UGC & Govt. Approved
Sonargaon University (SU)
সোনারগাঁও ইউনিভার্সিটি (এসইউ)

Faculty of Engineering

Department of Textile Engineering

Report On

Industrial Attachment

At

GMS Composite Knitting Ind. Ltd.

Shardagong, Kashimpur,Gazipur, Dhaka, Bangladesh.

Course Title : Industrial Attachment

Course Code : Tex-442

Batch: **14B**

Submitted By

Name	ID
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Academic Supervisor

Kamrul Hassan Bhuiyan

Co-ordinator & Lecturer

Dept of Textile Engineering,

Sonargaon University (SU)

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

Advance in Apparel Manufacturing Technology

Duration: From 06 August 2021 to 28 September 2021.

Declaration

We, hereby declare that all information of this report is true. And We also declare that the information contained in the Industrial Training Report is correct. We collect all these information during my internship period from "GMS Composite Knitting Ind. Ltd "
This report is not copied from anywhere & this report is not submitted anywhere.

.....

Md.Mithu Ahammed

TEX-1802014032

.....

Md.Jikrul Islam

TEX-1802014076

Department of Textile Engineering

SU/Textile/Int. Letter/2021/Summer/01
Date: 07/05/2021

To
Assistant General Manager
HR & Compliance
GMS Composite knitting Ind.Ltd.
Sardagonj, Kashimpur, Gazipur.

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

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

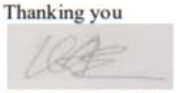
As industrial training is one of the important core courses of 4 years B.Sc in Textile Engineering program, therefore the university seeks your kind help and cooperation in order to impart practical knowledge to our students. Duration of this program would be 12 weeks and it is advised to accommodate the students at your production unit from May 22, 2021.

SL No.	Student Name	Specialized	Student ID	Contact No.
01	Md Mithu Ahammed	Apparel Manufacturing	TEX1802014032	01768247805
02	Md Jikrul Islam	Apparel Manufacturing	TEX1802014076	01765-317323

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

Your Co-operation will be highly appreciated.

Thanking you



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

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

Letter of Approval

This is to certify that Md. Mithu Ahammed, Tex 1802014032, and Md.Jikrul Islam, Tex-1802014076 B.Sc in Engineering Textile Engineering program, 14B Batch have successfully completed their Industrial Internship on Apparel Manufacturing Technology under my supervision. I do hereby approve their report. I also recommend accepting their report for partial fulfillment of Bachelor of Science in Textile Engineering Degree.

Supervisor

Kamrul Hassan Bhuiyan

Co-ordinator & Lecturer

Dept of Textile Engineering,

Sonargaon University (SU),

Acknowledgement

First of all We would like to thank Almighty Allah for giving me Strength to complete

this report by this short period of time. We faced lots of problems to prepare this attachment paper because of lack of information & short of time. Really it's a good way to increase my efficiency, skill & knowledge about the production, productivity & productivity improvement by watching different department of the organization.

We would to thank our honorable Kamrul Hassan Bhuiyan Coordinator & Lecturer, Dept of Textile Engineering, Sonargaon University.
We would also like to thank Md. Ali kadar of GMS Composite Knitting Ind. Ltd who gave us the chance to execute ours internship at his organization.

Than thanks to our friends who also acted attentively and responsibly together and all the members of every departments of GMS Composite Knitting Ind. Ltd they have been a real help in the time of our internship.

Purpose of This Internship Program

The main Objective of study of this internship program is to achieve practical knowledge. We have need of practical knowledge about textile as well as specific departmental work such as Quality Control in various departments. An assignment can helps us to achieve this kind of knowledge. Only theoretical knowledge doesn‟t give the clear concept about the departmental activity. That is why We need practical knowledge. We gather huge knowledge during this assignment. We think the main Objective of this study is that to earn practical knowledge about textile and overview of different machinery and equipment and their improvement practices of various companies and our textile industries and observe the overall activity of GMS Knitting Ind.Ltd. This internship program also gives me the idea of the working conditions of the industries of Bangladesh. This program also makes a student ready and capable of working inside the work flow of an organization. It creates responsibility in the students and makes them better as member of an organization.

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Chapter 1

Introduction

Introduction

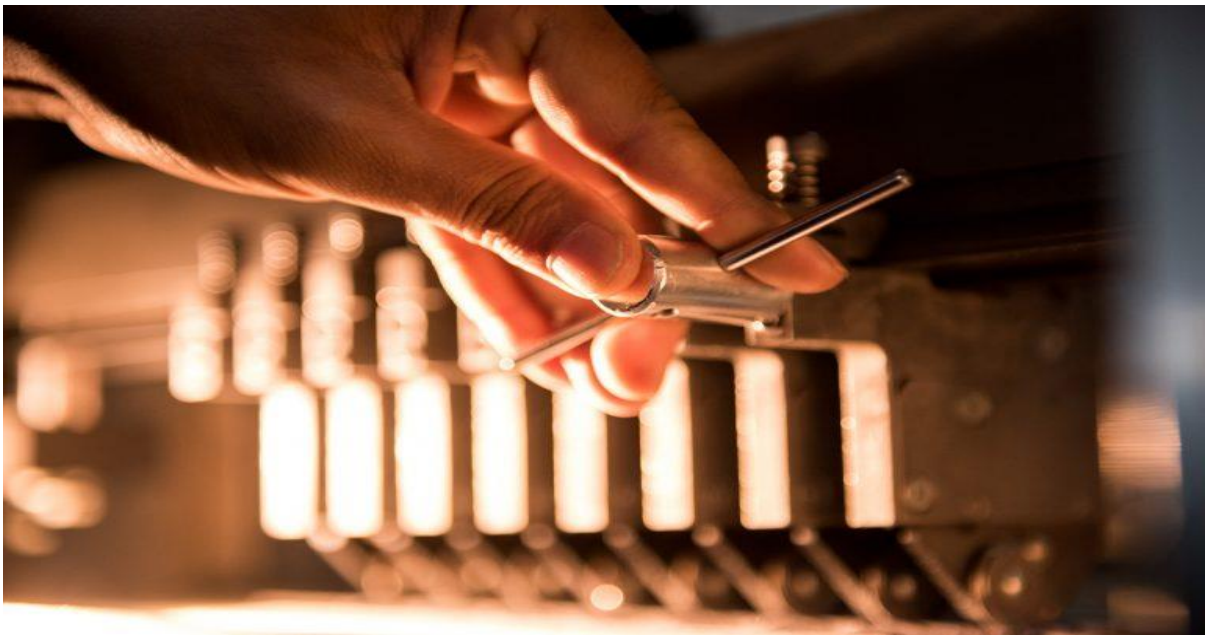
GMS Composite Knitting Limited started its operations in 1999. It is an entirely integrated and independent company which comprises of state of the art composite knitting, dyeing, finishing, and stitching units. Its modern facilities and highly skilled workers have placed the company in the market as a reliable exporter of quality knitted fabrics across the globe. GMS is an ISO 9001:2008 certified company.

Mission, Vision, Objective

GMS's mission is to maintain its business operations as one of the leading RMG exporters in Bangladesh. GMS's vision is to develop technologies and best practices specific to fulfill the global demand of RMG. GMS aims at producing high quality garments through an effective quality control system from sourcing of fabric to end-product

Management

GMS's dedicated management team is professional in approach, proficient in vocation. Their spirit of enterprise and dedication to quality symbolizes GMS's corporate culture, where commitment leads and achievement follows. Management and technical professionals including expatriates manage the operation of the company.



Manufacturing Excellence

GMS Composite Knitting factory is a vertical composite facility. The skilled workers of GMS and the latest technology in use power its production process. All the production lines at GMS are equipped with state of the art machinery manufactured by leading global brands. The production processes at GMS are eco-friendly, energy efficient, and uses less water and chemical. The production lines are computerized and are able to run in full capacity in high temperature, having low liquid ratio.

