

الرَّحِيمِ الرَّحْمَنِ اللَّهُ بِسْمِ



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

WE WILL  
RISE UP  
WE WILL  
**SHINE**

# Faculty of Engineering

## Department of Textile Engineering

### REPORT ON Industrial Attachment

### AT NEWAGE GROUP NEWAGE APPARAL LTD. NEWAGE GARMENTS LTD.

Holding:06/66/1,road:#11,block:#L.Ward:#06  
Nischintopur,purbo norshingpur,ashulia,savar,Dhaka-1341

**Course Title: Industrial Attachment**  
**Course Code: Tex-442**  
**13(A),Titas,Fall'21**

Submitted by:

Name	ID Number	Batch	Group(wp)
Md abu rayhan	Tex.1801013106	13(A)Titas	

Academic Supervised  
**Kamrul Hassan Bhuiyan**  
Course coordinator  
Department of Textile engineering  
**Sonargaon University (SU).**  
146 Mohakhali, Wireless Gate. Dhaka.

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

**Major in wet processing**  
**Duration: 04 month**

## DECLARATION

We hereby declare that, this Industrial Attachment on **NEWAGE GROUP** of Bangladesh is done by us under the supervision of **Kamrul Hassan Bhuiyan, COORDINATOR**, Department of Textile Engineering, **Sonargoan University (SU), Dhaka**. We also declare that, this Industrial Attachment report has not been submitted anywhere for award, degree or diploma. We ensure that, any part of this attachment has been presented anywhere.

-----  
Md abu rayhan  
Tex.1801013106  
13(A)Titas



Department of Textile Engineering

SU/Textile/Int. Letter/2021/Fall/01

Date: 11/09/2021

To

Deputy Manager (HR-admin –coc)  
Merchandising Division, New Age Industrial Park  
Nischintapur, Ashulia, Savar

**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 11<sup>th</sup> September, 2021.

SL No.	Student Name	Specialized	Student ID	Contact No.
01	Md Abu Rayhan	Wet Processing	Tex-1801013106	013033380627

Therefore, I am requesting you to provide him 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. Abu Rayhan, Tex.1801013106**, B.Sc Engineering Textile program, 13(A)Titas Batch have successfully completed their Industrial Internship on Apparel Merchandising 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 (B.Sc) Degree.

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

# ACKNOWLEDGEMENTS

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

I am grateful to” **Kamrul Hassan Bhuiyan**” **HEAD** of **Sonargaon University (SU)**, Dhaka. Textile Engineering my Academic Supervisor. As well as to “**GOLAM MAWLA BANI asst. Manager, woven merchandising division, and RUHUL AMIN RIPON ast. Manager knit merchandising division** of my factory supervisor of **The Newage garments and Newage apparel ltd, Newage Group. Bangladesh.**

Being working with them I have not only earned valuable knowledge but was also inspired by their innovativeness which helped to enrich my experience to a greater extent. Their ideas and way of working was truly remarkable. I believe this report could not be finished if they did not help me continuously.

I would like to thanks the Chairman, General Manager, Production Manager, Sample Manager, Finishing Manager, Dyeing Manager, Maintenance Manager, Quality control Manager, Factory Manager & Costing Sr. Manager of N.R Group. Who has given us scope for doing industrial attachment in the factory as well as for giving scope to work in their respective section. We also would like to thanks to **sample manager MD Dilder Ahamed,store manager MD Habib Hasan with others persons**” for their proper management & taking necessary procedure about our industrial attachment.

I am also very much grateful to Newage Group Authority/ Management for giving me opportunity to do my internship work in their factory. Last but not the least, thanks go to all the workers, supervisors, Line Chief and Floor in charge who have assisted, helped and inspired me.

# ABSTRACT

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

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

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

We were able to study on their different sections and their activities practically. Due to some limitation of the factory, we have found store section, finishing section and maintenance section, costing section dyeing section.

All the activities of this factory are performed according to the central orders of the company. This company works for Academy buyer and sometimes works which is an own buying house of this group of company.

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

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# CHAPTER 01

## EXECUTIVE SUMMARY

### Introduction

Textile & garments sector is the biggest and fastest growing sector in Bangladesh. Textiles and clothing will always be essential goods for human beings. Spinning and weaving were the main activities that drove the industrial revolution in the 18th century. Since then the textile industry has been a leading industry in the initial phases of industrialization in many countries and in different periods of time in the world. Bangladesh is an important producer & exporter of knit RMG product. There are about 4500 garments factories running in Bangladesh. Growth of garments factories started in Bangladesh around 1980. but now nearly 79% of our foreign currency is earned from RMG. At present Bangladesh is producing & exporting more than 60 items of garments. Garments are exported to USA, Canada, Japan, Australia, Middle East and many other countries in the world. Cheapest labor cost is the biggest advantages for Bangladeshi garments producers & exporters

Science is going to be flourished day by day. Almost every invention becomes successful due to the development of science. Technology, the modified segment of science makes the thing possible, which was impossible yesterday. Education provides important leanings of the modern inventions & the theories and also gives me a combined knowledge over theoretical and practical studies. Literatures provide the right information which I have been learned through my university. On the other hand practical knowledge increases the practices of theoretical perception clear and more efficient

Internship has made these opportunities. Because I have learned theoretical knowledge last four years but due to lack of proper industrial knowledge on my course, I would not been said a complete engineer. Industrial attachment did work for me. I have taken part in this industries attachment in NEWAGE GROUP.

Industrial attachment is an important and essential part of 4 year B.Sc. in Textile Engineering Course. Actually industrial attachment is the practical experience for every Textile Engineer which is needed to be familiar not only the industry but also all over the necessary job related to continue in any industry. During student life a student cannot know about the practical condition so its badly needed for every student for attain for the industrial attachment .The NEWAGE GROUP is truly an excellent industry from our point of view. All types of modern technology are well arranged here. Every section in here helps us so much by giving information during our training period which was unbelievable.

Especially IT Department maintain the Management Information System a vital role for the companies smooth operation and development, we are so satisfied and lucky student to complete our Industrial Attachment in NEWAGE GROUP. We think this Industrial Attachment will be outstanding helpful in our future cariar.

## CHAPTER 02

# PROJECT DESCRIPTION

### **NEWAGE GROUP**

Newage Group is a leading manufacturer and exporter of woven and knit apparels from Bangladesh with an annual turnover of about 100 million US dollars. Operating for over three decades since 1984, the group is a leader in making high fashion men's casuals; ladies blouses of most recent craze, and latest branded hot selling high street knitwear products. Its years of existence in this trade are dotted with numerous recognitions of performance of excellence from its buyers.

From its modest beginnings employing 150 people at its headquarters in Dhaka in 1984, the company has grown to over 10,500 people and 4,550 machines at four locations. In addition to consolidating its status as a premier supplier Newage has embraced available garment industry technology, including: computerized supply chain management systems; computer aided pattern & marker design; latest fusing machinery; laser technology and modern knitting, dyeing and finishing plant. It also has a fully equipped testing & development laboratory.

But being a leader brings responsibility. This means that we care about the impact that we have on the people and places touched by our organisation. Our textile plant uses captive power generation and has a state of the art effluent treatment plant for protection of environment. The garments are produced in compliant factories using no child or forced labour, providing workers free child care, and medical assistance. Our purpose built modern factory buildings are designed keeping in mind extreme structural safety considerations and equipped with modern addressable sensors to detect heat, fire and dust to actuate the fire alarm system and fire pump network. There is adequate water stored to fight any eventuality. The installed fire pumps are according to UL specifications. Regular fire drills are held to make the workers aware of the actions required to be taken in such eventualities.

Through the Gulshanara Razzaque Welfare Foundation, our company has supported a school & hospital project with cash donations, logistics, and employee time. The school provides free education for the poor children of the area, with the hospital providing free or subsidised medicare for people of less developed areas of Bangladesh.

At Newage we place great emphasis on satisfying our buyers' requirements and have built an award winning business on this philosophy. We welcome your enquiries and sincerely look forward to working together.

## CHAPTER 03

# COMPANY PROFILE

### NEWAGE GARMENTS LTD - 1984

---

Established in 1984, the company has been successfully exporting for over three decades to exacting standards. With 600000 pieces per month production capacity, fabrics used are numerous and include solid and yarn dyed COTTON, CVC, TC, POPLIN, POLYESTER, TWILL and DOBBY sourced from local and regional suppliers. These products are supplied in various STAIN RESISTANT, WRINKLE FREE, TEFLON, PEACH, SOFT and MERCERISED finishes. Our buyers are happy to lean on us for product development based on a large collection of fabric gathered from our extensive network of suppliers. Our representatives remain in constant touch with these suppliers keeping track of their latest advances. We take pride in being able to accommodate our buyers' fabric requests.

The 16,000 square metre factory is situated in Newage Industrial Park, beside the Uttara-Bypail highway in Ashulia. Just 17 Km away from the main airport of Dhaka and employs over 1,400 people. The factory has received certification from a number of our buyers who are satisfied with our work practices.

#### **Quality Assurance:**

We inspect up to 10% of all inbound fabric consignments at our premises using 4 points system. If incidence of defects rises above normal range in this initial random check, the full quantity is inspected to assure acceptability of consignment.

Consistency of quality of production at each machine is controlled through traffic light system marshalled by a team of quality inspectors reporting directly to Managing Director. At end of the production all shirts are checked on leaving floor and again before packing.

We use AQL level 2.5 for in house inspections, though other standards are also used during third party inspections as demanded by the buyers.

Satisfied with our consistent supply record of superior shirts, one of our major European customer has accorded Newage Garments the honor of QCC0 status.

#### **Major Buyers:**

- C&A
- H&M
- Target (Australia)

#### **Factory Address:**

**NEWAGE GARMENTS LIMITED**

Nischintapur, purvo narasinghapur

Ziravo, savar, Dhaka

## **NEWAGE APPARELS LTD - 1995**

Founded to produce high classknit & woven apparel for the international market, we have won in less than a decade nominations of a number of leading retail houses such as H&M and C&A to produce for them fashionable casual shirts & blouses.

The 14,200 square meter twin unit factory is set in Newage Industrial Prak Ashulia, 35Km outside Dhaka. Employing nearly 3,300 workers and staff in a safe and friendly work environment, With 1200,000 pieces per month production capacity, our factory has received certification of compliance from a number of our buyers. Our modern facilities house cutting edge technology that serves to meet the ever changing fashions.

### **Quality Assurance:**

We inspect up to 10% of all inbound fabric consignments at our premises using 4 points system. If incidence of defects rises above normal range in this initial random check, the full quantity is inspected to assure acceptability of consignment.

Consistency of quality of production at each machine is controlled through traffic light system marshalled by a team of quality inspectors reporting directly to Managing Director. At end of the production all shirts are checked on leaving floor and again before packing.

We use AQL level 2.5 for in house inspections, though other inspection standards are also followed for third party inspections as prescribed in the buyers' specifications.

### **Major Buyers:**

- H&M
- C&A
- Target
- VF Asia
- Alpha Border
- Takko
- New Frontier

### **Factory Address:**

**NEWAGE GARMENTS LIMITED**  
Nischintapur, purvo narasinghapur  
Ziravo, savar, dhak

## CHAPTER 04 BOARD OF DIRECTOR



A.S.M. Quasem  
Chairman, Newage Group.



Rokiya Quasem  
Vice Chairman - Newage Garments Ltd.



Arif Ibrahim  
Managing Director - Newage Grou

## **CHAPTER 05 MANAGEMENT**

### **1. Bikash Chandra Paul**

Executive Director      bikash@newage-group.com

Ph. : +8801713015922

### **2. Brig. Gen. (Rtd) Mahmud Hossain**

Executive Director      mahmud@newage-group.com

Ph. : +8801713438993

### **3. Ruhul Karim Reza**

GM, Production (Woven)      ruhulkarim@newage-group.com

Ph. : +8801730793355

### **4. Mozaharul Islam Prince**

DGM, Admin & MIS      prince@newage-group.com

Ph. : +8801713438929

### **5. Jewel Ahmad**

AGM, HR & Sustainability      jewel@newage-group.com

Ph. : +8801714168909

### **6. Oli Ullah Khan Shapon**

AGM, Merchandising (Knit)      shapon@newage-group.com

Ph. : +8801713438903

### **7. Md. Jafor Ahmed Bhuiyan**

AGM, Merchandising (Woven)      jafor@newage-group.com

Ph. : +8801711688094

### **8. Mamun Moansur Ali**

AGM, Production (Knit)      mamun.monsur@newage-group.com

Ph. : +8801713438996

### **9. Engr. Mahfizul Hassan**

AGM, Engineering & Projects      engr.hassan@newage-group.com

Ph. : +8801714015573

### **10. Sk. Masudul Haque**

AGM, Commercial      masudul.haque@newage-group.com

Ph. : +8801713438915

### **11. Md. Ataur Rahman**

Factory Manager (Newage Garments Ltd, F-2)      ataur@newage-group.com

Ph. : +8801730793367

## **CHAPTER 06**

### **VISION**

To help ensure economic development of the country and improve standard of living of the people through sustainable and environment-friendly investments.

