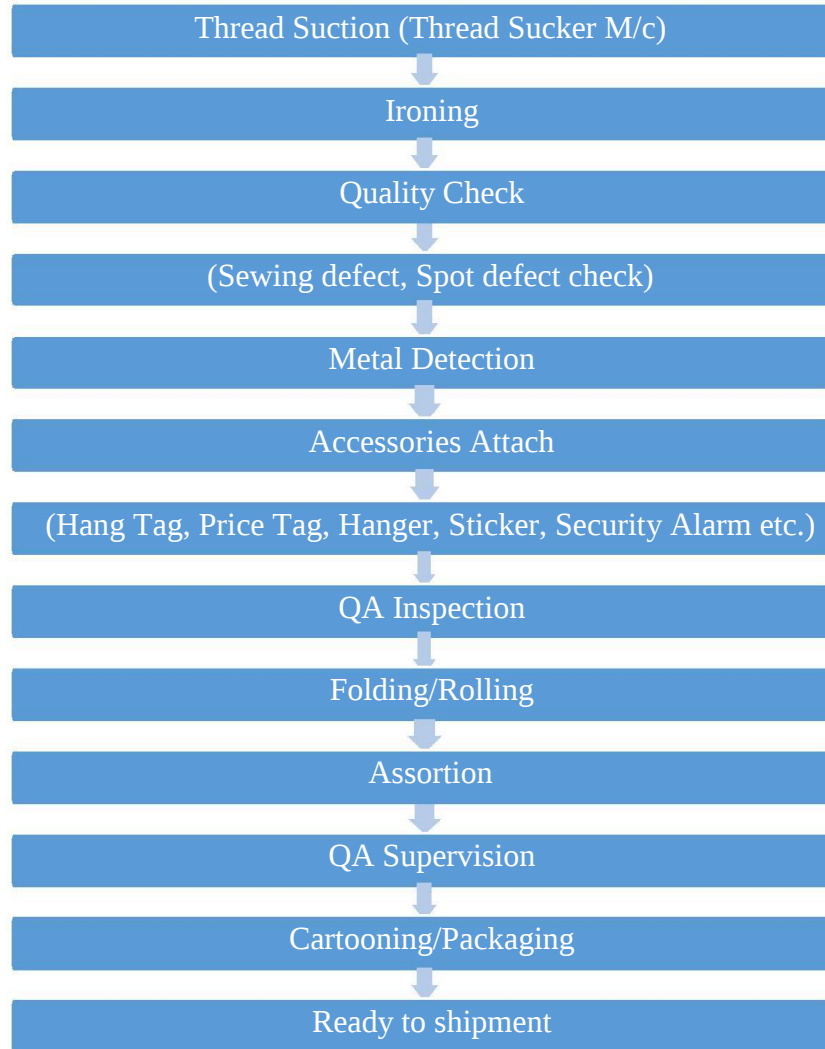
Objectives of Garments Finishing:

- ❖ To enhance the suitability of the fabric for end use.
- ❖ To improve appearance and sale appeal for comfort and utility desirable qualities to the fabric like-
 1. Softness
 2. Luster
 3. Drape
 4. Dimensional
 5. Stability

6. Crease recovery

7. Soil repellence

3.7.13 Process Flow Chart of Garment Finishing:



3.7.14 List of Accessories Used in Finishing Section:

- Main Level
- Size Level
- Care Level
- Hang Tag
- Bar code Sticker
- Poly Bag

- Tag Pin
- Carton Hang
- Tag String
- Clip Paper
- Gum
- Tape
- Silica Jell
- Tissue Paper