GMS Composite Knitting Ltd. ensures 100% compliant manufacturing plant. The company also ensure social compliance. The international certifications obtained by GMS are:

- ISO 9001-2015 for Quality Assurance
- WRAP for Social Compliance
- BSCI for Social Compliance with Rating A
- ISO 9014 for Environmental Management
- SEDEX for Social Compliance
- GOTS for Sustainable Product Manufacturing
- OCS 100 for Sustainable Product Manufacturing
- GRS for Sustainable Product Manufacturing
- RCS 100 for Sustainable Product Manufacturing
- OEKO-TEX Standard 100 for Sustainable Textile Product

Different Departments of GMS

Knitting Section

Dyeing Section

Finishing Section

Lab & Quality Assurance

Garments Section

Utility Section

Maintenance Section

Supporting Department

Chapter 2

Information about Factory

General Information about Factory

GMS Composite Knitting Ind.Ltd.

Status: Private Limited Company

Type: 100% Export oriented composite knit dyeing industry

Location of the Factory: Shardagong, Kashimpur,Gazipur, Dhaka, Bangladesh.

Total Floor Space :500000 square feet.

Head Office Address: House# 365(lst floor), Road# 28 New D.O.H.S, Mohakhali, Dhaka-1206, Bangladesh.

Product Mix: Auto stripe, Single jersey, Lycra single jersey.

Lycra rib (lxi, 2 x 2 etc.), Stripe Rib.

Lacoste (Single & Double), Fleece,Teery, Mesh, Interlock.

Collar & Cuff. Polyester cotton blend fabric

And also mélange (grey, ash).
Total Working Days: 355 days/year

Total Working Hours: 24 hours/day

Project Cost:

The project cost of GMS Composite Knitting Ind.Ltd. is nearly 1000 corer taka.

Production Capacity:

The production capacity of GMS Composite Knitting Ind. Ltd. are

given below-

Knitting: 20-21 ton/day

-600-700 ton per month (Body fabric)

-1000000 pcs (Collar & Cuff)

Dyeing: 30-32 ton/day

-900-1000 tons per month (approx.)

- Finishing: 15-20 ton/day

-600 tons per month (approx.)

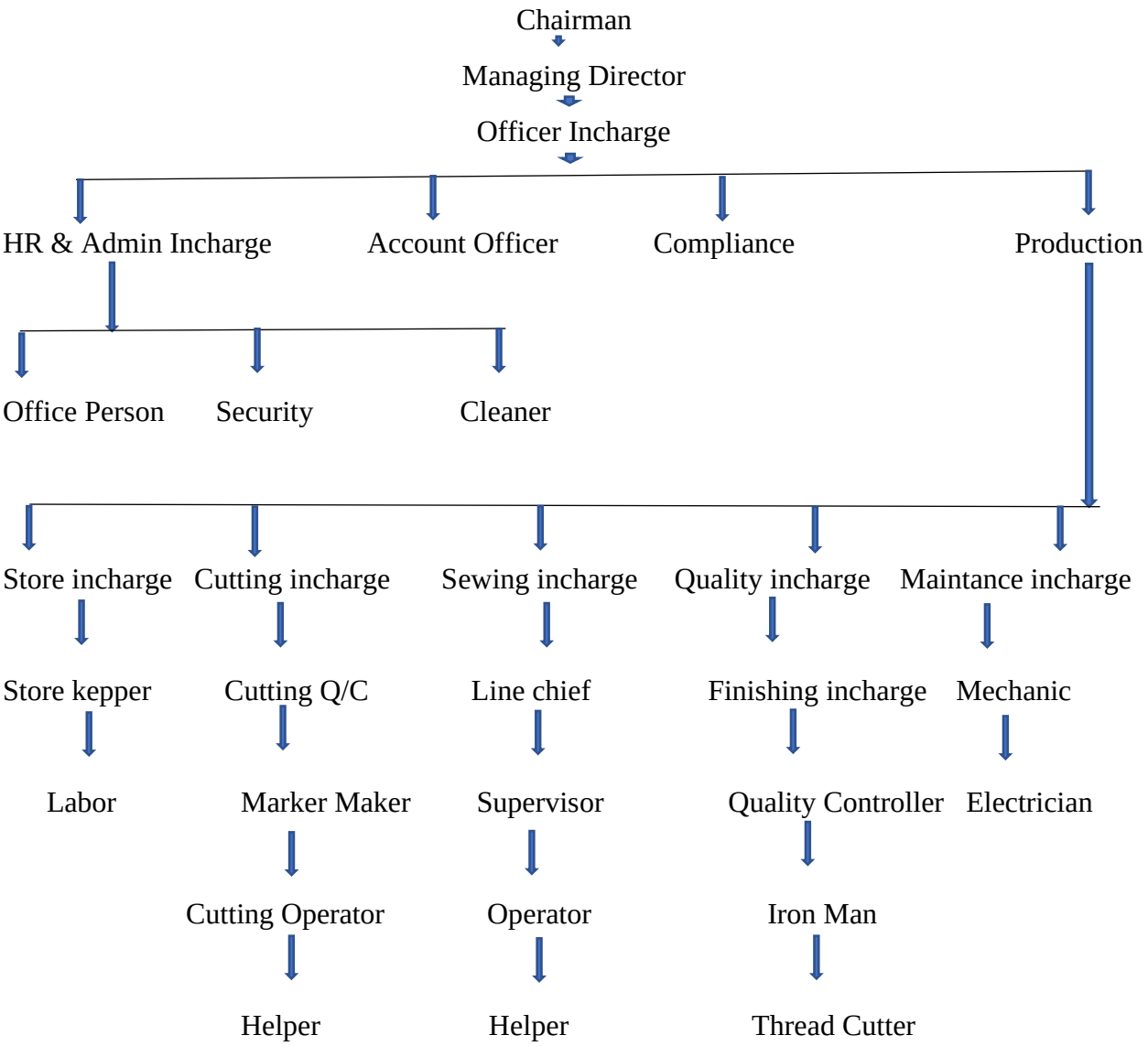
- Garments: 115000 pieces per day (approx.)

The production capacity of GMS Composite Knitting Ind. Ltd.is an approximate idea, it may vary.

Even History

Year	Event
1999	Incorporation
2000	Commencement of Production
2009	• National Export Trophy Silver 2009-2010 • Business Social Compliance Initiative (BSCI) (Cycle Number- 1) 2009-2012
2010	Worldwide Responsible Accredited Production (WRAP), Platinum Certificate, 2010-2012
2011	• Oeko-Tex Standard 100, for Fabric Dyeing: (Product Class-1), 2011-2012 • Certificate International ISO 9001:2008, 2011-2014
2012	Oeko-Tex Standard 100 for Yarn Dyeing: (Product Class-1), 2012-2013

Organogram:



Item of products

T-shirt

Polo-shirt

Jacket

Baby Item

Ladies Wear

Sport's Wear

Boxer's Wear

Trousers

Main Buyers

Jack & Jonse

Kappa

Pimke

Russel

Name it

Puma

Champion

Spots Master

Celio

New Look

Orsay

Diesel

Best seller

Target

MotherCare

Buyer's Logo

DIESEL

orsay

NEW LOOK

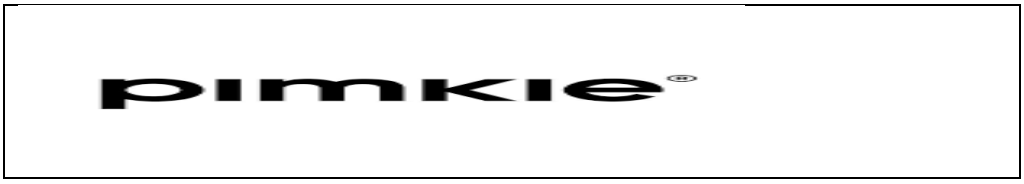
celio*

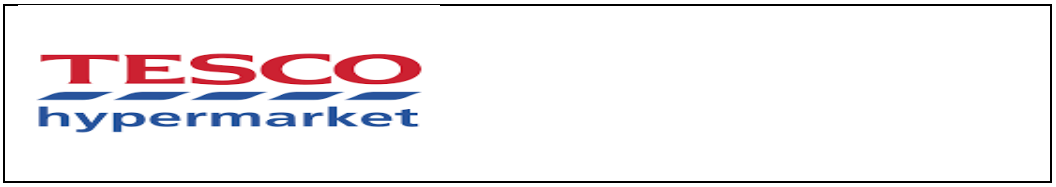
mothercare

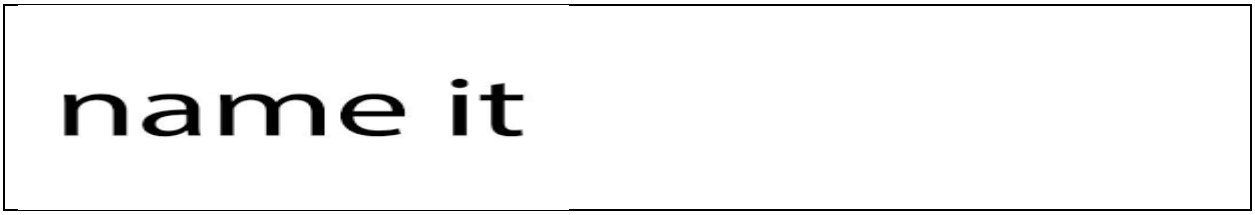
Champion

NIKE

JACK&JONES







Physical Infrastructure

The mill is built in such a way that there is possibility for further expansion of the mill. The structure such as mill, office buildings, record rooms, guardroorns & dining room etc. are made of solid hard concrete & brick mtls. The whole area is surrounded by safety brick wall .The main set up for rn/c's are built of corrugated iron & iron sheet, transparent hard plastics with enough ventilation & scope for passing light & air.

Responsibilities of officers:

1.To collect necessary information from previous shift for smooth running of the section
2.To match production sample with target shade
3.To discuss with production manager about overall production if necessary.
4.To identify disputed fabrics & report to production manager for necessary action.
5.To execute overall floor work
6.To supervise personal working under him
7.Batch preparation
8.To sign the store requisition.

Job description of the officers:

Report to: Assistant Production Manager
Job Summary: To plan, execute & follow up the production activities & control the quality.

Chapter 3

Description of the Attachment

Description of the Attachment

In this factory the major actions which are performed –

Order Collection

Development sample

Produce pre-production sample

Sample approved

Pattern making

Marker making

Fabric spreading

Cutting

Sewing

Inspection

Packing

Delivery or shipment

Sample Section

- Receive developed sheet from buyer
- Send the sample to buyer for approval
- Send pre-production sample to buyer
- Approval of sample/comments about the sample (if necessary)
- Start bulk production.

Unfortunatelythere is no sample section in in this factory. All the sample work is done from its central sample section of the group which is situated at Shardagong, Kashimpur,Gazipur. In GMS Composite Knitting Ind. Ltd. only the pre-production sample is prepared after which factory goes on bulk production. Sometimes production sample is demanded by the buyer from the factory. This samples are produce under the supervision of quality incharge, line incharge and supervisors.

Store Section

For a bulk production of an industry it is essential to maintain a well-organized & Well equipped inventory system. Being a bulk production industry GMS Composite Knitting Ind Ltd. maintains an organized store department. This department is located at the 1st floor of the 10 storied main factory building. The main responsibility of this department is to store all the raw material which are necessary to produce garments and requisite when it is needed.

GMS Composite Knitting Ind. Ltd Store Department:

Store Incharge
↓
Store Keeper
↓
Labor

Fabric Store Departmen

General Work Flow of Store Department:

Receive order
↓
Inspection of Raw Materials
↓
Preparation of Swatch Card
↓
Clousing Summery
↓
Inventory Raw Materials
↓
Issuing Raw Material
↓
Sustaining Balance

Inventory Control

Store is the place where every type of raw materials, spares, finished goods are kept in proper system. Inventory control means the accurate calculation and data of every type of raw materials spares and finished goods in time to time store.

Inventory Procedure:

- Swatch Card
- Store Requisition
- Store Ledger Account
- Daily Inspection & Package Report
- Month Stock & Consumption Report
- Received Delivery & Balance Stock

Fabric spreading:

Fabric spreading means the smooth laying out of the fabric in superimposed layers (plies) of specified length. Knitted or woven fabrics are laid in one ply (single ply) or in several plies (multi lays) for simultaneous cutting in one operation. Fabrics are usually laid up manually. The manual spreading process is suitable for small-scale production. Manual spreading may be used for all kind of fabrics, including those with complex structures and intricate patterns. In large-scale production, manual cutting is often used for working with intricately patterned and high-cut pile fabrics. When compared to automated spreading, the cost of technical equipment in manual spreading is low, but the productivity is poor. The fabric spreading process is carried out by one/two workers at each side of the spreading table who move the fabric ply to the beginning of a spread. The spreading process is repeated until the desired number of fabric plies are laid down.

Automated methods of fabric spreading have significantly increased the productivity of the spreading process, but have not altered its main work principles. Similar operations are performed in both the manual and the automated spreading processes.

Figure: Fabric Spreading

Methods of Fabric Spreading

Four methods of fabric spreading are available in garment industry:

1. Completely manual laying-up;
2. Electrically driven laying-up by spreading machines (Semi-automatic or fully automatic)
3. Manual laying-up aided by spreading and cutting off devices;
4. Manually driven, mechanized laying-up using carriages;

Figure: Workers are laying fabric on cutting table

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. In this factory marker is made by hand drawing. There is no automatic machine to do this job. Though it is a time consumable job but factory authority says that it is cost effective for them.

Figure: Marker Making

In this factory the marker size, no. of garments containing in a marker and the direction of garments parts are guided centrally. Here the workers follow these rules and a convenient marker for the job.

Fabric Inspection

When the fabrics are received from the supplier, it needs to be checked, because, faulty fabrics can be supplied. So the cutting section has to check it properly before cutting operation, otherwise the end products will be faulty. For this, the fabric is being inspected by the quality inspector of the cutting section. They check the fabric fully and find out the faults. Then mark it so that, these faulty portion of the fabric can be rejected during spreading and cutting. Then the fabric is being stored for relaxation.

Fabric Relaxation

Fabric relaxation is performed for a certain period. This time is varied from fabric to fabric. But the minimum time of relaxation is twelve (12) hours. This time also may

Chapter 4

Cutting Section

Cutting Section:

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

Figure : Fabric Cutting

Cutting Section Organogram:

Cutting Incharge
↓
Cutting Quality Controller
↓
Marker Maker
↓
Cutting Operation
↓
Helper

Flow Chart of Cutting Action:

Receive the Fabric

Fabric Inspection

Relaxation

Trial Cut / Test Cut

Marker Making

Fabric Spreading
Placing Marker on the lay

Cutting

Numbering

Bundling
Quality (Panel Check)
Solid
Print/Embroidery
Quality Check
Matching
Short Bundling
Send to Sewing Line

Methods of Fabric Cutting:

In the garments industry, there are two available cutting methods, are-

1. Manual Method,
2. Computerized Method.

1. Manual Fabric Cutting Method:

Here cutting process is done by using a knife, scissors, drill, etc. The knife is placed in the head of the cutting machine. The manual method is the most used cutting method in the garments industry.