### **MISSION**

To catalyze and optimize private sector participation in promotion, development, and financing of infrastructure as well as renewable energy, and energy efficient projects in a sustainable manner through public-private-partnership initiatives.

## CHAPTER 07

### **Historical background of the Garment Industry in Bangladesh:**

Once the cloth of Bangladesh achieved worldwide fame specially muslim and jamdani cloth or our country was used as the luxurious garments of the royal figures in Europe and other countries. The British rulers in India didn't develop our cloth industries at all. Rather they destroyed them and imported cloths from England. Garment Industry Large-scale production of readymade garments (RMG) in organized factories is a relatively new phenomenon in Bangladesh. Until early sixties, individual tailors made garments as per specifications provided by individual customers who supplied the fabrics. The domestic market for readymade garment, excepting children wears and men's knit underwear (genji) was virtually non-existent in Bangladesh until the sixties.

Since the late 1970s, the RMG industry started developing in Bangladesh primarily as an export-oriented industry although; the domestic market for RMG has been increasing fast due to increase in personal disposable income and change in life style. The sector rapidly attained high importance in terms of employment, foreign exchange earnings and its contribution to GDP.

Most importantly, the growth of RMG sector produced a group of entrepreneurs who have created a strong private sector. Of these entrepreneurs, a sizeable number is female. A woman entrepreneur established one of the oldest export-oriented garment factories, the Baishakhi Garment in 1977. Many women hold top executive positions in RMG industry. The hundred percent export-oriented RMG industry experienced phenomenal growth during the last 15 or so years. In 1978, there were only 9 export-oriented garment manufacturing units, which generated export earnings of hardly one million dollar. Some of these units were very small and produced garments for both domestic and export markets. Four such small and old units were Reaz Garments, Paris Garments, Jewel Garments and Baishakhi Garments.

Reaz Garments, the pioneer, was established in 1960 as a small tailoring outfit, named Reaz Store in DHAKA. It served only domestic markets for about 15 years. In 1973 it changed its name to M/s Reaz Garments Ltd. and expanded its operations into export market by selling 10,000 pieces of men's shirts worth French Franc 13 million to a Paris-based firm in 1978. It was the first direct exporter of garments from Bangladesh. Desh Garments Ltd, the first non-equity joint-venture in the garment industry was established in 1979. Desh had technical and marketing collaboration with Daewoo Corporation of South Korea. It was also the first hundred percent export-oriented company. It had about 120 operators including 3 women trained in South Korea, and with these trained workers it started its production in early 1980. Another South Korean Firm, Youngones Corporation formed the first equity joint-venture garment factory with a Bangladeshi firm, Trexim Ltd. in 1980. Bangladeshi partners contributed 51% of the equity of the new firm, named Youngones Bangladesh. It exported its first consignment of padded and non-padded jackets to Sweden in December 1980.

Till the end of 1982, there were only 47 garment manufacturing units. The breakthrough occurred in 1984-85, when the number of garment factories increased to 587. The number of RMG factories shot up to around 2,900 in 1999. Bangladesh is now one of the 12 largest apparel exporters of the



world, the sixth largest supplier in the US market and the fifth largest supplier of T-shirts in the EU market. The industry has grown during the 1990s roughly at the rate of 22%.

## **Present Situation of RMG Sector in Bangladesh:**

The quota system was a great blessing for establishing our garments industry. We were strongly benefited from using that. As a result, we can see a matured garments industry today. But while the quota system was approaching an end in 2004, there are so many who got upset about the RMG sector of Bangladesh. Though in the latter it can't be affected here as the experts seemed. We conquered the post-quota challenges and made that a successful story.

In the RMG sector of Bangladesh, there are more than 5000 garment factories (private statistics) at the current time, employing more than 12 lack laborers, where 85% of the labor force is women. But, according to BGMEA the number of garment factories in Bangladesh around 4000. Now, the RMG industry is the countries largest export earner with a value of over \$24.49bn of exports in the last financial year. It's great news for us that Bangladesh is clearly ahead of other South Asian suppliers in terms of the capacity of the ready-made garments industry.

Though, there are various types of garments are manufactured in Bangladesh, but all the ready-made garments are classified into two broad categories, where one is woven products and another one is knitted products. Woven products include Shirts, Pants, and Trousers. On the other hand, the knitted product includes T-Shirts, Polo Shirts, Undergarments, Socks, Stockings, and Sweaters. Woven garments still dominate the export earnings of the country. From the BGMEA website, it's seen that Day by day knitted items production is increasing at a considerable rate and now about 40% export earnings have been achieved from knitted products.

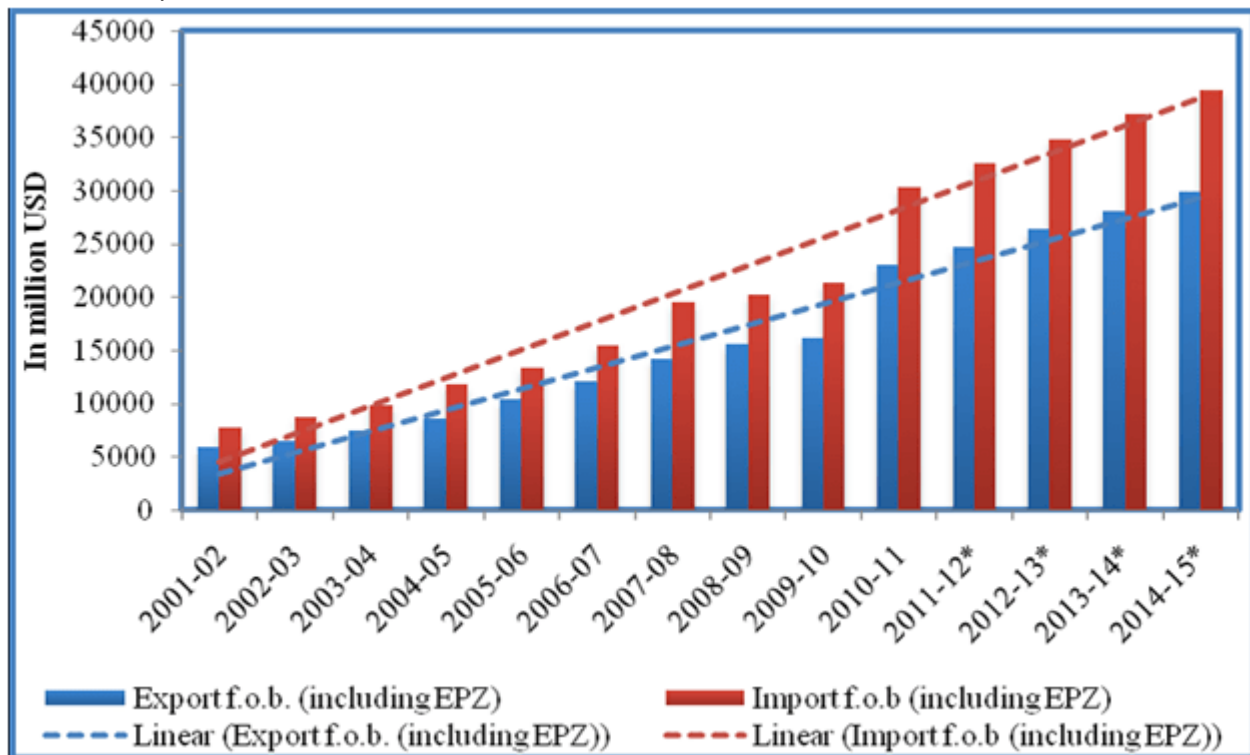
## **Contribution of RMG Sector to the National Economy:**

The role RMG sector in Bangladesh's economy is remarkable. It's seen that, from the last decade, the RMG sector contributes to the national economy at a considerable rate. About 76% of the total export earnings come from the RMG sector. From statistics, it's known that in FY 2003-04 RMG sector of Bangladesh earned US\$ 5,686.06 million, in FY 2004-05 the value was US\$ 6,417.67.67 million, in FY 2005-06 the value was US\$ 7900.80 million, in FY 2006-07 the value was US\$ 9,211.23 million, in FY 2007-08 the value was US\$ 10,699.80 million, in FY 2008-09 the value was US\$ 12.35 billion and finally in FY 2013-14 the value

## **The opportunity of RMG Sector in Bangladesh:**

RMG sector of Bangladesh has some key factors which inspired the steady growth of this sector. Though it's a matter of great surprise for so many that how the RMG sector of Bangladesh continues to show its robust performance in the world.

stands at \$24.49billion.



*The main key factors which have a great influence on the RMG sector of Bangladesh are the following:*

1. Vast labor force,
2. Skilled human resources,
3. Technological upgrades,
4. Government supports for textile and clothing,
5. Special economic/export processing zones,
6. Creation of textile and clothing villages,
7. The incentive for use of local inputs,
8. Duty reduction for the import of inputs/machines,
9. Income tax reduction,
10. And international supports like GSP, GSP+, duty-free access, etc.

By using the above key points we can easily take place the world's readymade garments market very strongly. But there's some another key factor. If we apply those key factors in our readymade garments sector, then we will achieve the priority to the world's famous buyers' notebook.

*Those key factors are-*

- a. Cost-Effective Strategy,
- b. New Product Development strategy,
- c. Product Diversification Strategy and
- d. Market Diversification Strategy.

## **Cost-Effective Strategy:**

Cost-Effective Strategy includes the following two key points:

1. Cost Reduction Strategy and
2. Labour Productivity Improvement.

### ***Those key points are discussed below:***

**1. Cost Reduction Strategy:**  
Cost reduction strategy should begin with assigning the highest priority for establishing backward linkages. The establishment of backward linkages will reduce our dependence on foreign sources which will reduce the total and average production cost of garments. This Strategy will make our products more competitive in the world's ready-made garments market.

**2. Labour Productivity Improvement:**  
Bangladeshi workers are not as efficient as Hong Kong, South Korea, and Sri Lankan workers. Wages are low in Bangladesh, but it does not necessarily mean that relatively low wages workers automatically lead to higher productivity. So, to keep the place in the world's largest competitive market, labor productivity must be improved.

## **New Product Development strategy:**

It's a matter of great sorrow for us that, we are regularly produced the same products. Our product categories are very less in quantities. Our product items that are exported into the foreign market are Shirts-60%, Jackets-11%, Knit items-10%, Trousers-7%, and Others-11.50%. To survive in the world's most competitive RMG market, we have to develop new product items with a lot of variations.

## **Product Diversification Strategy:**

Product Diversification Strategy is an important factor to keep the place in the world's ready made garments market. Different types of products should be produced by applying fashion. Thailand, China, India, Pakistan, Hong Kong, Singapore, Malaysia, Indonesia, and others are the main competitors of Bangladesh. They are already ahead of Bangladesh in product diversification strategy areas.

## **Market Diversification Strategy:**

Bangladesh has exported its products to the world's limited market. Most are in the USA, Canada, and Europe. About 46% of its total garment exports go to the USA, 14% to Canada, and the rest of those into the European market. The competitors of Bangladesh have regularly expanded their markets and keep changing their products by using fashion.

### ***The following key factors must be undertaken during a market diversification strategy:***

1. Market research on product design
2. Market research on product development,
3. Market promotion through trade fairs, exhibitions, etc.
4. Human resources development by providing training.

## CHAPTER 08

# Challenges for RMG Sector of Bangladesh

Though the RMG sector of Bangladesh has achieved the second spot for the highest number of garments exporter, it has a lot of problems. The major problems faced by the RMG sector currently is the lack of safety in working place and working conditions for the millions of garment workers. It's become a great challenge for the upcoming fiscal year of Bangladesh. Another important one is political stability.

Two major incidents in the RMG sector of Bangladesh are the Tazreen fire and the Rana Plaza collapse, which have brought the issue of workplace safety to the fore and led all stakeholders to act accordingly. But it's good news for the RMG sector that, following the unfortunate incidents, various platforms such as the Bangladesh Accord on Fire and Building Safety, the Alliance for Bangladesh Worker Safety, and the National Plan of Action have been formed to improve building and fire safety of Bangladesh's garment industry. Also, BGMEA and BKMEA are working together here to solve such kinds of problems. They have also taken necessary actions and invested a huge amount of money.

It's a huge responsibility for the government of Bangladesh to ensure working place safety in all the garments manufacturing factories. If we can't do it, foreign buyers will refuse to place orders here, which will be a massive blow for the RMG sector of Bangladesh. We hope, the government of Bangladesh, BGMEA, and BKMEA, with the support of global brands and international development partners, will be able to ensure the safety of the RMG industry and maintain the momentum of socio-economic development in the country.