3.8 Washing Section

3.8.1 Layout of Washing:

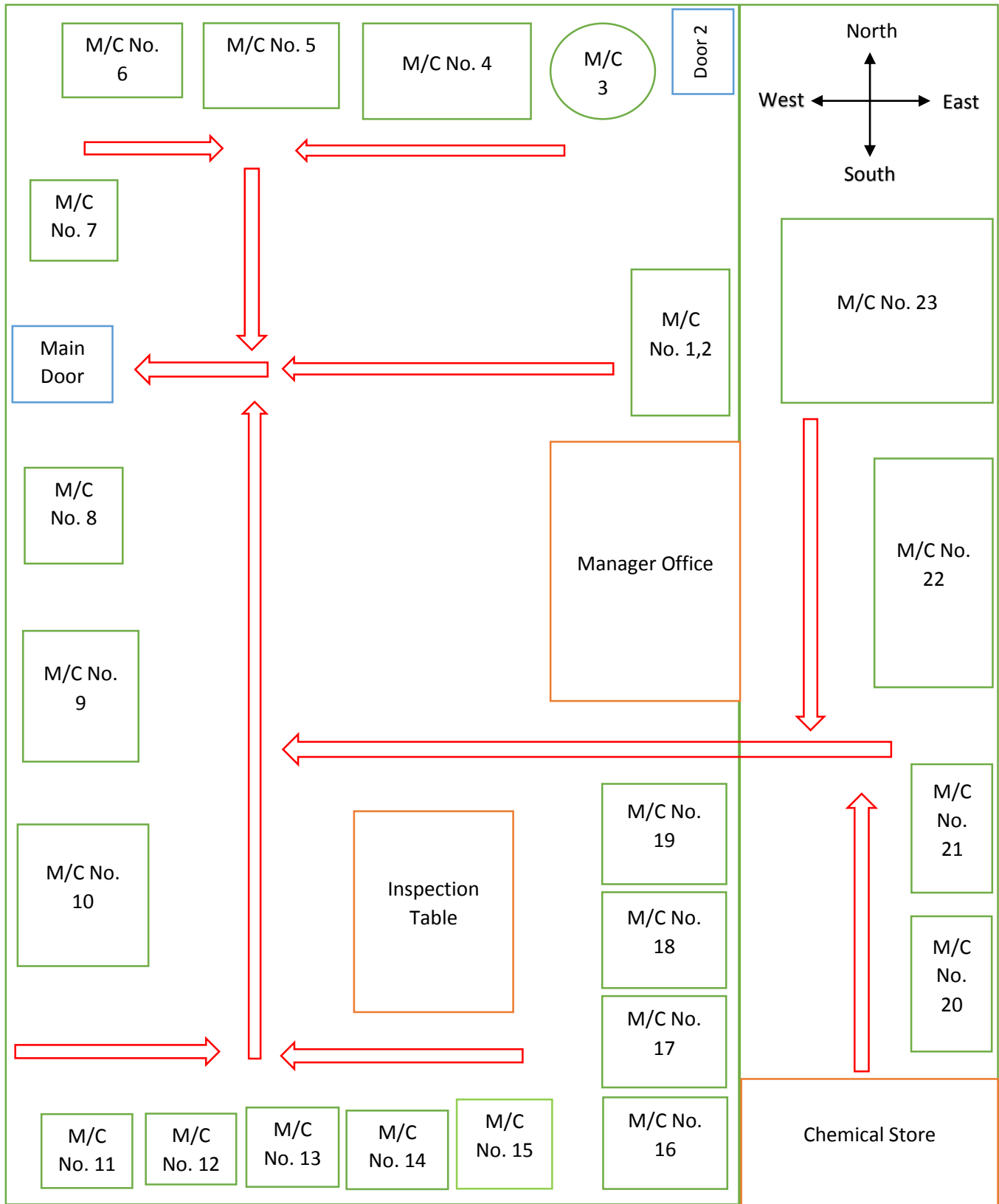
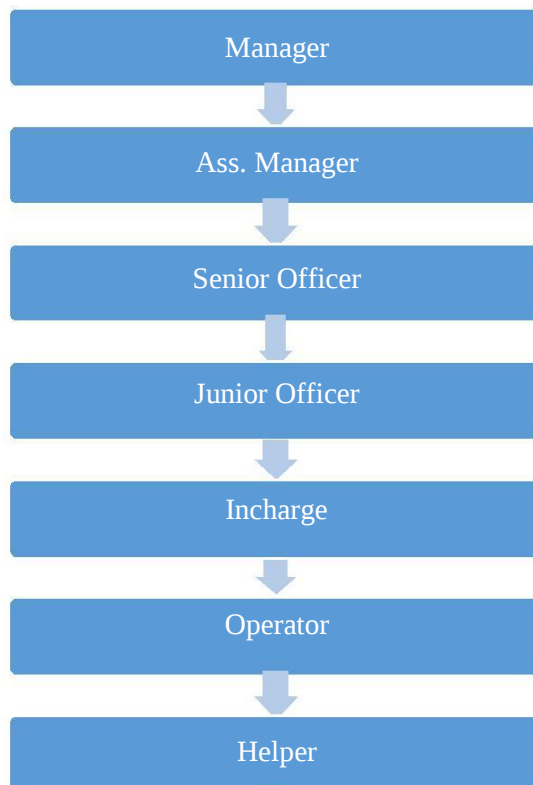