The manual cutting method can be done by using the following equipment:

- Round knife,
- Band Knife,
- Straight Knife,
- Scissor,
- Die-cutting,
- Drill.

Figure: worker are cutting fabric

Straight knife cutting machine:

Machine name: K.M company cloth cutting m/c
Model: K.M KS_AUV
Producer: Made by K.M cutting m/c co, JAPAN
Type: Heavy duty industrial cloth cutting machine with self-Sharpening
Dimension: 8 inch width X 11 inch length X 24 inch height
Weight: 33.5 lbs.
Current: A.C (2.6-33 amps)
Speeds: 3000/360

Figure : Straight knife

Machine parts:

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

Advantage of Manual Cutting Method:

1. Easy process of cutting.
2. Educated manpower is not required.
3. The low-cost knife is enough here to cut the fabric.
4. Low maintenance cost.

The disadvantage of the Manual Cutting Method:

1. Slow process.
2. Not suitable for large scale production.
3. Cutting speed cannot be controlled.
4. The intensity of the accident is very high.
5. Higher labor cost than computerized cutting method

2. Computerized Fabric Cutting Method:

In the modern clothing manufacturing industry, the computerized cutting method becomes so much popular day by day due to its higher production and less time-consuming efficiency. Here all programs are loaded into the computer and the computer performs all the activities which are loaded.

The computerized Cutting method can be done by using the following equipment:

- Straight knife cutting,
- Water jet cutting,
- Laser beam cutting,
- Plasma torch cutting.

Advantage of Computerized Cutting Method:

1. Very much effective cutting by a computer-controlled system.
2. Very fast cutting operation.
3. Suitable for large scale production.
4. Cutting speed can be controlled.
5. The intensity of the accident is very low.
6. No need for any marker.
7. Fabrics can be cut 7-8 times higher than the manual cutting method.
8. Low labor cost.

The disadvantage of the Computerized Cutting Method:

1. Higher maintenance cost.
2. Skilled and educated manpower is required.
3. So much expensive machine.
4. If the correct disc is not loaded in the computer, then an error will be indicated.

Figure: *Computerized Fabric Cutting*

Fabric Test:

Different tests are being performed to ensure the buyer recommended quality. Among the tests, the important test matters are GSM, width, shed, shrinkage, twisting, fastness etc. These tests are done to be sure about that the fabric quality is fair enough for maintaining garments quality. These tests are done from the factor

Pattern Making:

The cutting section of GMS Composite Knitting Ind. Ltd. just modify the pattern provided by central pattern section, According to fabric quality and type and buyer recommendation (after pre-production meeting) cutting incharge modify the master pattern and graded as required sized.

Methods of Pattern Making:

Pattern making involves three methods-

- Drafting
- Draping
- Flat paper patternmaking

Pattern-making softwares:

GMS using some Pattern making Softwares ,The different softwares used are Gerber, **Lectra, Tukatech , OptiTex** etc.

These softwares has made the job of the Pattern master easier. They have made the process of pattern making more economical and less time consuming.

A pattern can be made from a 3D form in just a few steps by using these softwares. An individual's measurements are collected from **3D body scanner**. The measurements are used to create a virtual 3D model of the individual's body. The 3D to 2D software allows the user to define a garment surface in relation to the 3D body model. Once the garment surface is defined, the application automatically unwraps and outputs a 2D flat pattern in .dxf format.

Numbering:

After cutting the cut pieces are shorted out size and shade wise. All the components of the same size are brought together. And they are numbered with Numbering machine. This numbering process is an important factor. As it prevents the garments parts form mix up. The sorted pieces are now ticketed. Ticketing is the process of marking the cut components for shade matching precision and sequence identification. The seal number maintains cutting number, size number, serial number.

Numbering section:

- Seal Machine: 6pcs

Prepared the bundling card

Quality controller prepare bundling card according to fabric lay. This report card maintain –

- Date
- Style Number
- Shade Number
- Card serial
- Quality
- Color
- Lot Number

Bundling

The numbered components of one styles and in one size are now bundled using ties.The size of bundle depends upon the requirement of the production plant. Each bundle contains pieces of the same style and same size only. Bundling is done according to card no. In this stage all numbered parts are bundled according to serial number.
If any parts requires print or embroidery, parts are send to the print or embroidery factory as this factory doesn‟t have any printing section or embroidery section. After the process is done all the parts are quality checked and if passed then supplied to the next step.

Cutting Section Quality Control

Step by step process by which quality is checked in the Cutting Section –

Fabrics Roll spreading Inspection:

- Fabrics Roll spreading Inspection:
- Roll number
- GSM
- No. of lays
- Ends of Bits

Spreading Quality Control (Defects):

- Table marking
- Fabrics flaws
- Marker placing
- Splices or Joint
- Ends
- Leaning
- Tension

Quality Inspection for Marker:

- Every parts Measurement check
- Calculate the total no. of parts of each Garments
- Marker length & width determined

During Cutting Quality Control:

- Notches
- Miscut
- Matching plies
- Ragged Cutting
- Pattern Check

Limitation of Cutting Section:

- Input problem.
- There is no fixed group for any table.
- Handmade marker as the factory hasn‟t equipped with any computerized
- marker maker.
- Check, variegated rib fabric lay quantity may be excess. As a result reject
- percentage may be increase.
- Fabric spreading is done manually.
- Workers are often found impatient for proper fabric relaxation, lay spreading
- and cutting.
- Low efficiency

Chapter 5

Sewing Section

Sewing section:

The sewing process is the attachment of different parts of the cut pieces. In this work place there are many operators who perform single operation. All this factor decides what parts of garment can be sewn at that station. Sewing section is the most importat department in apparel industry.

Figure: Sewing Floor at GMS

Machine used in the sewing section:

1. Single Needle Lock Stitch machine
2. Double needle Lock stitch machine
3. Vertical Lock stitch machine
4. Single needle Chain Stitch machine
5. Pointer (collar, cuff)
6. Halamark m/c
7. Overclock Machine (5Thread)
8. Feed off the Arm machine
9. Flat bet fusing machine
10. Continuous fusing Machine
11. Kansai machine etc

Figure: Single Needle Lock Stitch machine

Figure: Overclock Machine

Process flow of sewing section:

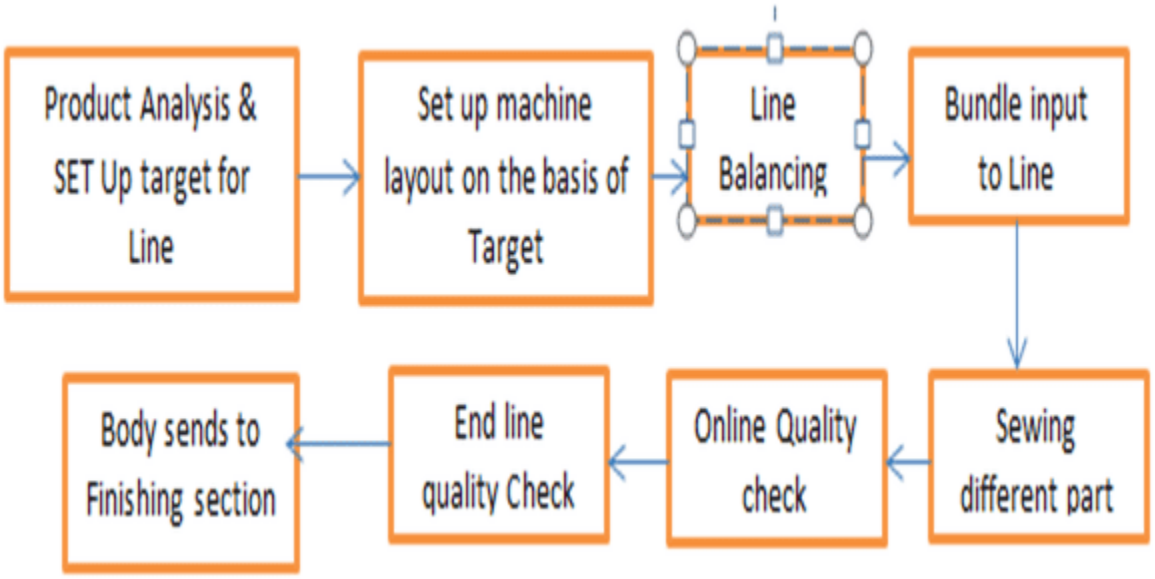


Figure: A Operator Sewing a Garment

Input from cutting & store

After receiving all the details they send a request for the cut parts from the cutting & sorting section & the request is sent to the accessory stores for all the accessories that are required for the particular style then they start the production for the new style.