Political stability creates a negative impact on the RMG sector of Bangladesh. If it continues, it will be a massive blow to destroy our most valuable sector. So, political leaders should come out immediately to solve such kinds of problems.

### **Hoping for RMG Sector of Bangladesh:**

According to the McKinsey survey, it's seen that 86 percent of the chief purchasing officers in leading apparel companies in Europe and the United States planned to decrease levels of sourcing in China over the next five years because of declining profit margins and capacity constraints.

Also, they said in that survey, "Western buyers are evaluating a considerable number of sourcing options in the Far East and Southeast Asia, many chief purchasing officers said in the survey that they view Bangladesh as the next hot spot". Many chief purchasing officers mentioned Bangladesh as the hot spot in the readymade garments market.

## CHAPTER 09

# ABOUT GARMENTS

### **Definition of garment:**

What is garment? It is a mutual enquiry for many people. Actually a garment is a slice of article of apparel which is manufactured past times stuff or textile materials for protecting human trunk in addition to decorated purpose. These materials tin terminate live natural, cellulose in addition to synthetic fibers. There are many types of garments similar woven or knitted alongside dissimilar names in addition to uses. Garments tin terminate both metaphorically in addition to literally comport the imprint of its wearers equally objects that accept been worn, carried or used to adorn, their persons.

### **Classification of Garments:**

**Garments** could live classified based on several aspects equally at that topographic point is no measure classification arrangement available. However, the garments could live classified based on the sex equally virile somebody or female, or historic menstruum equally children's garments. Generally, based on use, manner in addition to material, dissimilar varieties of garments exhibit dissimilar styles.

*Presently, the garments are classified based on the next aspects:*

#### **1. Type of fabric:**

- Knit (T-shirt, sweater)
- Woven (shirt, suitings in addition to denim)
- Nonwoven (diaper, socks)

#### **2. Season:**

- Winter (jacket)
- Summer (tank top)
- Spring (singlet)
- Autumn (shirt)
- Late Autumn (shirt (design))

### **What are the Difference between Apparel, Garment and Cloths?**

#### **Difference between Apparel and Clothing:**

Apparel can include the things you wear like jewelry, shoes and other stuff. Clothing refers the stuff which is only made from cloth. It is traditionally made.

Apparel is somewhat formal. Apparel can categorize like wedding apparel. Apparel also comes with the meaning that what you wearing. A wearing is a total look of your body. What you wear with your clothes.

Apparel is something that is sold but it is not a ready-made material whereas the clothing or cloths are ready-made.

### **Difference between Garment and Clothing:**

**Garment and clothing** are a little bit different from each other. The garment includes uniforms and a particular dress code for school, college, office and some other place where a particular uniform takes place.

We can include garment into cloths but we can never include cloths into garments. The reason behind this is clothes are ready-made whether it is uniform or not.

So this kind of meaning takes place when we talk about these three terms. People find it the same thing but they are a little bit different in their own way.

## CHAPTER 10

# APPAREL MERCHANDISING

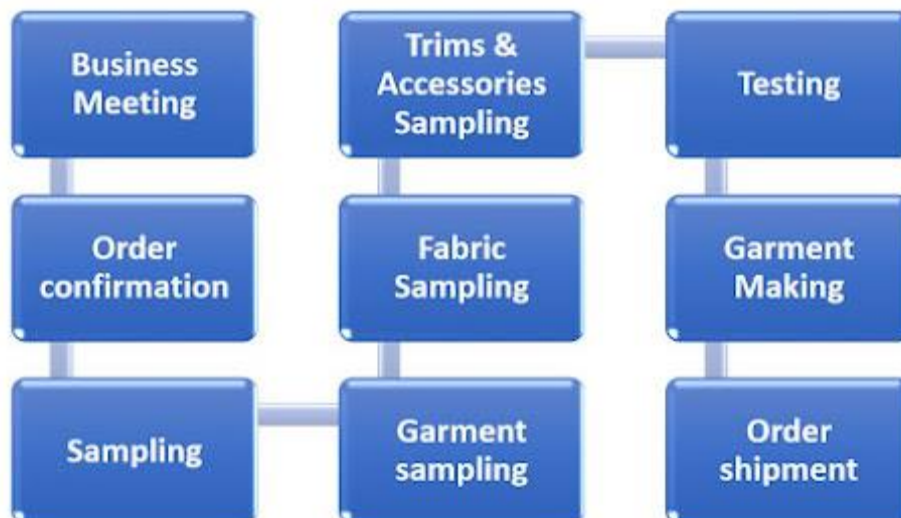
### Apparel Merchandising:

The process of executing an apparel order from receiving to shipment through proper following-up all the in-between processes. Merchandisers should take care of every single stage mentioned below to meet the customers' requirements. S/he has to deal with quality, quantity, and most importantly time. Merchandisers must have sharp eyes on each and every supply chain involved. Identifying and understanding what potential customers want and providing their desired Textile items to them at a certain price and lead-time by making a communication bridge between the customer and the manufacturing company can also be termed as the Apparel Merchandising process. So merchandising process involves at least three parties as-

- **Company/Supplier/Vendor:** Who are making the products for buyers,
- **Customer/Buyer:** Who place the order to the vendors or who are targeted by the company with the help of merchandiser and
- **Merchandiser:** Who places his position between the above two parties.

### Apparel Merchandising Process:

Textile & Clothing business is a multi-chain business starting from the customer's technical meeting with the potential vendors. In that meeting, both customers and vendors appear with all their possible credentials. Customers indubitably have crystal clear data on the up-to-date market trend and product price issues. Vendors offer what they can produce and what is their product portfolio. At the very beginning, customers or buyers discuss their product demand what they are going to the business. They choose the items by conducting a survey on consumer behavior and fashion trends in their target market. They get early forecasting about the product or item to be ordered to the vendors.



After a successful technical meeting with the vendor, they both agree on product style, amount, quality parameters, shipment mode, shipment port, and price details, etc. Customers issue a purchase order to the vendors and open a [Letter of credit](#) (master LC) against this order. Vendors can initiate their jobs after getting the technical package or tech pack or technical specification sheet from the customer along with the master LC. They then execute the order as per the PO and ship it to the customers' destination accordingly. All the chains from technical meeting to product shipment has been illustrated precisely as below-

### **Business Meeting:**

In this meeting, customers discuss what they want, e.g. [T-shirt](#), [Polo shirt](#), Tank-top, etc., and different styling parameters of what they want on the item. For example, for a t-shirt, whether any chest pocket or not, how about the necking- neck rib or plain fabric, what about the bottom hem, etc. though styling may be changed later on through the sampling stages. Contrariwise, vendors also place their capabilities and may discuss their own product portfolio to convince the customers as a reliable vendor.

### **Order Confirmation:**

If the item and detail styling is within the capabilities of the vendor and customers become happy with their product portfolio, then start pricing. Both customers and vendors offer their suitable prices for the desired item. Customers initiate the price negotiation with a base price which is usually a lower price than the exact or tentative prices. Vendors start with their target price which is, on the other hand, a bit higher price than the usual prices. They go through a logical negotiation stage and finally reach a win-win point and make an agreement to proceed with the order. Customers open a master LC against the order and generate the PO mentioning quite detailed information like size range, colors, quantity details, and shipment details, etc.

### **Sampling:**

After getting the tech pack and master LC, vendors calculate the necessary consumption of the required fabrics, [trims & accessories](#) and place booking to the sub-units like sewing thread supplier, zipper supplier, button supplier, spinning unit, fabric unit, dyeing unit, garment unit, etc. These individual chains then open a back-to-back LC against the master LC and proceed from sample developments. Obviously, they have to take the approval of their developed items from the respective department like the customers' quality control (QC) unit.

### **Garment Sampling:**

[Sampling](#) is done to ensure the styling, fittings, color quality, and embellishment quality (if any). Though garment sampling processes vary from customer to customer, development samples, proto samples, pre-production samples, production samples are required by all the customers. It is worth mentioning that the approved production sample is used in the inspection before shipment as this sample is prepared using all actual materials as per PO.



## **Fabric Sampling:**

Fabric sampling starts with color approval as per color standards provided by the buyers. Color or shade approval can be either yarn dip or lab dip and simultaneously grey fabric quality has to be approved. Then starts fabric dyeing as per the approved shade for solid color order or yarn dyeing for stripe order. Before dyeing the full lot, the first bulk dyeing shade has to be approved to proceed on. If the order contains any printing (placement print or all-over print), print strike-off must be approved as per the design story before going for bulk.

## **Trims & Accessories Sampling:**

All the necessary trims & accessories required for the order have to be developed and approved by the customer alongside the garment sampling and fabric sampling steps. Actually, all these 3 issues (garment sampling, fabric sampling, trims & accessories sampling) must run at a time to meet the order lead time.

## **Testing:**

Customers usually require some standard testing in every stage of order execution like yarn stage, fabric stage, garment stage, etc. from a well-recognized [testing lab](#). Merchandisers must submit the passed test certificates to the customers along with the samples.

## **Garment Making:**

When everything like fabrics, trims & accessories are ready and in-housed then starts the bulk garment production steps including fabric spreading, cutting, sewing, and finishing. But before starting the sewing of a new style, there is a technical meeting consisting of the merchandisers, planning manager, production manager, inventory manager, and quality manager to set the sewing line layout. Then a trial of short quantity is run for line balancing which is called pilot run. Garment sewing and then finishing has been accomplished through a series of in-line quality checks.

## **Order Shipment:**

Customers' nominated QC team or often the 3rd party inspection team like Bureau Veritas, SGS, Intertek, TUVSUD, etc. inspects the produced garments whether it conforms to the PO or not. They use the production sample approved by customers as the reference or standard to cross-match the bulk lot. After getting passed certificates from them, these bulk lots are shipped along with necessary export and logistic documentations.

## **PO Sheet of Garments Industry:**

A garments PO sheet gives us a general idea about a purchase order. This is an authorized document for garments suppliers handling a lot. Generally, the merchandiser provides a PO sheet to all departments, from warehouse to QC inspection room; some customers have online software that anybody can download PO sheet using user ID and password.

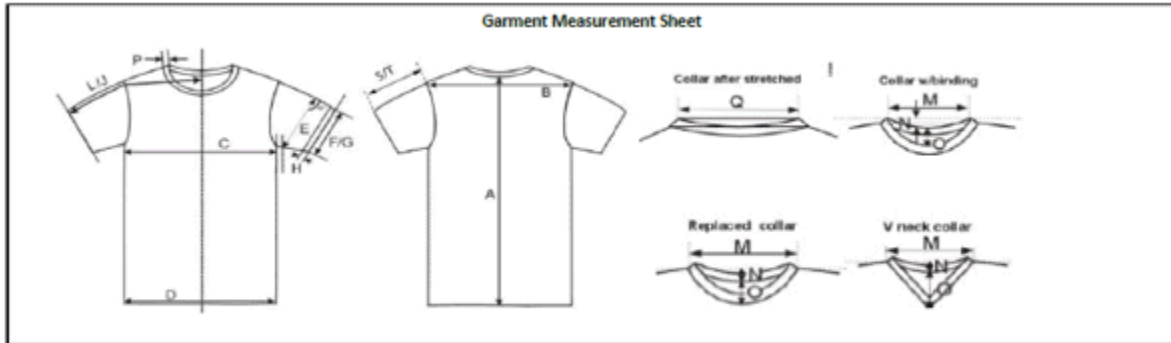
## **List of information we get from a PO Sheet:**

PO sheet varies from buyer to buyer, here I am giving all information here that all may not available in all buyer PO sheets.

1. Purchase order number/ PO Number- The PO number is fixed by customers themselves.
2. Size breakdown with order quantity
3. Lot wise Order Quantity
4. Shipment Date of Exporter port/ ETD (Estimated date of departure)
5. ETA- Estimated date of arrival, the date customer may receive goods in their port.
6. Penalty if a supplier fails to give on-time shipment
7. Product Unit Cost- FOB
8. Total Cost of that PO
9. Factory Name
10. Vendor/Supplier Name
11. Shipping Address
12. Overseas Port Reach Date
13. Sourcing Agent
14. Shipment Terms
15. PO Issue Date- The date buyer generated PO.
16. LC Number
17. Fabric Supplier Name and Code
18. Fabric Content- Percentage of cotton, lycra. Fabrics GSM.
19. Exit country port
20. Quantity per case
21. Trims and Accessories cost- All **BOM** cost has in some buyers' PO sheets.
22. Product Category
23. Season- There is a 3/4 season of a year.
24. Description- Buyer sets product description from a commercial point of view, as its marketing policy.
25. Goods Description
26. Size-wise Order Quantity
27. Packing Type: Solid or Assort

28.