Fig 3.8.1: Layout Plan of washing

3.8.2 Organogram of Washing:



3.8.3 Different washing M/C Specification:

M/C No.	1,2
M/C Name	Sample Washing M/C
Capacity	1 kg

M/C No.	03
M/C Name	Hydro extractor
Capacity	100 kg
Brand Name	Ramsons
Origin	India

M/C No.	04, 05, 06
M/C Name	Washing Ramson
Capacity	200, 100, 50 kg
Brand Name	Ramsons
Origin	India

M/C No.	07, 08, 09, 10
M/C Name	Washing Tonnello
Capacity	05, 10, 200, 250 kg
Brand Name	Tonnello
Origin	Italy

M/C No.	11, 12
M/C Name	Dryer Machine
Capacity	100 Piece
Origin	China

M/C No.	13, 14, 15
M/C Name	Triventa Dryer M/C
Capacity	200, 200, 250 kg
Brand Name	Triventa
Origin	Italy

M/C No.	16, 17, 18, 19
M/C Name	Tumble Dryer Machine
Capacity	100 kg
Brand Name	Han Scong
Origin	Korea

M/C No.	20, 21
M/C Name	Acid Washing Machine
Capacity	248 kg
Origin	China

M/C No.	22
M/C Name	Oven Curing Machine

M/C No.	23
M/C Name	Dip Dyeing Machine
Capacity	240 Piece

Table 3.8.1: Washing machine specifications

3.8.4 Different Washing Technique:

In the Amantex mainly Knitted garments are Washed. Some special knitted washing technique are given below-

Wet wash:

1. Acid Wash
2. Burnout Wash
3. Bleach Wash
4. Enzyme Wash
5. Antique Wash
6. Softener Wash
7. Silicon Wash
8. Towel Wash

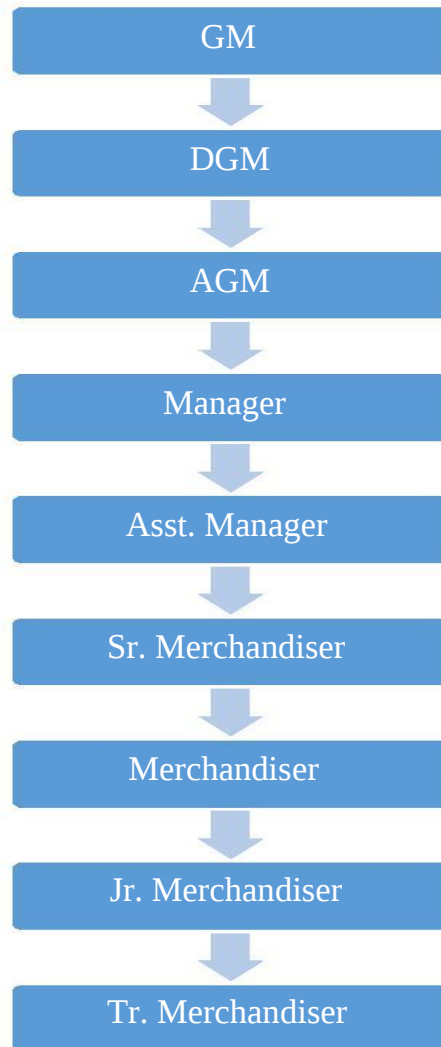
Dry Wash:

1. Wrinkle
2. Spray

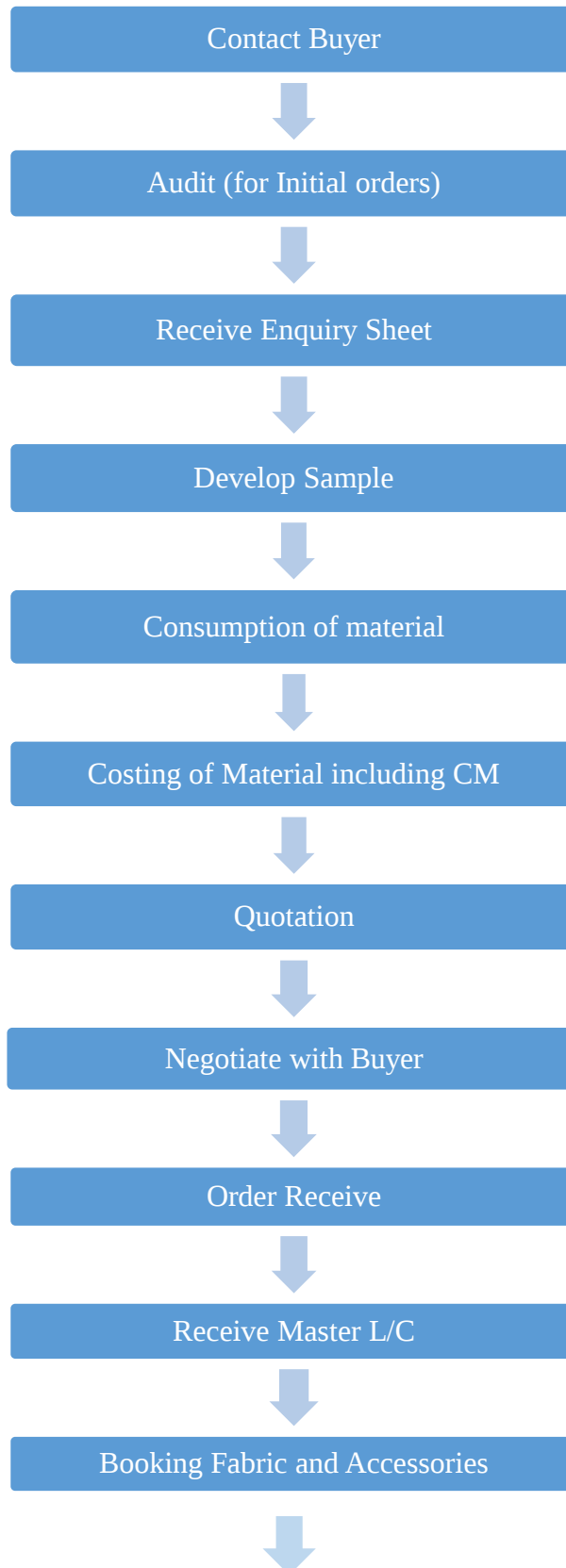
3.9 Merchandising

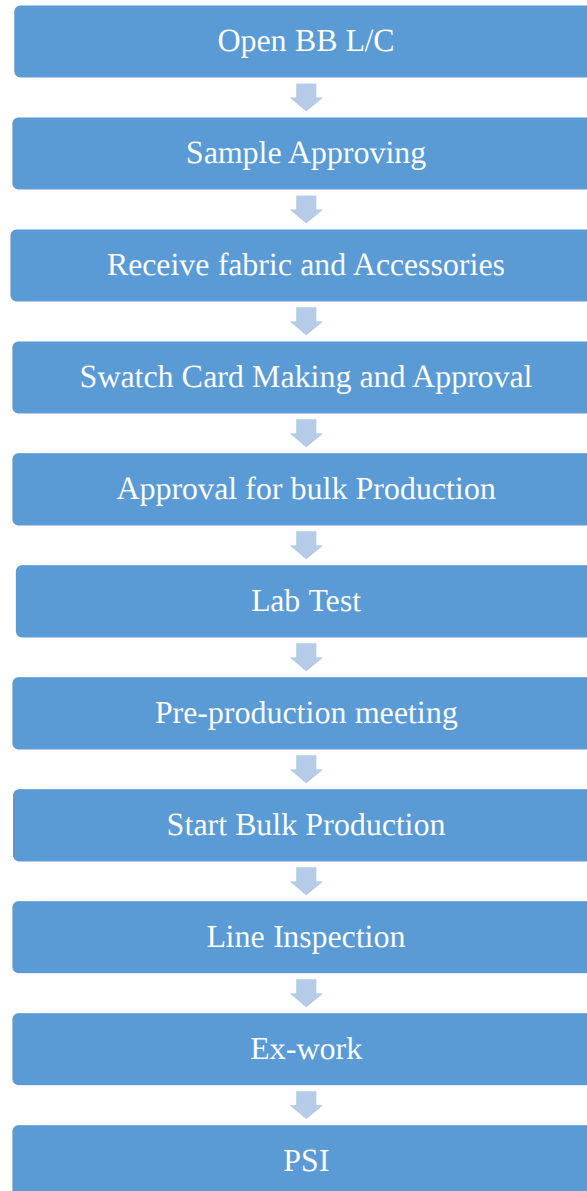
Merchandising in garment trade refers to the work of contacting with buyer, collecting raw materials, planning and production of the garments, maintaining required quality level and shipment to the right destination at right time.

3.9.1 Organogram of Merchandising:



3.9.2 Flow Chart of Merchandising:





3.9.3 Objects of Merchandising:

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

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

3.9.4 Merchandising Calculation:

Fabric or Body Calculation:

$$\frac{(\text{Body length} + \text{Sleeve length} + \text{Allowance}) \times (\text{Chest} + \text{Allowance})^2 \times \text{GSM} \times 12}{10000000} + 10\% \text{ waste}$$

= Result kg/dozen

NB:

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

$$\text{Body Consumption By Marker: } \frac{\text{Length} \times \text{width} \times \text{GSM} \times 12}{1000 \times 1550 \times \text{Ratio}} + 12\%$$

$$\text{Dia Measurement: } \frac{\text{Chest or Bottom} + \text{Allowance}}{2.54} = \text{Dia / Result}$$

NB:

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

$$\text{Self or Rib Fabric Neck Dia Measurement: } \frac{\text{Neck opening or Width} + \text{Neck drop} \times 2}{2.54} = \text{Result}$$