Starting of layout

Before starting the proper production the production floor does a process of batch setting for the floor which is training the operators for the new style that has to be produced bulk, this teaching session will go on for about 1-2 days maximum. After this batch setting process the production for the next day starts with a smaller commitment i.e. may be for 50 pieces for the entire day then the production gradually increases from 50-100-150 & so on, this will make the operators team slowly & precisely about the processes that has to be carried out for the particular style.

In process quality control Sewing:

During the swing in process quality control|| is done by the line QC„s through 7 pieces inspection system. For critical operations 100% process inspection are carried out. The following parameters are also checked in sewing process –

- Machine check.
- Tension
- Stitch per Inch (SPI) checks
- Needle check.
- Cleanness
- Table inspection.
- Inspection before wash.

Once the cut parts are received from the cutting & store section then the parts are prepared & assembled according to the line that is planned. After the assembling of the parts is done then there will be a line checking where the shade matching and the measurements are checked and then sent for next operation (Finishing).

Sewing Quality checking points:

- Skip/Drop/Broken/Joint stitch
- Raw edge
- Size mistake
- Uneven Hem
- Uneven Cuff
- Uneven Neck
- Uneven Shoulder
- Uneven Placket
- Twisting
- Without care label
- Sleeve up-down
- Stripe up- down
- Open seam
- Shading

Sewing problems in Factory:

- Input problem
- Shortage of skilled operator
- To achieved the overtime, they worked slowly

1. If any problem will create during production then

- Nobody will take the responsibility
- Nobody will give the instant decision.

2. Sewing line production depends on supervisor and incharge.
3. Needle hole due to friction, needle eye is to large, mistake of needle selection.
4. Measurement problem- from cutting section.
5. Seam pucker:

- Due to unequal tension of feed dog and pressure foot on two plies of fabric
- Due to unequal thread tension.
- Shrinkage of either fabric or sewing thread.

6. Broken stitch:

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

- Faulty fitting of bobbin cage.

7. Skipped/ Slipped stitch:

- 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.

8. Variable stitch density:

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

Working way of sewing floor:

Product Analysis and set up target for Line: Here usually find the critical operation of the product by analyzing the product and decide where need help, which operator works on which operation. After analyzing the product line target is set for per hour production. Line supervisor monitoring target production achieving or not.

Set up machine layout on the basis of Target: On the basis of operation layout and target of per line, machine layout is setup to ensuring target per hour production.

Line balancing: Line balancing is a tool used for production line to capacitate the flow line of production. If line is not balanced properly, required target result will not be achieved properly. Some work have higher work load, some have lower load which caused bottleneck in the line.

Bundle Input to Line: After ensuring line balancing, bundle wise cut panel input to line as per pre-determined manner to workers.

Sewing: Workers sew different parts as per pre-determined manner according to machine layout for ensuring right operation is made by right machine and right operator.

Online Quality check: In this stage, front and back part sewing quality checked by on-line quality inspector. If found any defect, send the garment to that operator who sew the defective for repair the sewing faults.

End line Quality check: Here Full garments of both inside and outside checked properly to ensure the garments is defect free. If found any defect, repair that defect by who are responsible for that defect. Here also count the body to comparing if target is achieved or not.

Body sends to finishing section: After end line quality inspector, garments are sending to finishing section for finished the body for shipment as per buyer's requirements.

Figure: A worker set a needle

Elements of sewing section:

1. Sewing thread
2. Needle
3. Sewing Machine

Sewing defects:

1. Needle damage
2. Skip stitches
3. Thread breakages
4. Broken stitches
5. Seam puckering
6. Pleated seam
7. Wrong stitch density
8. Uneven stitch density
9. Staggered stitch
10. Improperly formed stitches.

Important sewing machine descriptions are given below:

Plain Machine or Lock Stitch Machine:

- No. of needle: Generally 1 needle or 2 needles
- SPM (Stitches per Minute): 1500-5500
- Stitch Length: 5mm in Juki
- Automatic Thread Cutting
- Automatic Bobbin Winging
- Edge Cutting System
- Most commonly used for sewing of woven garments.

Over lock or Over edge Stitch machine:

- No. of needle: one or 2 needle
- No. of thread: 2-5 threads
- SPM: 6500-8000
- Stitch length: maximum 4mm and stitch length can be changed by push button.