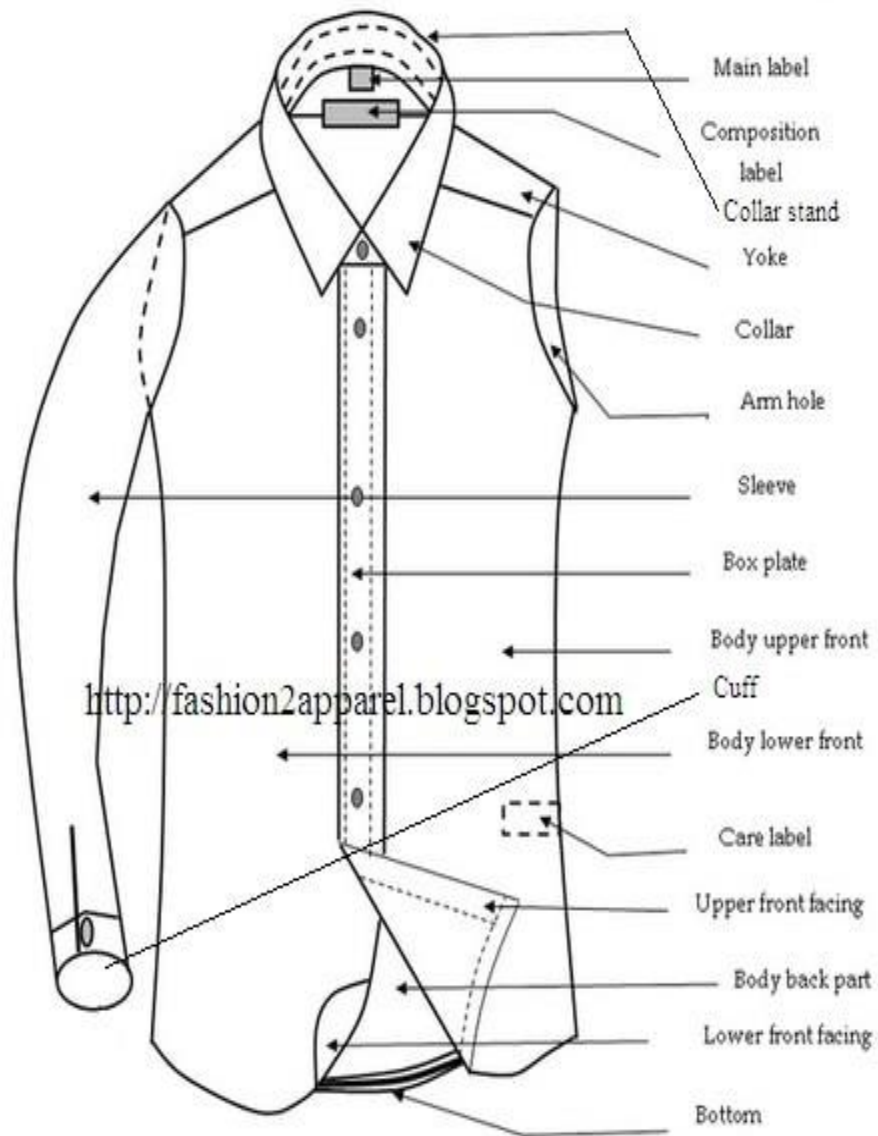
## GARMENTS MESSERMENT SHEET:



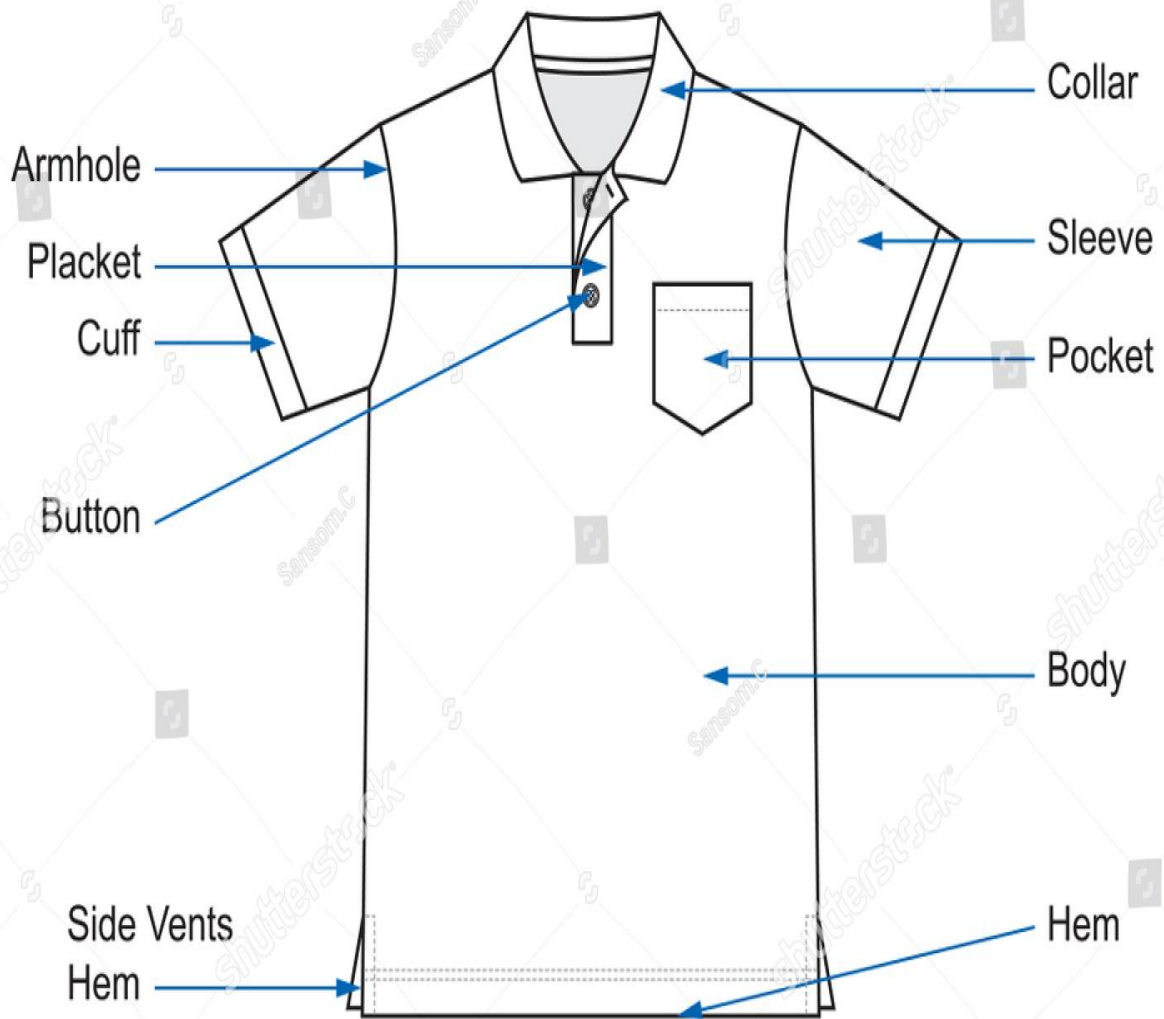
Code	NAME	XXS	XS	S	M	L	XL	Allowance (+/-)
A	LENGTH OF BACK ON CENTER	48.00	51.00	54.00	58.00	62.00	66.00	
B	LENGTH OF SHOULDERS ON BACK	31.00	32.50	34.00	36.00	38.00	40.00	
C	1/2 WIDTH OF CHEST	37.00	39.00	41.00	44.00	47.00	50.00	
D	1/2 WIDTH OF BOTTOM	37.00	39.00	41.00	44.00	47.00	50.00	
E	1/2 WIDTH OF SLEEVE 2 CM UNDER ARM HOLE	13.50	14.50	15.50	17.00	18.50	20.00	
F	1/2 WIDTH OF BOTTOM SLEEVE	12.50	13.00	13.50	14.20	14.90	15.60	
J	LENGTH OF SLEEVE FROM 1/2 NECK HOLE	28.00	30.00	32.00	34.00	36.00	38.00	
M	WIDTH OF NECK HOLE	15.90	16.20	16.50	17.00	17.50	18.00	
N	DEPTH OF BACK NECK HOLE	2.50	2.50	2.50	2.50	2.50	2.50	
O	DEPTH OF FRONT NECK HOLE	6.10	6.30	6.50	6.80	7.10	7.40	
P	HEIGHT OF COLLAR / RIB WIDTH	2.00	2.00	2.00	2.00	2.00	2.00	
Q	1/2 MINIMUM NECK HOLE WIDTH, AFTER STRETCHED	26.50	27.00	27.50	28.20	28.90	29.60	
S	LENGTH OF SLEEVE FROM SHOULDERS	12.50	13.75	15.00	16.00	17.00	18.00	

CHAPTER 11  
PARTS OF GARMENTS

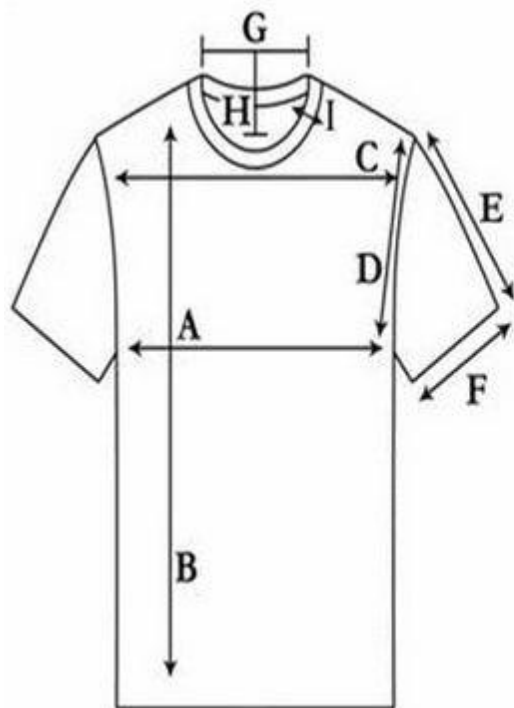
DIFFERENT PARTS OF SHIRT



## DIFFERENT PARTS OF POLO SHIRT



## DIFFERENT PARTS OF T-SHIRT



- A. CHEST
- B. LENGTH - HSP
- C. FULL SHOULDER
- D. ARM HOLE
- E. SLEEVE LENGTH
- F. SLEEVE OPEN
- G. NECK OPEN SEEM TO SEEM
- H. FRONT NECK DROP
- I. RIB

### CHAPTER 12

#### Standard Garment Size Charts:

Below are standard size charts for most of the garments we sell. There may be slight variations among different manufacturers. Please consult with the individual product description, or contact a customer service representative for the particular garments you are interested in. Not all sizes are available for all garments.

<b>ADULT</b>									
SIZE	XS	S	M	L	XL	2XL	3XL	4XL	5XL
<b>CHEST (Inches)</b>	30-32	34-36	38-40	42-44	46-48	50-52	54-56	58-60	62-64
<b>WAIST (Inches)</b>	24-26	28-30	32-34	36-38	40-42	44-46	48-50	52-54	56-58
<b>HIP (Inches)</b>	29-31	33-35	37-39	41-43	45-47	49-51	53-55	57-59	61-63

## ADULT

SIZE	XS	S	M	L	XL	2XL	3XL	4XL	5XL
<b>CHEST (Centimeters)</b>	76-81	86-91	97-102	107-112	117-122	127-132	137-142	147-152	158-163
<b>WAIST (Centimeters)</b>	61-66	71-76	81-86	91-97	102-107	112-117	122-127	132-137	142-147
<b>HIP (Centimeters)</b>	74-79	84-89	94-99	104-109	114-119	124-130	135-140	145-150	155-160

## LADIES

SIZE	XS	S	M	L	XL	2XL	3XL
	0-2	4-6	8-10	12-14	16-18	20-22	24-26
<b>CHEST (Inches)</b>	32-33	34-35	36-38	39-41	42-44	45-47	48-50
<b>WAIST (Inches)</b>	24 1/2 - 25 1/2	26 1/2 - 27 1/2	28 1/2 - 29 1/2	30 1/2 - 32	33-35	36-38	39-42
<b>HIP (Inches)</b>	34-36	37-38	38-40	42-44	45-47	48-50	50-52
<b>CHEST (Centimeters)</b>	81-84	86-89	91-97	99-104	107-112	114-119	122-127
<b>WAIST (Centimeters)</b>	62-65	67-70	72-75	77-81	84-89	91-97	99-107
<b>HIP (Centimeters)</b>	86-91	94-97	97-102	107-112	114-119	122-127	127-132

## YOUTH

SIZE	YXXS	YXS	YS	YM	YL	YXL
	3T-4T	4-5	6-8	10-12	14-16	18-20
<b>CHEST (Inches)</b>	21-22	22-23	24-26	28-30	32-34	36-38
<b>WAIST (Inches)</b>	19-20	20-22	22-24	24-26	26-28	28-30
<b>HIP (Inches)</b>	22-23	23-24	25-27	28-30	31-33	34-36
<b>Chest (Centimeters)</b>	53-56	56-58	61-66	71-76	81-86	91-97
<b>WAIST (Centimeters)</b>	48-51	51-56	56-61	61-66	66-71	71-76
<b>HIP (Centimeters)</b>	56-58	58-61	64-69	71-76	79-84	86-91

# GIRLS

SIZE	GXS	GS	GM	GL
		4-5	6-8	10-12
<b>CHEST (Inches)</b>	22-24	25-27	28-30	31-33
<b>WAIST (Inches)</b>	22-24	24-25	25-27	28-30
<b>HIP (Inches)</b>	23-24	25 - 28 1/2	30-32	34-35
<b>CHEST (Centimeters)</b>	56-61	64-69	71-76	79-84
<b>WAIST (Centimeters)</b>	56-61	61-64	64-69	71-76
<b>HIP (Centimeters)</b>	58-61	64-72	76-81	86-89



## CHAPTER 13

# GARMENTS ACCESSORIES STORE

### **Garment Accessories:**

A garment is made not only from the apparel fabric, but also various accessory items. Fabric is the basic material in garment manufacturing. Except fabric of the garment, the other materials are known as garment accessories. These have to be chosen in such a way that they complement the outer fabric both aesthetically, in terms of decoration, and practically, in terms of ensuring that the garment performs as expected in its intended end use. Various kinds of accessories are used on garments, some are part of the garment such as buttons, zippers, interlining etc. while others are used for decorating and enhancing the product appearance such as sequins, embroidery etc.