$$\text{Pant / Trouser or Pajama Consumption: } \frac{(\text{Length} + \text{Allowance} \times \text{dia} \times 2 \times \text{GSM}) \times 12}{10000000} + 10\% = \text{Result kg. / Dozen}$$

NB:

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

Pocket Consumption: Length + Width + Allowance.

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

Carton Dimension:
$$\frac{(\text{Length} + \text{Width} + \text{Allowance}) \times (\text{Width} + \text{Height} + \text{Allowance}) \times 2}{100 \times 100}$$

= Result / SQM.

NB:

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

Button Ligner (Find out Formula):

1 GG = 144 Dozen.

1 GG = 1728 pcs.

Ligner =
$$\frac{\text{Button Dia}}{0.61}$$

= Result / ligner.

NB:

- Always Button liner is plural number.
- As like 16,18,20,22,24

Yarn Booking: Fabric yarn (kg) + Process Loss.

= Result / kg.

NB:

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

Sewing Thread Consumption:

Machine Name	Thread required
Plain Machine	1" for 2.75"
Over lock (3 Thread)	1" for 14"
Over lock (4 Thread)	1" for 19"
Over lock (5 Thread)	1" for 24"

Flat lock (2 Thread)	1" for 7"
Flat lock (3 Thread)	1" for 17"
Flat lock (4 Thread)	1" for 24"
Flat lock (5 Thread)	1" for 28"
Button hole, Button Attach, Bar-take	1" for 7"

Table 3.9.1: Thread consumption for different sewing M/C

Cone Quantity = per garments thread × garments qty. × qty. in cone.
= CBM / Result.