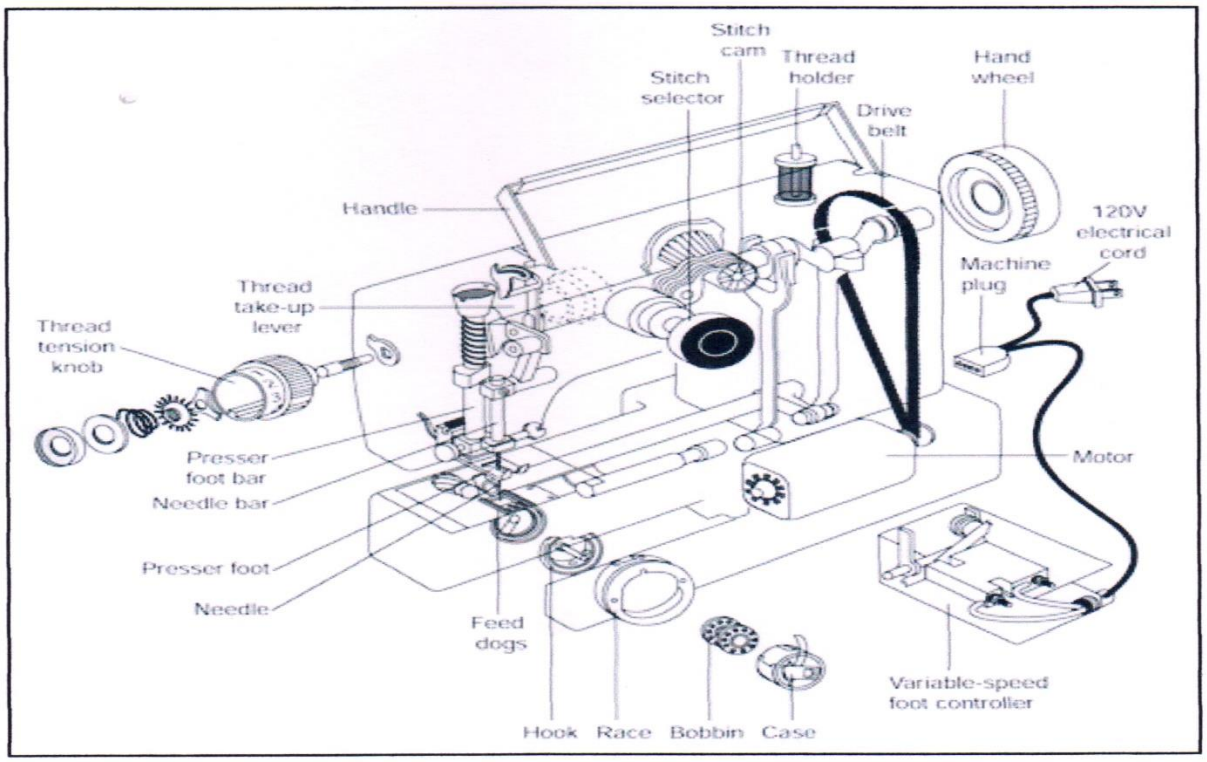


Fig: Different Parts of a sewing Machine

Sequence of Apparel or Garments Manufacturing or Flow Chart of Garments

Operation	Job	Method
Design or Sketch	It comes from buyers to manufacturers containing sketch including all measurement of particular styles	Manual or Computerized
Basic block	It's an individual component of garments without any design or style	Manual or Computerized
Working Pattern	Supposed cutting off figure of net dimension down on paper. Each cut part is called pattern.	Manual or Computerized
Sample Making	After making sample, it is sent to buyer for approval	Manual
Basic Manufacturing Difficulties	----------	Manual
Approved Sample	After rectifying faults it's again sent to buyer. If ok, then it is called approved sample	Manual
Costing	Fabric required Trimming Making Charge Profit	Manual
Production Pattern	Taking allowance with net dimension	Manual or Computerized

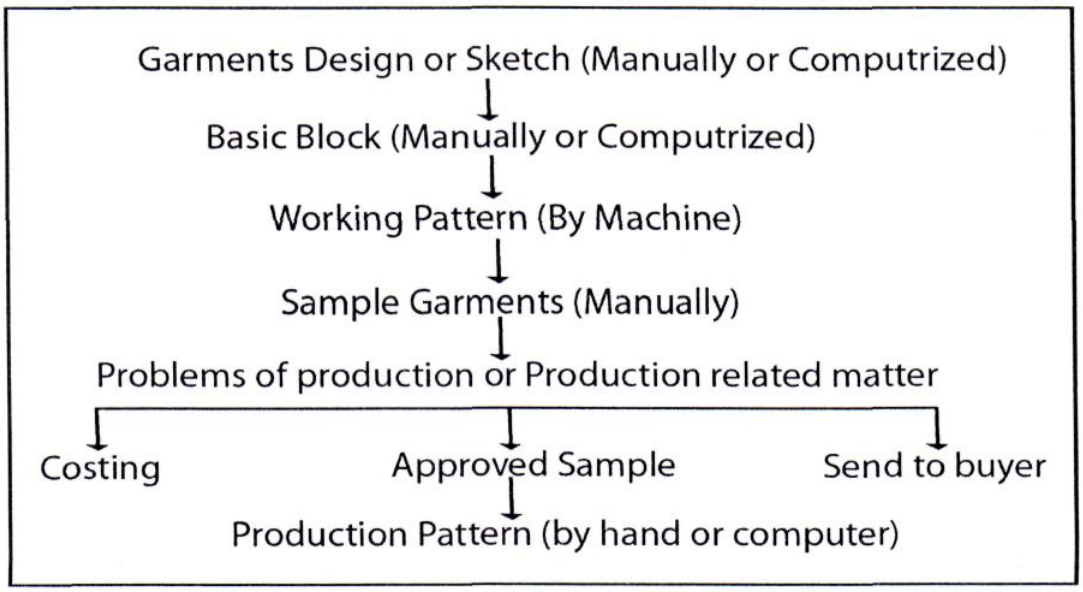
Grading	Approved sample is always made medium. If the buyers require different sizes, so we should have to grade the dimension.lt may be S=Small, L= Large, M= Medium, XL= Extra Large or XXL	Manual or Computerized
Marker Making	Marker is a thin paper which contains all the components for different sizes for a particular style of garments.	Manual or Computerized
Fabric Spreading	To spread the fabric on table properly for cutting	Manually & with the help of Spreader machine
Cutting	To cut fabric according to marker dimension	Manual or Computerized
Sorting & Bundling	Sort out the fabric according to the size & for each size make individual bundle	Manual
Sewing	Inspection	Manual
Ironing or Finishing	After sewing, we will get a complete garment which is treated with steam ironing	Manual
Final Inspection	Approved as initGMS sample	Manual
Packing	Treated by polyethylene bag	Manual
Cartooning (final inspection by buyer)	After packing it is placed in	Manual

	hand paper bag for export, so as to minimize damage	
Send to buyer or Dispatch	If it's ok then send to buyer	Manual

Production of the Garments

Sequence of sampling:

Sequence of Sample Garments Manufacturing



Quality control Section

Introduction :

Quality is an attribute property of specGMS features. The Nature, kind or character of any materGMS is known as quality. Control is to check or verify & hence to regulate them at all. So, quality control is the checking verification & regulation of the degree of excellence of an attribute or property of materGMS. Quality control is governed by **three** M's: Men, Machine & Material.

Objects of quality control section

1. Research.

2. Selection of raw materials.

3. Process control & Product control.

4. Process development & Product Development.

5. Product (Sample) testing.

6. Specification test.

Figure: Quality check Table

Quality Standard

GMS Apparels Ltd. follows two types quality standard methods:

1 . Customer methods (given by buyer own like M& S)

2. ISO method

3. AATC (Incoming)

For Testing Section: 1.

CarboIite M/C

Scope of ISO 17025 : yes

M/C Code : M 002

M/C name : Carbolite

Made by : Roaches

Made in : England

Supplier : Maizime Trading Company

Installation Date : 06.09.04

- **Conditioning Cabinet M/C**

  Origin : China

  Brand : Shanghai sansher medical instrument company Ltd

  Instalation date : 10-06-06

  3. Sunflower Washing M/C

  Type of Loading : Top Loading

  Origin : China

Brand : Sunflower
Instalation date : 01 -10-07

- **Tumble Dryer M/C**

  Brand : Fisher & Paykel

  Origin : UK

  5. Wascator FOM71 CLS

  Type of Loading : Front Loading

  Origin : Sweden

  Brand : Electrolux

  M/C Code :M014

  Instalation date : 06-09-04

  Last calibration date : 28-08-07

  6. M223/2 **precision tumble dryer**

  Origin : England

  Brand : SDLATLAS

Instalation date : 04-04-09

7. WASTEC-P

M/C Code : M011
Origin : England
Brand : Roaches

Instalation date : 06-09-04 Last calibration date : 18-08-08

8. Deionizer

Origin : Uk
Company Name : Vedia Water System Ltd.
Brand : Elga
Instalation date : 05-06-06

9. GSM Cutter

Origin : England
Company Name : SDLATLAS LTD

10. Hanna P^H meter

Scope of ISO : yes
M/c code : M006
M/c name : Hanna P^H meter

Made in : Portugal
Supplier : THS Corporation

Installation Date : 20.03.2005

11. **Perspirometer**

Brand : ROACHES
Origin : UK

12. Crock meter

Made by : Roaches England

Made in : England

Supplier : Roaches

13. Yarn tester

M/C code : MOOS

M/c name : yearn tester

Made by : Officinic brustio

Made in : Italy

12. Date : 08.01.2008

Scope of ISO : No

14. Overlock Sewing Machine
Brand : JUKI
Origin : Japan
Needle No : 4 needles

15. Hardness Test Kit
Brand : Hanna Instruments
Origin : Hungery

Mesh Tray: Where the pre-tested fabric or after tested fabric is kept.

• **Shrinkage Test Calculation:**
{(Before wash length or width - After wash length or width) X 100}/ Before wash length or width - Shrinkage %

Example:
Before wash length = (350+350+350)73 = 350mm & Before wash width= (350+350+350)73 =350mm
After wash length = (350+350+350)73 = 320mm & After wash width =

(350+350+350)73 =320mm

Length wise shrinkage: (350-320)7350 - -0.09% shrinkage
Width wise shrinkage: (350-320)7350 = -0.09% shrinkage

Spirality Test Calculation:
If S = (Sl+S2)/2than, Spirality = (S x 100)/L.