### **Types of Garment Accessories:**

Various kinds of accessories are used on garments, some are part of the garment such as buttons, zippers, interlining etc. while others are used for decorating and enhancing the product appearance such as sequins, embroidery etc.

### **Normally garment accessories can be classified in three ways:**

1. Garment accessories/Basic accessories
2. Decorative accessories
3. Finishing Accessories

### **Garment accessories/Basic accessories:**

Some basic accessories:

Thread, Zipper, Interlining, Button, for example: Snap button, Plastic button, Metal button, Label: Main label, Size Label, Wash care label, Motif: Leather, Plastic, batch Metal, Pocketing fabric, Lining, Velcro, Elastic, Cord, Ribbon, Toggles, Rivet, Collar bone etc.

### **Decorative Accessories:**

Some decorative accessories:

Elastic tape, Buttonhole tape, Piping, Moiré ribbon, Seaming tape, Welted tape, Ribbed tape, Velvet ribbon, Bias binding, Stamped tape, Taffeta ribbon, Galloon, Fringes, Cords, Tassels, Rosettes, Soutache, Pompons etc.

## Finishing Accessories:

Some finishing accessories:

Hang tag, Price tag, Plastic/ poly bag, Tissue paper, Carton, Scotch tape, PP belt, Tag pin, Plastic clip, Sticker, Butterfly, Collar insert, Back board, Necks insert etc.

## What is Trimming :

**Trims:**

The raw materials used in sewing room other than fabric are called Trims .On the other hand, materials are directly attached to the fabric to make a garment are called trims. Like: Threads, buttons, lining, Interlining, zippers, labels, care labels, etc.

## What is Accessories :

The materials, which are used to make a garment attractive for sale and packing, other than fabrics and trims, are called Accessories. Polybag,Elastic bag,Mini Polybag,Master Carton,Inner Carton,Size Clip,P.P.Band,Tag Pin,Collar Stand,Safety Pin,Gum Tape,Arrow Sticker,Scotch Tape,Barcode etc.

## Different between trims and Accessories :

The main key differences are mentioned below in part by part:

Sl No.	Subject	Trimmings	Accessories
01	Technical Definition	The materials which are attached to the body of garments by sewing are termed trimmings.	The materials which are not attached to the body of garments by sewing, only used for garments finishing and packing are termed as accessories
02	Non-Technical Definition	Trimmings are the ultimate materials that are attached to the garments while using by the end-users.	Accessories are the ultimate materials that are not attached to the clothing while using by the end-users.
03	Key Point	Trimmings are used for functional purposes.	Accessories are used for decorative purposes.
04	Example	Sewing Thread, Button, Interlining, etc.	Carton, Gum Tape, Polybag etc.

## **Button:**

Buttons are an essential accessory which is normally used in all types of garments. Therefore button can be said to be the main accessories of garments. In garments the main purpose of the buttons is mainly functional and decorative. Functional purpose refers to open and close garments with security and others purpose used for garment decoration. Now I would like to discuss garment buttons and their types also.

Types of Buttons Used in Garments:

In apparel industry buttons are normally classified according to the size, materials, and holes. By this ways, buttons are as follows-

- a. Number According to Material Used
- b. According to Ligne
- c. According to No. of Hole

### **According to Ligne Number:**

Ligne no. is the measuring unit of the button and indicates the diameter of the button.

We know that,

1Ligne = 0.025 inch or 0.635mm.

### **B. According to Material Used:**

- i) Plastic button: Made of polyester, polyamide, polyacrylonitrile etc, cheap, not glossy and widely used in shirts.
- ii) Metal button: Used in normally denim pants, trousers etc.
- iii) Wooden button: Used for decorative purposes.
- iv) Horn button: Made up of horns of animals. Used in shirts, pants.  
Artificial horns are also used which is made of nylon, plastic, and additives.
- v) Chalk button: Used to make plastic glossy. Used in shirts.
- vi) Printed button: Used in decorative purposes

### **C. According to No. of Holes:**

1. 2 hole button.
2. 4 hole button.
3. 3 hole button

4. 4 hole button

5. 2 hole button fish eye

6. 5 hole button

7. 6 hole button

**There also have a few special buttons. those**

- Toggle button
- Flat button
- Shank button
- Jean button
- Fabrics button
- Glass button
- Leather button
- Coconut button
- Horn button
- Metal button
- Wooden button
- Pearl\shell\MOP button

**Thread:**

**What is thread garment?**

Thread is a tightly twisted strand of two or more plies of yarn that are circular when cut in cross section. ... Sewing thread is distinguished from yarn by the fact that thread is used to sew together garments or other products, but yarn is the collection of fibers used to weave or knit into a textile fabric.

**Factors in thread Selection:**

1. Garment design, type, quality, end use, and life expectancy.
2. Desired strength and durability.
3. Fabric weight and type
4. Stitch and seam type, number of stitches/inch, machine speed, and needle size.
5. Cost

## **Types of Sewing Thread Used in Apparel Manufacturing:**

Various types of sewing thread that are vastly used in garment manufacturing has mentioned below:

- Linen thread,
- Silk thread,
- Soft cotton thread,
- Mercerized cotton thread,
- Glazed cotton thread,
- Viscose thread,
- Polyester thread,
- Nylon thread,
- Aramide thread

## **Label:**

label is a part of garments which indicates the various instructions about the garments. Without any label a garment cannot be sold especially in export oriented garments. The essential data like size of the garments, fiber type, care data, country of origin, company name, and trade mark etc.

### **Types of label: There are mainly two types of label as below:**

- a. Main label.
- b. Sub label.
  - Size label.
  - Care label.
  - Price label.
  - Composition label.
  - Main label: Main label contains brand name of buyer, country name. Like J.C. Penn, Levis etc.
  - Sub label: Sub label is of different types as below:

**a. Size label:** Size label indicates the size of the garments.

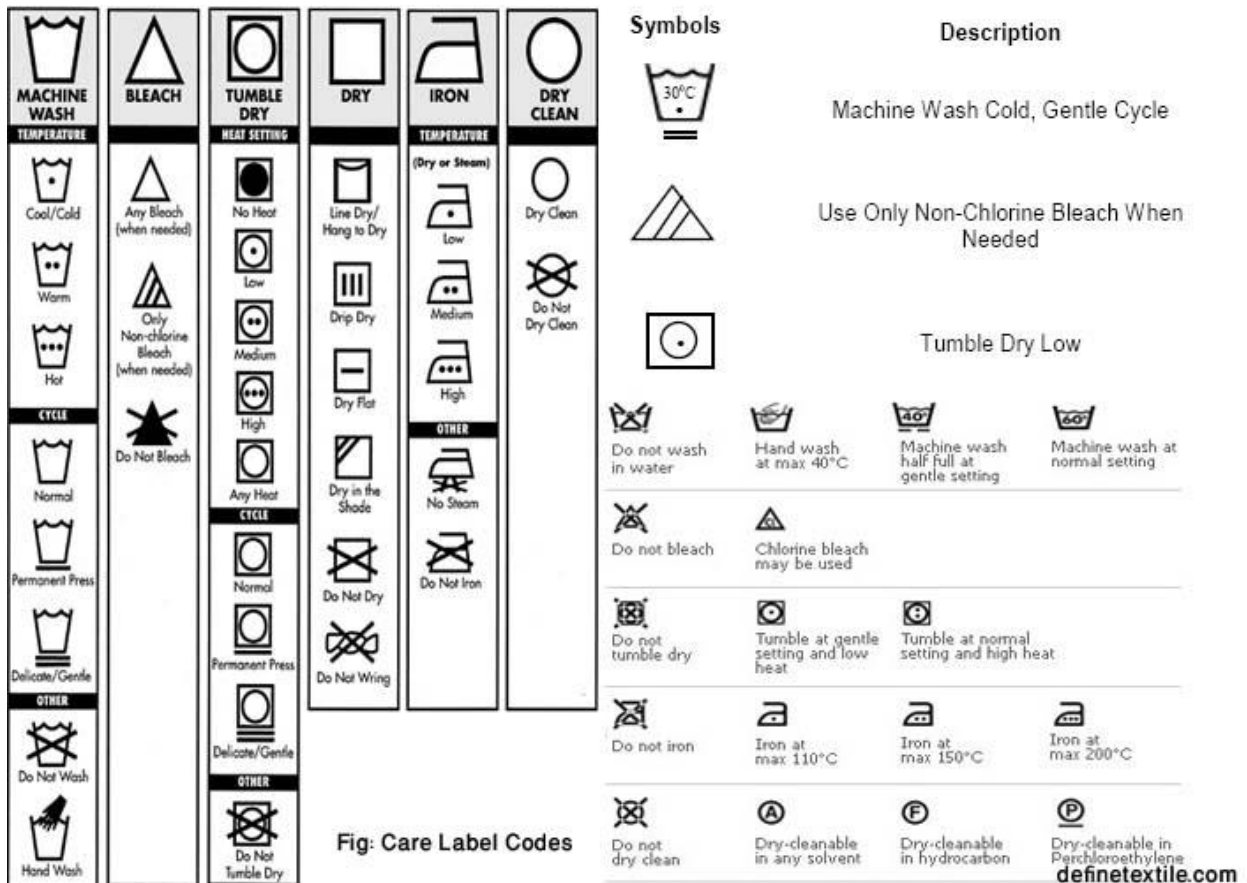
**b. Price label:** This label indicates the price of the garments.

**c. Composition label:** This label indicated the composition of the garments that means what type of fabric and what percentage is used to manufacture the garments. i.e.: 80% polyester, 20% cotton or 90% cotton, 10% spandex etc.

**d. Care label:** It is very important that the customers be given accurate information as to how to take care of their garments. SO that they can make informed purchase decision concerning the care characteristics of competing products and to enable consumers and cleaners to avoid product damage caused by the use of improper cleaning procedures.

Care label is a typical label that indicates the care instruction of the garments by internationally recognized signs. In this label instruction has been given that how to clean the garments. Especially washing, bleaching, drying, laundering, ironing etc is marked in the label.

**Care label code:** Internationally recognized symbols and instructions to perform care of garments that are given in care label is called care label code.



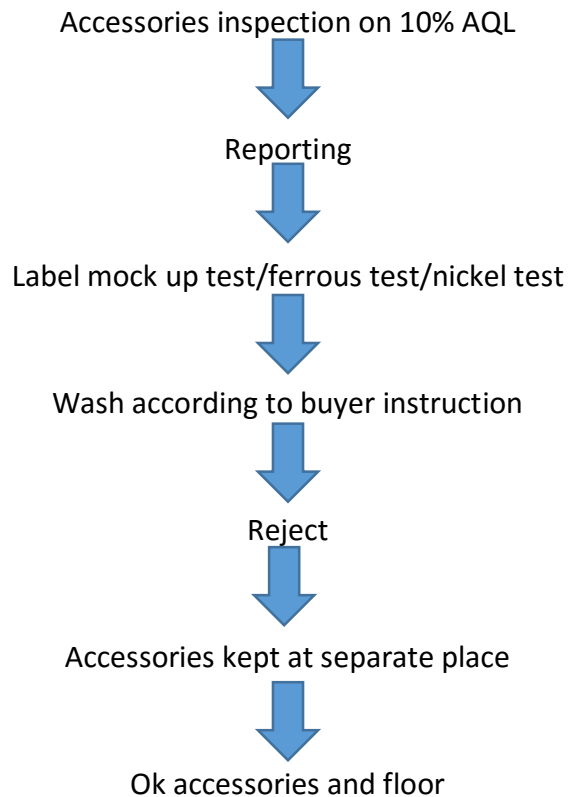
### Store accessories work procedure

Accessories received



Accessories inventory





## Material item check system:

Main Label and size label:

- Check with original approval trim card.
- Shade check in light box.
- Label check with artwork and order sheet.
- Label all written check.
- Un-readable label not acceptable.