NB:

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

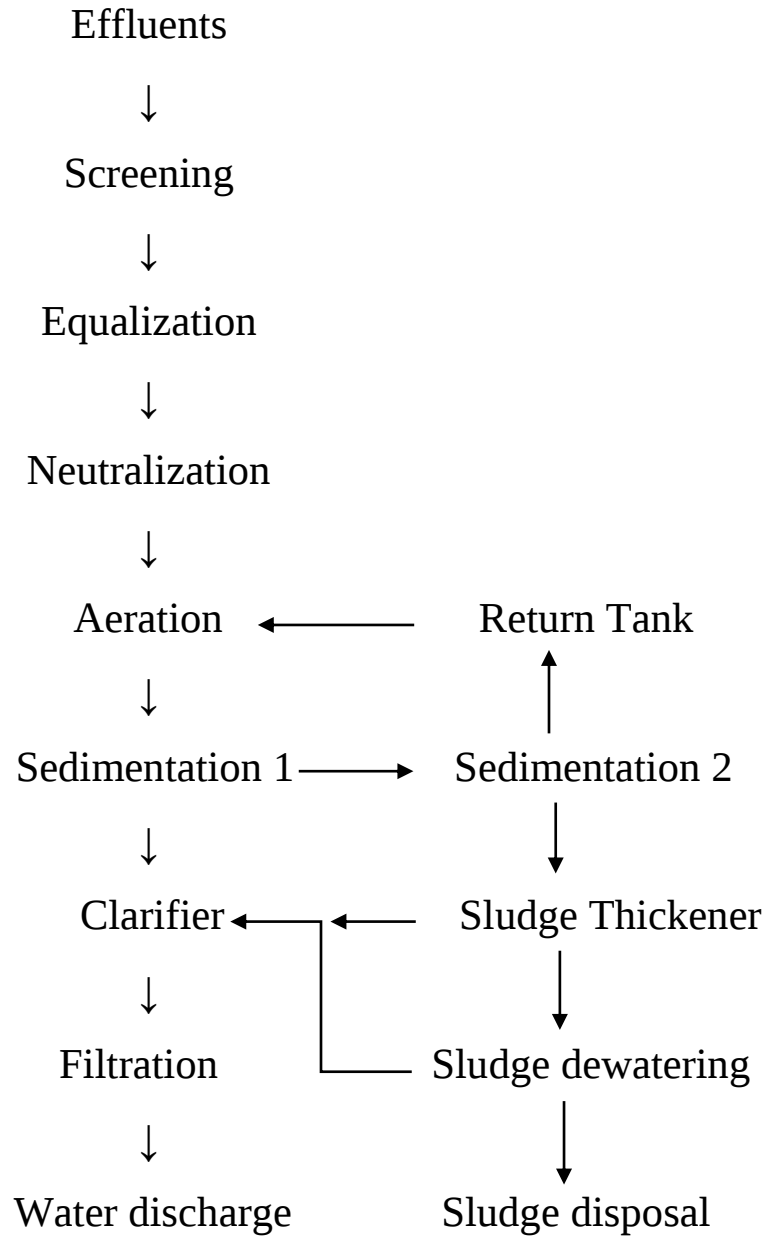
Marker Consumption (Formula):

Open Dia = $\frac{\text{Marker length} \times 2.54 \times \text{Marker width} \times 2.54 \times \text{GSM}}{10000000 \times \text{Marker Pcs}} \times 12 + 10\% (+).$
= Result kg. / Dozen

Tube Dia = $\frac{\text{Marker length} \times 2.54 \times \text{Marker width} \times 2.54 \times \text{GSM}}{10000000 \times \text{Marker Pcs}}$
= Result kg. / Dozen

3.10 Effluent Treatment Plant

3.10.1 Flow chart of ETP:



3.10.2 Functions of different Ingredients Used in E. T. P Plant:

Lime: Lime is used to change the color of effluent and to increase the transparency of water. **Ferus Sulphate:** Ferus Sulphate is used for the agglomeration of the foreign matters present in the effluent.

Poly Electrolyte: Poly Electrolyte helps to make the agglomerated materials be gummy for easy deposition below the surface of water.

Hydrochloric Acid: Hydrochloric Acid is used to sustain the required PH of the treated water.