Where,

51 = The right side distance of the specimen from the stitch line after wash.

52 = The left side distance of the specimen from the stitch line after wash. L = Length obtain after wash
Example:

[{(17.5+17.5)/2> X 100]/440 = 3.98%

Color Fastness Test Process

Color Fastness:

The "color fastness" of a colored textile is defined as its resistance to the changes when subjected to particulates of conditions. It follows that color fastness must be specified in terms of these changes and expressed in terms of the magnitude.

Color Fastness to Wash

Required materGMS

s1. Sample size =40 x 100 mm

2. Multifiber Fabric = 40 x 100mm

3. ECE detergent (WOB) - 4g/L

4. Sodium Perborate (Na2BO3.H2O2.3H2O2-lg/L) - Ig/L
Distilled water
6. Normal cold water
7. Steel ball

Required instrument:

1. Rota Wash
2. Scissor
3. Stitch machine

Recipe:

ECE detergent= 4gm/L
Water- 1L
P^H=10.5±0.1
Time= 30minutes
Temperature= 40°C (Wastec-P m/c)

Procedure:

1. Cut sample & multifibre at 100 x 400 mm and then stitch.
2. 50 ml ECE detergent (WOB) & 50 ml Sodium per borate is taken with the sample. For Marks & Spencer, the solution is taken by the following formula: (Sample fabric + Multifibre weight) xSOml
3. The sample is kept in 60°C for 30 minutes in Rota Wash Machine (but for Wastec m/c it's 40°C)
4. Rinse the sample twice with cold water.5. Dry at 60°C by hanging or by Flat iron pressing but temperature should not be more than 150°C.

Report:

Dry the specimen and the change of shade & degree of staining is measured by Grey Scale & Staining Scale

Chapter 6

Printing section

Emboos silicone print:

Code number:
XG-360KY-55 &catalyst XG-360BH
XG-360KY-65&catalyst XG-360BH1
Mesh number 80-120 (32-48T)
1st Embossing silicone ink mixing:
Embossing silicone ink XG-360KY-55/XG-360KY-65 : 50G
Embossing silicone catalyst XG-360BH/XG-360BH1: 5G （mixing ratio 10%）
Silicone thinner : not necessary
2nd Printing mixing silicone ink on the backside of the fabric
3rd Heat press printing fabric :
Upper mold 180 degree
Bottom mold 120 degree
Heating time 8-12 seconds (depends on temp and design size)
Before embossing to stick a thin fabric on the printing fabric backside or without backside fabric (depends on design)

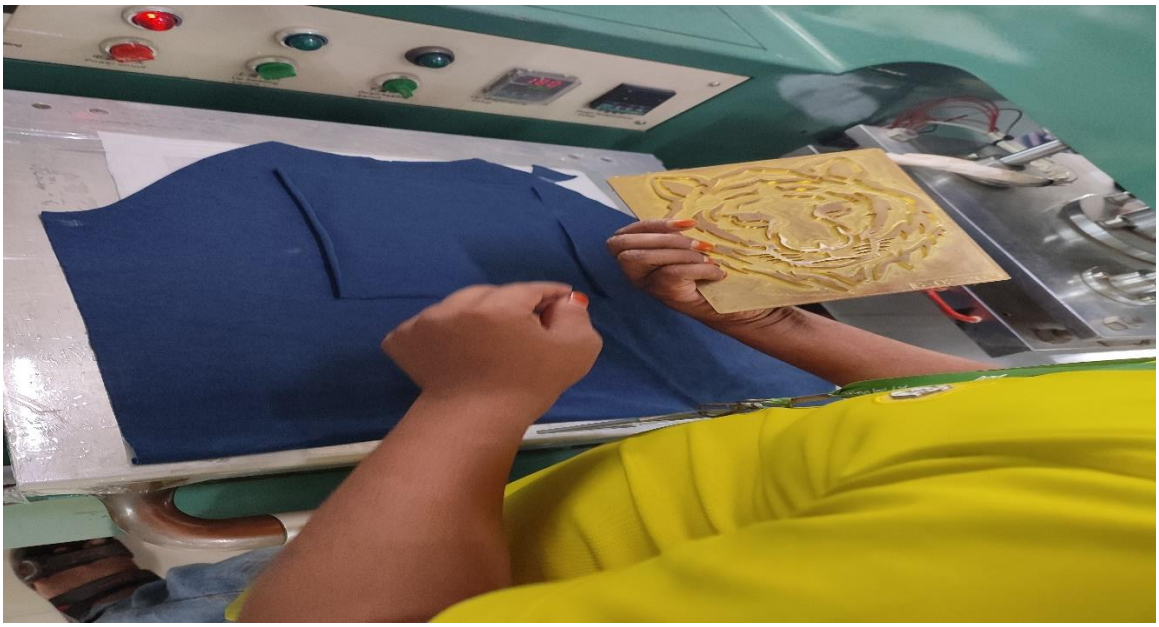


Figure: Emboos silicone print

Foile printing:

Foil printing is done as the following sequence:-

Fabric preparation

⬇

Fabric plaited on the table

⬇

Foil gum/ foil paste apply by screen

⬇

Dry slightly in air temp/hand dry

⬇

Apply foil paper on the fabric

⬇

Heat apply by heat press m/c

⬇

Cooing for 4 sec

⬇

Foil paper removed by hand

⬇

Delivery

Figure: Foil print

Ink-Jet Printing:

Ink-jet printing is a non-contact printing process in which droplets of colourant solution are set in motion towards a substrate and directed to desired spot. Inkjet is an emerging technology in the textile industry and has not yet been adopted for high commercial usage. The dye types most used in the ink-jet printing of textiles are vat, sulphur, fiber reactive, and naphthol dyes.

Figuer: Digital printing

Screen Printing:

This process includes a screen i.e. a frame with a fine mesh fabric stretched over it tightly. The pattern is either in stencil form or is blocked off on the screen itself, using a screen for different colours to be printed. Dye is impelled through mesh fabric with a squeegee tool to evenly scatter the dye into the fabric in the areas below that are not blocked out. Screen printing is an expensive procedure which requires space as well as special equipment. Flat-screen printing is carried in the same way but machines are functioned at each stage and the pattern is applied to the screen digitally. On the other hand, digital printing is a suitable method for small batches of fabric.

The use of screen printing has been escalated in past few years due to it versatile quality and up gradation of rotary screen printing machines which provides high scale of output. Hefty depth of various shades can be produced by this printing.

Figure: Screen printing

Oval printing m/c:

Figure: Oval printing m/c

Chapter 7

Finishing Section

Functions of Finishing Department in Garment Industry

In the production department garments are stitched by sewing machines. Stitched garments are finished in the finishing department. Finishing activities are performed prior packing garments into poly bags. The major activities of a finishing department include thread trimming, checking garments and ironing.

The folding, tagging and packing of garments are done in the packing section in the finishing department. This post covers major functions of the finishing department. Mind these functions may vary while there is a change in product categories.

Organogram of Finishing Section:

Quality Incharge
↓
Finishing Incharge
↓
Quality Controller
↓
Ironman
↓
Thread Cutter

Responsibilities of Finishing Section:

The major responsibilities are performed by the finishing department. It is their duty to confirm the required quality as required by the buyers. For this they performed several action which can only be performed after the garments production. They perform –

1. Thread Trimming:

In the stitching department, thread trails and thread chains are not trimmed neatly. Uncut threads and thread tails in garments are trimmed in the finishing department by helpers. Uncut and loose threads on garments are considered defects.