Care label:

- Check with original approval trim card.
- Shade check in light box.
- Label check with artwork and order sheet.
- Label all written check as country, wash simple, RN number, buyer address, ON number, PN number, session.
- Un-readable label not acceptable

Thread:

- Check with original approval trim card.
- thread check in light box.
- Thread strength check.

- Thread count check.

Elastic:

- Check with original approval trim card.
- Elastic manufacturing and expair date.
- Wash check.

Button:

- Check with original approval trim card.
- 100% button N/D machine pass.
- Per pocket 10 pcs 10 button nickel test.
- Button liner check.
- Shade check in light box.

Zipper:

- Check with original approval trim card.
- 100% zipper N/D machine pass.
- Runner check.
- Grading check.

## **Trims card:**

To assure Fabric & Trims which are going to be used for production are approved by the Buyer / Merchandiser with details. Every Trim card has fabric and Trims which will be used for the order is approved by the buyer, clearly can refer to make sure each item is going to be used is correct. Everybody will be aware of each item in detail and standard. Trims card is also known as "QC File" in the garments Industry.



## Trim Card



### Trim Card Application Procedure in Garments Manufacturing:

1. Merchandiser should provide Fabric Swatch and Trim Card to stores consisting of each sample of items approved by the Buyer along with all Fabric and Trim booking sheets before receiving bulk at stores to identify items and quality supposed to be received.
2. After receiving bulk at stores, Store should prepare four sets of Fabric/Trim Cards including Fabric swatches and each trim received at stores.
3. Stores In-charge shall get these Fabric/Trim cards prepared in the stores and shall certify Fabrics/trims included in cards are correct after comparing with the original trim card received with Buyer's approval and report if there is an issue.
4. The merchandiser will check each item with Buyer's approval and one set shall be given for Buying Office reference, one set for production, one set to be kept in the master file, and one set for Store.
5. Each item attached to this trim card shall not be changed by anybody for any reason.

6. Merchandiser and Q.A. Manager shall sign and approve the trim card which shall be used in production.
7. Merchandiser and Q.A. Manager shall assure that each item approved by them remains unchanged in this card till the completion of the order.
8. Finally Merchandising manager Q.A. Manager shall sign and approve this trim card before issuing it to the factory.
9. After completion of the order, this trim card shall be kept in the factory safely for future reference.
10. The factory shall not start bulk production without approval from Buyer, Merchandiser, and Q.A. Manager for Fabric and trims.

## CHAPTER 14

# FABRICS STORE

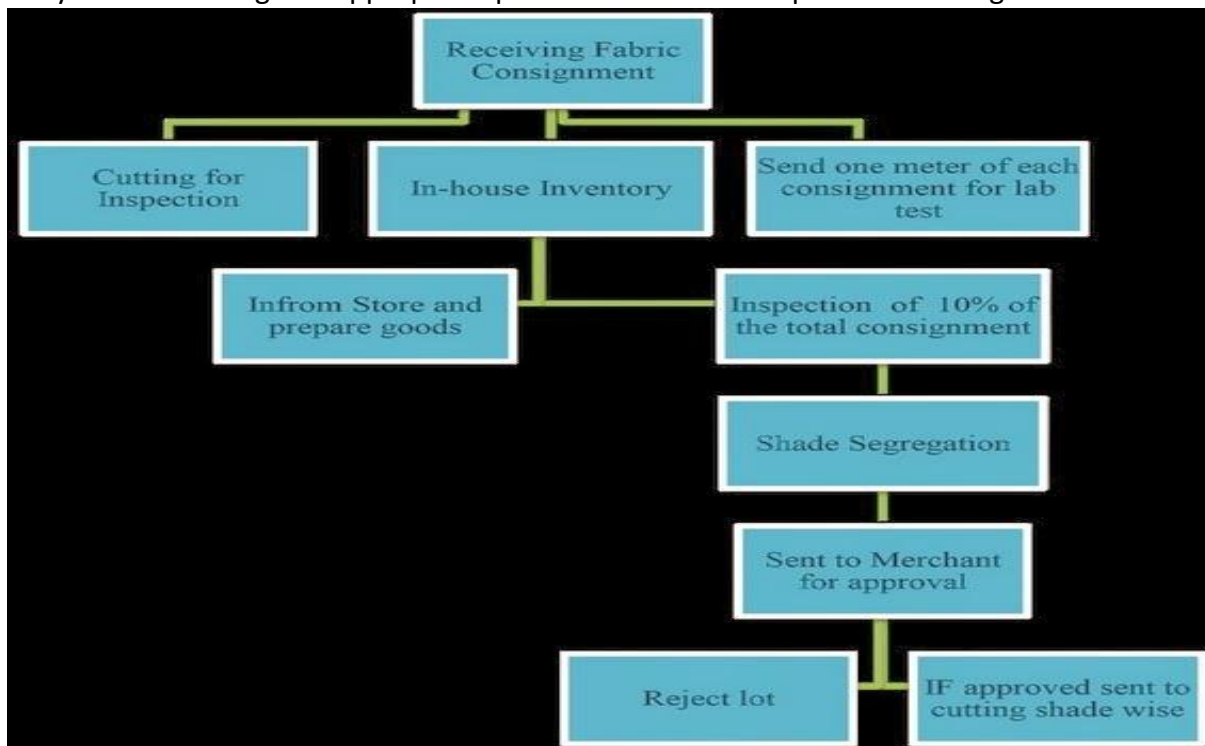
### Fabric Store Department:

For a bulk production industry it is essential to maintain a well-organized and well equipped inventory system. The main responsibility of fabric store department is to store all the raw materials specially fabric necessary to produce garments. This department is sub divided into three sections. inventory can be described as stock maintained between any two processes for uninterrupted operation. It can also be defined as assets that are intended for sale, or are in the process of being produced for sale, or are to be used in producing goods. Inventory is primarily maintained due to two reasons—to optimize the sourcing cost (where requirement can be predicted) and to minimize the risk of stock out (where requirement cannot be predicted).

The higher the inventory, the higher the capital blockage, and/or the higher the space requirement; on the other hand, lower inventory may lead to disruption in production or unsatisfied customers. Therefore, managing inventory is very important for a garment factory. The main goal of the garment production systems is to decrease the total production time which leads to reduction in inventory cost

### .Working Flow Chart of Fabric Store Department in Garment Industry:

They follow a strong and appropriate procedure. Their work process flow is given below:



## **Working Procedure of Fabric Store Department:**

### **A.Receiving Fabric roll**

2.Woven fabrics are supplied in roll package. Once these rolls of fabric are delivered the store in-charge receives the incoming consignment. This is the first phenomenon which is done in fabric store.

#### 2. In-house Inventory

Once these rolls are received, the store in-charge matches the packing list of the fabric consignment with the original quantity of the fabric rolls (i.e. fabric width, fabric length). He also keeps the all the record in a log book. This inventory maybe done alone by the store in-charge or with the presence of a representative of the fabric supplier.

#### 3. Cutting for inspection

At the time of inventory a piece of fabric is cut form every roll. The piece is of full width of the fabric and of a length depending on buyer (i.e. for H&M 22 inch of length, for others 12 inch of length). These cut piece is send for inspection tests like shrinkage, blanket making for shade segregation.

Fabric is the primary raw material for the manufacture of clothes, comprising 60-70 percent of the total cost of clothing.

To ensure that only quality fabric is used in garments, the factory takes precautionary measures and establishes a department for fabric inspection with qualified personnel.

According to quality standards, the factory prepares through three reports before cutting bulk production and receives approval from the authorized person.

- Fabric inspection report
- Fabric shrinkage report

Shade band report for 100 percent fabric rolls (applicable to dyed and printed fabrics).

The three reports above are sent within "48 hours" of in-house fabric for approval.



Initially, only 10 percent of the fabric rolls are inspected on a 4-Point System according to Standard Operating Procedures (SOP).

If there is any question about approval, 10 percent of the total rolls of fabric will be checked. Many factories tend to inspect 100% of the fabric to ensure that only quality fabric is cut and fed to the line. Inspectors mark all the defects during fabric inspection so they can spot them during spreading remove the pieces after cutting. If a fabric is cut without being inspected, complete responsibility will be in the department of fabric quality inspection, as this is a critical aspect of the violation.

**Purpose:** Decide whether to accept or reject tissue roll (For Woven).

Inspection of the fabric is carried out using 4-point method. Guidelines for the movement of fabric  
 Minimum index for checked rolls not to exceed "28 points/100yd<sup>2</sup> Total indexes for rolls not to exceed" 40 points/100yd<sup>2</sup>.

Activity	Requirement
Select rolls	Roll to be chosen at random
Check the roll as per 4 points system.	
Give penalty points for defects	

Calculate index for each individual roll.	$\text{Points / 100 sq. yd.} = \frac{(\text{Total points in roll} * 36 * 100)}{(\text{Total length in yards} * \text{width in inches})}$
-------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------

The following criteria are used to assign points for defects in both the warp and weft direction for woven and the course/wale direction for knits:



Points	Inches (")	(mm)
1 Point	Defects up to 3 inches	Up to 75mm
2 Point	Defects > 3 inches ≤ 6 inches	Defects > 75mm ≤ 150mm
3 Point	Defects > 6 inches ≤ 9 inches	Defects > 150mm ≤ 230mm
4 Point	Defects > 9 inches	Defects > 230mm

Table -1

Size of Defect	Penalty Points
Length of defects in fabric (either length or width)	
Defects up to 3 inches	1
Defects > 3 inches ≤ 6 inches	2
Defects > 6 inches ≤ 9 inches	3
Defects > 9 inches	4
Holes and openings(largest dimension)	
1 inch or less	2
Over 1 inch	4

Maximum points measurement per yard In 4 point system fabric standard unit points/100 sq. yd are measured.

Points / Sq. 100. Yd. (Total points in roll\* 36\* 100)/ (Fabric length in yards\* Fabric width in inches).

The length of the faults shall be measured in the direction of the warp or weft, and the direction in which the fault is the longest is the direction of the fault. However, when the length of warp and weft is the same and the penalty for the shorter direction is heavier, take the fault of the direction the penalty is heavier in.

When the fault in the warp direction exceeds 1 yd, the part that exceeds 1 yd is deemed to be the fault of others of the same type.

When two or more faults overlap, only apply the faults which are the heavier penalty.

When two or more faults occur within 1 yd range and the penalty points reach 4 points, the points above 4 points are not applied.

The inspector must be at a distance of 3 feet from the inspection table and the linear inspection speed should not be less than 0.1 meters per second when an inspection is carried out on a cloth inspection machine.

*For example:*

*28 points per 100 square yards (23 points per 100 square meters) for Cotton Twill/Denim fabric roll*

*For all synthetic fabrics 20 points per 100 square yards (16 points per 100 square meters) for individual fabric rolls.*

#### **Fabric shade band report:**

- For styles the necessary apparel washing is submitted before and after washing (3 sets each) covering all rolls and is attached to the continuity card of the shade.
- A 100% shade band is made that covers all rolls and all colors relevant to a certain style/consignment and is accepted before the bulk fabric is cut.
- Shade band preparation process: The production department gathers fabric panels covering all rolls within 6 hours of the store no sooner than the fabric is in house.
- Cut 6 inches from roll top.
- Enter all panels by stitching the cover in the correct direction of the grain line to be in a blanket shape.
- When the style is non-wash system two sets the is prepared.

- If the style consists of a certain wash, then 4 blankets are prepared-2 unwashed blankets and 2 blankets with the style wash accurately approved.
- Once the shade bands are ready, segregation is achieved by dye lot or hue. If the Shade Band consists of 2-3 different shades, these shades should be divided into A, B, C, Etc families.
- A copy of the shade segregation is sent to the department store, cutting room, merchandising, and production. Stores will not have a problem and the department of cutting and production will continue without mixing, as per the separated shades.

### **Fabric shrinkage report:**

- For all styles, a 100 percent Shrinkage report is submitted, and the washing shrinkage must be done according to the type of wash needed for the bulk.
- Garment fit is a very significant factor in the customer's purchase decision.
- Misfit will lead to premature rejection at any point in the garment's existence and give the brand a bad perception.
- After each use, a garment is required to be washed and intended to maintain the same fit and appearance during the garment's lifetime.
- For dimensional stability, the fabric must be checked. For this, shrinkage checks are conducted to adjust the patterns in the same ratio to avoid any measuring issues during the washing of the fabric.
- Shrinkage Templates (25cm\*25 cm or 50cm\*50 cm) are used in industry for direct measurement of the shrinkage factor.