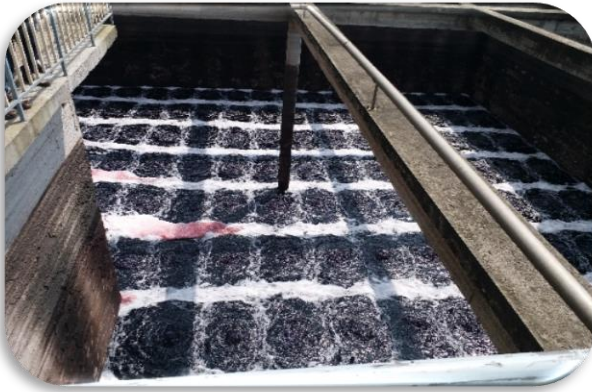
3.10.3 ETP Image Gallery:



Effluent Treatment Plant



Screening Tank



Equalization Tank



Neutralization



Distribution Tank



Aeration & Sludge returning tank



Sedimentation feeding tank



ETP Outlet

Fig 3.10.1: Effluent Treatment Plant

3.11 Compliance

3.11.1 Compliance

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

- ❖ Compensation for holiday[□]
- ❖ Sexual harassment policy[□]
- ❖ Child labor abolition policy[□]
- ❖ Anti-discrimination policy[□]
- ❖ Zero abasement policy[□]
- ❖ Working hour policy[□]
- ❖ Environment policy[□]
- ❖ Security policy[□]
- ❖ Buyers code of conduct[□]
- ❖ Health and safety committee[□]
- ❖ Canteen[□]
- ❖ Equal remuneration[□]
- ❖ National festival holiday[□]
- ❖ Overtime register[□]
- ❖ Labor welfare[□]
- ❖ Accident register[□]
- ❖ Workman register

3.11.2 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 cleans at once in a week.
- ❖ Water reserve at least once a week.
- ❖ Water center in charge person with cleanliness.

- ❖ Suggestion box register.

3.11.3 Toilet

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

3.11.4 Fire

- ❖ Sufficient fire extinguisher and active,
- ❖ Access area without hindrance.
- ❖ Fire signs in both languages.
- ❖ Fire certified personal photo.
- ❖ Emergency exit.

3.11.5 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.
- ❖ Doctor.
- ❖ Medicine.
- ❖ Welfare officer.

4. Impact of Internship

3.1 Knitting

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

3.2 Dyeing and Finishing

- ❖ Have known about dyeing process of different fabrics.
- ❖ Have known about chemicals and their function.
- ❖ Have known about dyeing and finishing machine.

3.3 Printing

- ❖ Have known about different types of printing process.
- ❖ Have known printing fault, causes and remedies.

3.4 Sample

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

3.5 Cutting

- ❖ Have known about cutting fabric
- ❖ Have known about method of cutting
- ❖ Have known defect of cutting section
- ❖ Have known about removal of fabric wastage

3.6 Sewing

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

3.7 Embroidery

- ❖ Have known the types of embroidery stitches.
- ❖ Have known Embroidery machineries.

3.8 Washing

- ❖ Have known about washing process of different garments.
- ❖ Have known about chemicals and their function.
- ❖ Have known about washing and finishing machine

3.9 Merchandising

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

3.10 ETP

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

3.11 Compliance

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

5. Conclusion

Conclusion:

Industrial training program is an important program for university student. During our training period we learn lots of thing. We get some experiences from here that truly needed for building up our professional career. We are grateful to **AMANTEX Ltd.** for giving us this opportunity. In this 2-months we seen, listen & learn from Knitting, Dyeing, Printing, Embroidery, Sample, Cutting, Sewing, Finishing, Washing, Merchandising and Planning section. Through the completion of 2-month industrial attachment at Aman Tex Ltd. have got the impression that the factory is one of the most knit composite industry in Bangladesh. Though it was established in 2008, it has earned very good reputation for its best performance over any other knit composite industries. During the industrial attachment program, had tried the best to do the duty properly. The supervising officer also satisfactory & offer co-operation in every steps. It is completely a new experience in life, which will be very effective in upcoming industrial life. During the training period, had realized that practical experience is valuable for industrial life.