2. Checking garments:

All garments are checked at the finishing stage for visuals and measurement. Finishing checkers check the complete garment inside and out. Checking is done for garment detailing, such as care labelling, and trims.

3. Button attach and Butting holing:

Products those have trimming like button, snap button, eyelets are attached in finishing section.

4. Removing stains:

Stains and spots are found on garments. Spots are removed using a hand spot gun or by using a stain removing machine prior to pressing. Dust and stains can be removed by machine washing. So, many times finishing department wash garments inside department.

5. Repair work and mending

Defective garments may need to repair for stitching and fabric defects. All repair activities are done in finishing department itself instead of sending defective garments to stitching department.

6. Ironing garments:

Garments are ironed using a steam iron. This is done to remove creases in the garment. For knitted garments measurements are set by steam press. Vacuum pressing tables are used for garment pressing.

7.Folding and tagging:

Pressed garments are folded in a specified dimension. Tags, such as price tags and hang tags are attached to the garment by means of a kimble gun or threads.

Figure: workers are hand tagging

8. Packing garments:

Finally, properly folded garments are packed into poly bags as per customer requirements. Individual poly bags are then packed into bigger cartons.

Figure: worker are paking garments

Carton packaging

9. Preparation of packing list:

The packing in-charge prepares a packing list for the shipment. After packing is completed for an order, the finishing department informs the concerned merchant.

10. Internal shipment audits

Quality department perform internal shipment audit in the finishing department. This audit is done prior to final inspection.

11. Documentation and reporting

Like other departments, finishing department maintain production records for pressing, and packing.

Garments Inspection Elements

Following elements must be checked on each order. Failure to meet any of the elements could cause the order to be rejected. Prior to final inspection following paperwork shall be provided to the onsite auditor to facilitate inspection of packed goods.

- Order quantity
- Packaging
- Labeling
- Style
- Shade
- Accessories
- Approved bulk / trim swatches
- Measurement Specification sheet

Store for delivery

After the packing is done, the garment cartons are kept in suitable place for the buyer (Quality Control) to check. They also keep the products until the delivery is done. The delivery goods store is located at 1st floor of the GMS Composite Knitting Ind. Ltd.Building.

Figure : Store for keeping ready garments for delivery

Chapter 8

Maintenance & Utilities

Maintannace

Organogram:

Maintenance Incharge
⬇
Machanic
⬇
Electrician

Utilities :

The utilities of Ornate Apparels are –

- Electricity
- Water
- Gas
- Steam

Electricity:

The main utility electricity is supplied from PDB line. There are also two Diesel generator for continuous electricity supply during load shedding.

Figure: Electric Supply House

Specifications of Generator:

Brand Name	CAT
Item -	GS3108
KW	1030
KVA	1288
Voltage	400
Frequence(HZ)	50

Figure: Generator

Water:

Continuous supply of water for GMS Knitting Ind.Ltd. is ensured by submersible pump.

Water Supply Pump

Gas:

Gas is mainly used in boiler for steam production. The gas is used from TITAS GAS Distribution Company.

Steam:

Pure steam is required at certain temperature in the iron section. There is Fire tube type boilers used for steam generation, to meet the requirement of iron section of Ornate Apparels Ltd. At first the boiler takes NTA (Natural gas) from the gas line and suck air. Then through the air and gas inside the boiler. For this reason the water is boiled and produce steam. The steam is supplied by the steam line in the iron section.

Figure: Boiler

Water treatment plant:

Pollutants associated with printing include suspended solids, solvents, foam, color and metals, and in general, large volumes of water are consumed during the washing-off stages. The main areas of environmental pollution of textile printing includes dyes containing metals, objectionable surfactants, air emissions, water from washing the print blanket, leftover print paste, excess paste from drums, screens and pipes, use of urea as this increases the nitrogen in the effluent. Like denim the quantity of effluent of textile printing industry is very low but highly polluted.

Figure: Water treatment plant

Compliance:

Compliance means conformity of certain standard. Ornate Apparels Ltd. maintain a moderate working condition for their employees. Though it is a 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.

- Compliance for holiday
- Leave with wages
- Maternity leave
- Time care
- Health register
- Accident register
- Working register
- Equal remuneration
- National festival holiday
- Overtime register
- Labor welfare
- Sexual harassment policy
- Child labor abolition policy
- Anti-discrimination policy
- Working hour policy
- Environment policy
- Security policy
- Buyers code of conduct
- Dining Hall
- Health and safety committee

Health:

- Drinking water at least 4L/day/employee
- Drinking water supply
- Drinking water signs in Bangla and English locate min.

Fire Safety:

- Sufficient fire extinguisher and active reserve water supply
- Access area without hindrance
- Fire signs in both language
- Fire certainly personal photo
- Two Emergency exit

Toilet:

- Separate toilet for woman & men
- A seat with proper privacy and lock facility
- Effective water sewage system
- Soap in toilet for hand wash
- Water tap
- Dust tins.

Safety Guard:

- Metal gloves on good condition
- One First aid box in each floor
- Ironers wearing sleepers
- Motor guard
- Doctor
- Medicine
- Medicine issuing register
- Welfare officer
- Childcare center

Others:

- Convenient floor temperature
- Enough lighting facilities for clear visibilities

Chapter 9

Impact of This Internship

Impact of This Internship:

The main purpose for taking internship is to gain knowledge practically. This industrial training has helped me to learn about garments sector at a great extent and made a significant impact on my personal and professional life.

Sample Section:

- Acquainted with machine used in Sample section.
- Operation of Sample Process.
- Idea about work-culture of Sample Section.
- To develop sample making procedure.

Store Section:

- Idea about Inventory Report.
- Idea about Chalan.

Cutting Section:

- Acquainted with machineries used in Cutting section.
- Operation of Cutting Process.
- Idea about work-culture of Cutting Section.
- Cutting faults & remedies.
- Numbering, bundling, and spreading.

Sewing Section:

- To know about machine Acquainted.
- Operation of Sewing Process.
- Idea about work-culture of Sewing Section.
- Sewing faults & remedies.
- Breakdown of sewing procedure.

Finishing Section:

- To know about machine Acquainted.
- Quality checking procedure.
- Operation of Finishing Process.
- Idea about work-culture of Finishing Section.
- Packing, Ironing and Checking.

Maintenance & Utilities Section:

- Acquainted with machine used in Maintenance & Utility section.
- Operation of Maintenance & Utility Process
- Idea about Function of Boiler.
- Function of different types machine list used in GMS Knitting Ind.Ltd

Compliance:

- Idea about different compliance issues.
- Idea about Maintenance complained issues.
- How to follow compliance issues in different section.
- Policies of GMS Knitting Ind.Ltd.

Chapter 10

Conclusion

Conclusion:

I have completed my industrial attachment successfully by the grace of Almighty Industrial attachment sends me to the expected destiny of practical life. The completion of the two months Industrial Attachment at GMS Knitting Ind.Ltd. I have got the impression that the factory is one of the developing export oriented garments in Bangladesh. It has earned very good reputations for its best performance over many other export oriented garments. I am enough fortunate that I have got an opportunity of having a training in this factory. During the training period I have received co-operation and association from the authority full & found all man, machines & materials on appreciable working condition. All stuffs & officers were very sincere & devoted their duties to achieve their goal.

Some Limitations, I faced during report writing are given below:

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

The management of GMS Knitting Ind.Ltd. was very helpful to provide me many important information. My respective seniors gave me time whenever they got free time. The specialty of this report is that, the information, data and description are very much subjective and practical oriented. So, one can easily have an idea about GMS Knitting Ind.Ltd. at a single look on it. The new comer can use this report for further details study or can know GMS Knitting Ind.Ltd. without much work. But, some process steps may be modified within the period of time while this paper will reach to the reader in future.

THE END