## **23 FABRIC DEFECTS TO LOOK OUT FILLING BARFOR DURING FABRIC INSPECTION**

- ❖ Horizontal lines
- ❖ Shade variation
- ❖ Dirt/stains
- ❖ Uneven dyeing
- ❖ Drop stitches
- ❖ Misprinting
- ❖ Crease marks
- ❖ Barre
- ❖ Neps/knots
- ❖ Abrasion marks
- ❖ Splicing
- ❖ Holes
- ❖ Defective selvage
- ❖ Snags



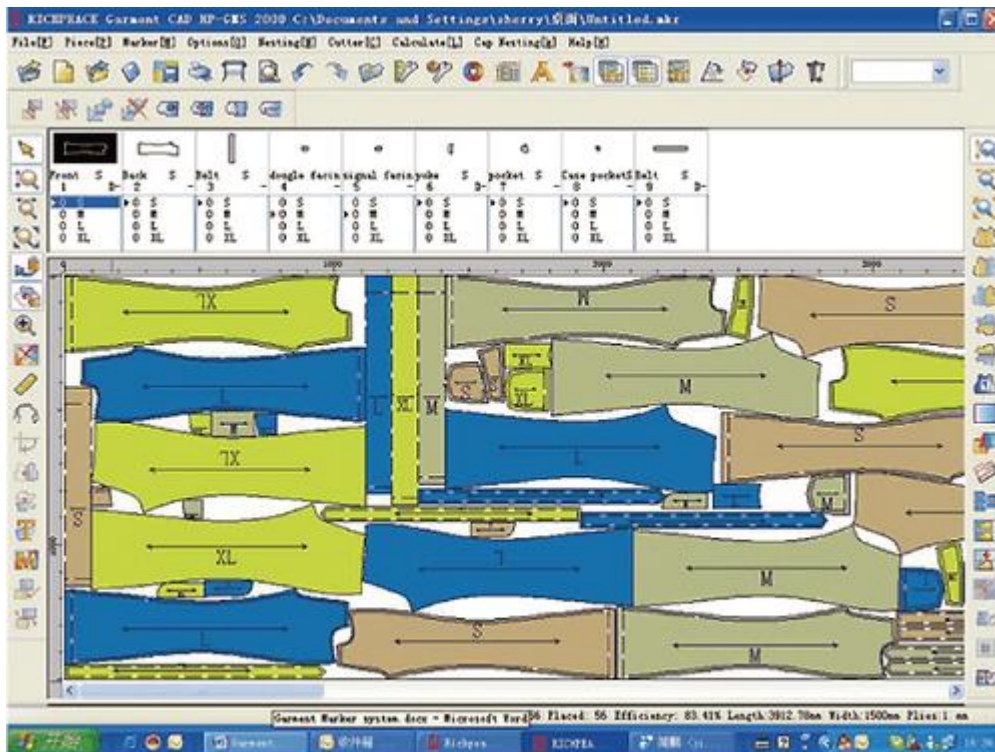
- ❖ Thick place/thin place
- ❖ Bowing and skewing
- ❖ Needle lines
- ❖ Coarse pick
- ❖ Coarse end
- ❖ Broken pick
- ❖ Broken end
- ❖ Missing end
- ❖ Filling bar

## CHAPTER 15

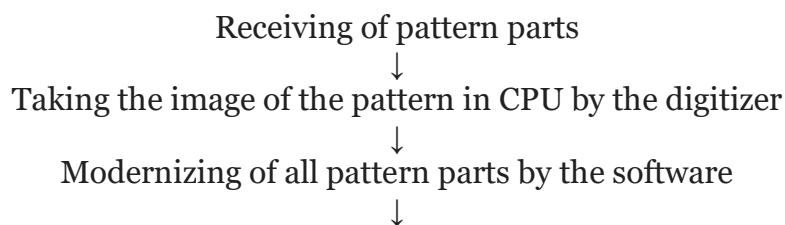
### CAD SECTION

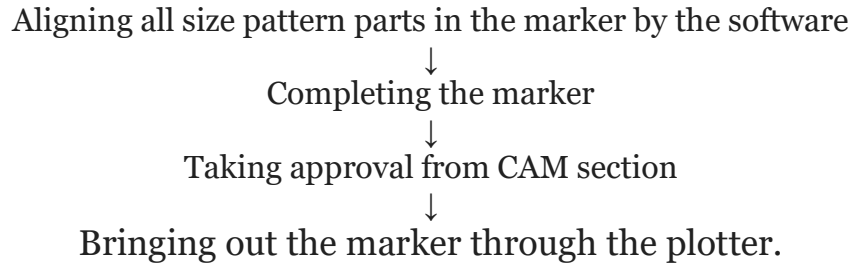
#### Computer-Aided Design:

CAD is the contraction which stands for Computer-Aided Design. This term means different things to different people involved in designing, manufacturing, and mechanical engineering. CAD or Computer-Aided Design has brought a revolution in the Textile industry, especially in the apparel industry. The time consuming and cumbersome process of textile designing has been made easier by CAD. Now thoughtful and innovative designs are available to textile designers and textile manufacturers at the click of a mouse. The working flow chart of CAD section in apparel industry is as follows:



#### Working Sequence of CAD Section in Apparel Industry





## The procedure of CAD Section:

- In the **CAD section** at first, the pattern put on the digitizer to take a clear image of the pattern part inside the CPU.
- After making all required size patterns using the “Diamino” software pattern parts are aligned in the mini marker. Then it is sent to CPU of CAM section for approval and checking the length & width of marker and pattern parts alignment.
- After getting approval from the CAM section the printer is used to print out the whole real marker then this marker, as well as a mini marker, are provided to the CAM section for cutting the fabric.

The computers help workers in the textile industry in tasks such as repeating a design or determine how to cut or make a fabric. Textile designers and manufacturers can use CAD programs to do repetitive or time-consuming processes. By simplifying the production process and decreasing the required labor hours, CAD design programs help lower production costs.

## PATTERN:

What is pattern?

Pattern is a hard paper on which different component of garments of a particular style are sketched according to the measurement of the garments.

**Grading of pattern:** Pattern grading is the scaling of a pattern to a different size by incrementing important points of the pattern using an algorithm in the clothing and. According to countries, pattern grading includes USA's, EUR's, UK's, and CHN's. Generally, pattern grading adjusts for people of different ages and genders.

### Types of pattern:

There are two types of pattern. They are-

1. **Working pattern**
2. **Production pattern**

**Working pattern:** Working pattern is made according to the exact dimension of particular style without allowance. This is use for sample making.

**Production pattern:** Production pattern is made according to the exact dimension of particular style with allowance. This is used for garments production.

**Method of pattern making:** There are two type of pattern making. These are:

1. Flat method.
2. Modeling method.

**Flat method:** In this method the pattern of different parts of garments are made by technological drawing by manual or computerized method. In this method fast pattern is possible.

**Modeling method:** It is a very old & widely used method. In this method block made by standard body measurement of dummy is called toile. Toile is warned out from the body of dummy & individual pattern is drawn on hard paper. It is very efficient but higher time is required.

## **MARKER:**

What is a Marker?

A marker is a diagram of a precise arrangement of pattern pieces for sizes of a specific style that are to be cut from in one spread.

What is Marker Making?

Marker making is the process of determining a most efficient layout of pattern pieces for a style, fabric and distribution of sizes (source: Apparel Manufacturing . Factories those don't have a CAD system perform this process manually. In manual marker making to make an efficient marker one need time, skill and concentration. Now-a-day Marker making is mostly done by CAD systems which give accuracy, increase control over variables and reduces the time required in making markers.

## **Methods of Marker Making:**

Manual marker making (with full size patterns and with small size patterns After making patterns of any garments (all the required sizes) marker is made. At the very beginning of marker making, the marker width is determined. The minimum width of the fabric with which garments will be made is taken as the width of the marker. Generally marker is made on white paper or newsprint paper. First the big patterns are placed and then the small patterns are placed in the gaps of the big patterns. As a result, the marker efficiency is increased. The marker making is a very skilled and technical job. Markers are made mainly in two ways.

1. Manual marker making
2. Computer aided marker making

## 1. Manual marker making:

In this method, markers are made with physical and mental labor. Manual marker can be done with full sizes patterns as well as with the small sizes patterns.

## 3. Computer aided marker making:

For making computer aided marker, first of all, the production patterns need to be stored in the computer memory. For entering the production pattern into the computer, generally digitizing or scanning methods are used. For digitizing or scanning, full size production patterns are used and in the computer memory also the full size patterns are stored, but reduced size patterns are seen in the computer screen. After entering all the production patterns, required for a garment in the computer memory, using the grade rule previously stored in the computer, the required patterns for all sizes are obtained. The computer aided marker man generally uses computer screen, key-board and light pencil. Then the marker man gives some instructions to the computer, such as: the marker width, pattern sizes to be used, check matching and all the obstacles to marker making, which the computer will always maintain during marker making. In this process the computer itself can make the marker, also the marker man can make the marker with the help of the computer.

## Marker Efficiency:

The success of the jobs a marker man is determined by the marker efficiency. The expression in percentage of the occupied area by the patterns used in a marker in relation to the total area of a marker is called the marker efficiency. Marker efficiency can be measured by the following formula:

$$\text{Marker Efficiency} = \frac{\text{The area of the patterns used in the marker}}{\text{The area of the marker}} \times 100$$

## CHAPTER 16

# SAMPLE SECTION

### What is sample?

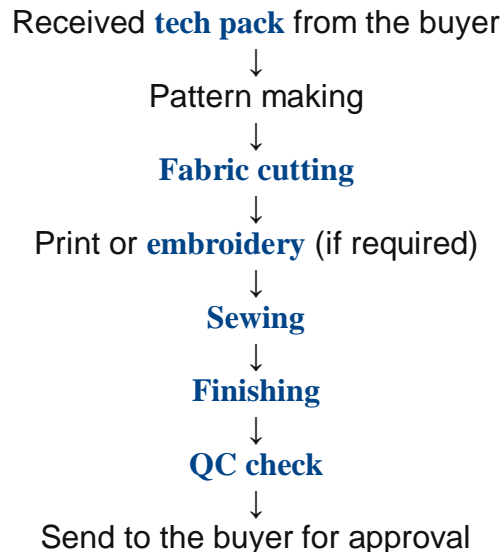
Sample is a product which represents a group of product or lot or batch, in order to assess their quality, style or design or any other characteristic of the product. Based on the samples, the buyer will give approval or comments for any alteration in design or style or quality. Samples will reflect the quality and workmanship of the exporter or manufacturer. Samples are made to make sure to get a desired style design or fit and good quality in the particular order.

Samples may be made before start of the production or can be taken from the finished goods. For every order or style, separate samples are to be made. Samples help in to procure or get the orders from the buyer. In a particular order, samples are made at different stages to make sure that all parameters are maintained properly. A good sample will make good first impression to the buyer on the exporter or manufacturer. Special care should be taken while making the samples.

### What is Sampling in Garment Manufacturing?

Sampling is a process of making a product proto-type prior to starting bulk production. The same process is applied to garment sampling. In mass garment manufacturing, where apparel brands source garments in bulk quantity, sample making is an essential step before placing the bulk order. The objective of the sampling is to eliminate the risk of making a wrong purchase of raw material, making mistake in bulk manufacturing that is not accepted by the buyer. Brands also would like the situation where they can't feed the retail shops or can't deliver the garment to their potential customers.

### Process Sequence of Garments Sample Making



## **Different types of sample in garment industry:**

In the apparel supply chain, apparel buyers need to ensure that the products they are sourcing from their supplier across the world meet their designs, construction, material quality and fit requirement. To ensure the finished product quality, buyers keep in close contact with their suppliers and in every stage from sampling to shipment they inspect the garment for a given order.

At the different stages of product development and garment manufacturing process, the samples are given a different name. The same sample might be known as different names. There is a defined objective for developing each type of sample.

The different types of samples made by the apparel manufacturers are listed below. All the samples are defined one by one.

1. Reference sample
2. Development sample
3. Photo shoot sample
4. Proto sample /First sample
5. Fit sample
6. Mock-up sample
7. Size set sample
8. Salesman sample
9. PP sample
10. TOP sample
11. Counter sample
12. Test sample
13. Shipment sample
14. Showroom sample
15. GPT sample
16. Gold seal sample /sealed sample
17. Red tag sample
18. Digital Garment Sample

### **Reference sample**

production, the seller sends the buyer some relevant produced products for the buyer's reference to understand the actual production strength of the manufacturer. The reference sample is mainly after the first contact and understanding of the buyer and seller, or after the manufacturer of the clothing factory visits the seller, the buyer has an OEM for those brand customers because of the actual

product that the seller's product can produce and the quality level of the product produced by the clothing factory. After understanding the samples through garment

### **Development sample**

The development samples are those sample which made until the final factory gets bulk production approval. The proto, fit and size set samples are considered as development sample.

### **Proto sample in garment industry / First sample**

The first sample that is developed from the design sketch or the design concept is known as proto sample. proto sample in garment industry are also known as the first sample. The proto samples are normally made of matching fabric quality (weight and fabric types), as during proto sample development actual fabric are not available with the factory. The proto sample in made in one size. Number of proto samples to be made depend on the buyer's requirement. At least three sample should be made – 2 samples to send to the buyer for approval. Out of these 2 sample, buyer keeps one sample and send back to the second sample to the factory. Third sample should be made as a factory's counter sample of proto. In case a third party buying house is involved in sample development, one additional sample may be required.

### **Fit sample in garment industry**

As the name suggests, fit samples are to ensure the adequate fit and fall of the garments and they're made in accordance with the sizing requested by the brand. Measurements and construction need to be accurate and correct in order to pass the fit evaluation. The fit sample can be made of a similar fabric as the one intended for the final design, and many adjustments could be necessary before the desired fit is achieved. Garment fit is one of the most important parameters in garment design. Fit sample is developed according to the spec sheet measurement and design sketch. Purpose of developing FIT sample is checking the garment fit on the dress form or on the human model. The measurement specifications are verified using the FIT sample and measurement are corrected as per fit requirement. Fit sample is developed after the proto sample and prior to size set sample. Like the proto sample, the fit sample is made for the middle size. 2-3 samples are developed for the fit sample. Normally, the sample resubmission rate is higher in FIT sample compared to other approval.

### **Mock-up sample**

A model or a copy of something, often the same size as it, that is used for testing, or for showing people what the real thing will look like. Mock-up sample main use the bulk fabric and accessories, trims sewing them together doing some internal testing, such as test the body fabric and contrast fabric color matching, the color fastness, if the construction of this area stable strong enough etc. propose use this sample.



## **Salesman sample (SMS)**

The salesman sample in garment industry main serving the selling. Salesman sample is developed using original fabrics. Salesman samples, known as SMS, are developed for displaying the design in the retail stores. The purpose of displaying samples in the store is forecasting the order volume. Salesman samples are also known as the marketing sample. More about the SMS sample discussed here.

## **salesman sample**

Photo shoot sample in clothing industry

Photo samples are mainly for customers to see sample styles. Photographic sample customers mainly look at the style, which is used to make color reference samples for large-scale goods, and they have relatively high requirements for colors and styles. The name of the sample clarifies it. For capturing a photo for the catalogue and e-commerce sites photo shoot samples are made, and the photo is taken on model or dress form. The photo sample is what a customer asks to make him a piece of clothing for them to take photos of.

## **Preproduction sample (PP Sample)**

The pp sample in garment industry is to make sure the bulk garment production all correct. The PP sample is made with actual fabric. The PP sample is made by the factory in the production line. All the development samples are made in the sampling room. Read the importance of the PP sample and more about PP sample.

## **Gold seal sample**

An approved sample for bulk production. The PP sample can be called as sealed if buyer sealed it. Some buyers and factory used to call the approved PP sample as the sealed sample. Gold seal sample also known as a Sealed sample. Buyer seals the approved using coloured tag, which can't be removed from the garment without damaging the garment. Some buyers give a unique code to each sealed sample, and number if embossed on the tag. Garment sample is sealed by the buyer to avoid tempering the actual approved sample by the factory tea.

## **TOP Sample/Production Sample**

TOP is abbreviated as Top of Production. Factory starts bulk production after the PP sample approval. After the bulk production start, few garments are picked randomly from the production output of the first production run for quality checking by the buyer's QA. These samples are known as Top of Production sample.

## **Counter Sample**

When a factory makes samples for different sample approvals from the buyer, the factory makes 2-3 additional samples for their internal reference. These samples are called as the counter sample. A counter When a factory 2-3 additional samples for their internal reference. These samples are called as the counter sample. sample can be of the counter size set, a counter of the fit sample, counter SMS, or counter of the PP sample. Counter samples are a copy of the original samples. In case, approved samples are not available when needed or the sample required by the different teams at the same time, the factory can refer the counter sample by giving internal merchandising or quality team.

## **Shipment Sample**

Ship sample: (Shipping Sample) refers to the bulk sample that will be exported for shipment and is a representative sample. The products must be produced in accordance with the requirements of the customer or the requirements of the order or the requirements of the modification or confirmation, and the products are packaged in accordance with the requirements. The ship sample generally needs to be sent to the customer before shipment. Buyers need to keep a random garment piece from the final shipment audit

## **Show Sample/showroom sample**

The apparel manufacturers and suppliers prepare a sample for the displaying on the in-house design room or in the exhibition. Sometimes garment manufacturers develop garment sample by themselves and show those samples to there prospect apparel buyer.

## **GPT Sample**

The sample that is collected from the bulk production and send to a testing lab for garment performance test , are known as GPT sample. In GPT sample, garment performance tests like seam strength, seam slippage, button pulling strength, print quality, chemical tests of metals, and dyed and printed colors are done. List tests to be performed by the lab are defined in buyers protocol. Generally, buyers don't ask for GPT sample submission. They need the GPT test report on the desired test parameters for their product. The factory needs to send at least 2 pieces of GPT samples for production.

## **Red Tag Sample/ Sealed sample**

A red tag sample is the same as the gold seal sample and sealed sample. A different term of the approved and sealed sample for bulk production approval. A red colored tag is attached in the sealed sample. Read more about the sealed sample.

## **Digital Garment Sample**

A garment sample that is made on the software and shows the 3D form of the garment, is called a digital garment sample. On the digital sample, a customer can see the garment fit, fabric fall, pressure points (tight fitting) on the selected digital model, both as a still form as well as the digital model moves on the screen. With the aid of digital technology and to reduce sample approval process time, many buyers and made-to-measure customers go for digital garment samples. The comments and feedback on the sample are given based on the display on the screen, which is accepted by the buyer like a physical sample.

## **The key points of various garment samples:**

The process of sample development depends on the buyer's various requirements. There are so many different types of samples in garment industry, but not all the clothing bulk production order required all the samples, this is also no need ask all the samples.

The purpose of samples is for communication between buyer and manufacturer/seller, make sure the understanding clearly, without misunderstand, confusion, as long as that clear will no need make one more sample, the garment sample making cost is many times than one bulk production goods, but some samples is a necessary can't be reduce that sample steps, anyway, you have to base on actual situation of your bulk garment production orders.

## **People involved in sampling:**

Several people and departments are involved in sampling process. They are: merchandising department, sampling/ product development team, trim and fabric store, pattern making department, quality assurance team, dispatch department and etc.

## **Assessment of sample:**

Buyer assesses the sample and gives the feed back within 5 – 7 days to factory with respect to sample. Feedback from the buyer is 3 types i.e. accepted, rejected, and accepted with comments.

The rejection of sample may be due to following reasons: There could be one or more reasons for the sample rejection from buyer, these are: sample made out of tolerance, incorrect construction, fabric quality may not up to mark, incorrect packaging, incorrect size submission, frequent change in style and more.

## What is buyer looks up in sample?

Sample type	Buyer seeks	Submission requirements	Submission timing
Design development	Manufacturer's capability of developing design	45 days	Do
Proto sample	Construction ability, aesthetic appearance, technical details	within 7-10 days as soon as proto request received	Do
Fit sample	Construction, measurement fit and hand feel	actual packing trims approved by buyer	Within 45 days of approval of proto sample
Ad or photo shoot sample	Fitting rather than aesthetic appearance of sample	Actual fabric, trims, assortment and packing	Within 45 days of approval proto sample
Salesman sample	Aesthetic properties like feel, looks, and construction	Actual look and appearance in sample	Within 45 days of approval proto sample
Size set sample	Grading, size measurement	submit all sizes with proper packing	Within 10-15 days once fit sample is approved
Pre-production sample	Actual look with bulk fabric and trims	Actual fabric, accessories, levels in correct quantity attached in the right places	Within 10-15 days of Size set approval
GPT sample	Performance of garment	Actual colours with all bulk trims and accessories	Along with Size Set Sample
TOP sample	Buyer checks whether production is going as per standard	Standard packing with production	As soon as first lot come out of sewing line
Wash sample	Hand feel and wash assessment	Sample after wash as specified	Either along with GPT Or Size set
Shipment sample	Same shipment is sent by factory or not	Random sample from shipment	Immediate after shipment get dispatched

## What are the Merchandiser's Roles in Product Development?

Here is a close relation between merchandisers and sampling section in the apparel industry. In fashion or buying house, sampling section is known as product development section.

Merchandisers have to involve in every stage in product development. Usually, there is a separate department in the apparel industry to do product development which is handled by design section. But merchandiser has to play a vital role in product development if design section exists or not in any garment industry. Merchandisers have to accomplish bunch of duties during product development, and those are listed below:

1. Buyers or their representatives to accomplish the mission and vision. Make query on their product line and request them to provide those items design, worksheet, color-way, fabric and accessories details that are going to be used in next seasons. It would be better if you can collect reference sample from a buyer. It will help you to track their instructions.
2. After review, the spec sheet/tech-pack/worksheet and product line then forward it to pattern to make a new pattern for sample making
3. Meantime merchandiser has to check all other necessary trims price and fabric's price. Prepare bill of material (BOM) sheet and get ready to procure all sample items from local and abroad.
4. Fix estimate time of delivery (ETD) of sample and inform to buyer.
5. Examine fabric and trims quality and analyze their price, lead time etc. to make it competitive.
6. Get ready to do Lap dips and other lab test and send all lab reports, fabric swatch to buyer for approvals.
7. Get ready to do Lap dips and other lab test and send all lab reports, fabric swatch to buyer for approvals.
8. Get ready to do Lap dips and other lab test and send all lab reports, fabric swatch to buyer for approvals.
9. Buyer will review the 1st proto sample once they receive it. After consideration of the sample, they will make some comments for improvement and request to make 2nd proto sample. Thus, a sample is ready to finished goods by providing long efforts of a merchandiser

### **Risk Analysis in Garments:**

Risk analysis is analyzing critical process and potential critical process analysis where quality can be hampered. Risk analysis can be done during reviewing sample in size set, PP meeting, and Pilot run stage.

### **Risk analysis for Bottom Garments; Pant manufacturing:**

Name of the critical process of pant manufacturing

1. Front pocket join
2. Front coin pocket join
3. Gusset joining

4. Waistband join
5. Loop tack
6. Bottom hem
7. J-stitch
8. Waistband elastic joining
9. Waistband closer join
10. Back pocket join

## CHAPTER 17

# CUTTING SECTION

### **What is cutting section in garments?**

To cut out pattern pieces of garment component as per exact dimension of the pattern from a fabric lay is called fabric cutting. It is totally different from general cutting in which exact dimension is not taken into account. number of apparels is being cut at a time.

### **Functions of Cutting Department in Garment Industry**

the cutting department is responsible for cutting fabrics and feeding the sewing department with cuttings. The cutting department's capacity is planned based on the daily feeding requirement of the sewing lines. The cutting department is set up with a cutting department head, cutters, spreaders, quality checkers and helpers for sorting, ply numbering and bundling. The activities of the cutting department are explained in this post.

#### **1. Take fabric from the fabric store:**

The cutting department gets a cut order from the production manager. According to the cutting plan, the cutting in-charge generates a fabric requirement sheet or requisition slip to the fabric store to issue fabrics.

#### **2. Relaxation of fabrics:**

Knitted fabrics require relaxation before cutting. After receiving the fabric from the fabric store, the cutting department opens the fabric from the fabric roll and lays it on the table for relaxation for some hours before cutting. Factories also relax fabric in the fabric store overnight after opening the fabric rolls.

#### **3. Cut order planning:**

The cutting master plans the number of markers they need to prepare, the size combination to be set for each marker and the number of plies to be laid in each marker.

#### **4. Fabric Spreading/ layering:**

In mass production, multiple layers of fabric are cut at the same time. So spreaders lay the fabric on a cutting table as per total marker length. The layer height is kept up to a certain inch.

#### **5. Planning markers:**

The cutting master plans marker ways, marker lengths and the numbers of plies to be laid in each lay.

## **5. Making markers:**

This is a process of making an outline of garment patterns on the lay for cutting garment components. After layering, the marker paper is laid on the top of the layer. Those factories that don't have CAD markers make markers manually using paper patterns.

## **7. Cutting fabrics:**

After making the marker, garment patterns are cut and taken out from the layer. Various technologies are used for cutting fabric layers, such as straight knife cutting, band knife machine cutting and a computer-controlled automatic cutting machine.

## **8. Sorting, bundling and numbering of garment plies (parts):**

After cutting the fabric, layers are sorted size-wise and colour-wise. Each ply is numbered using stickers. Bundles are kept on inventory tables, before these are sent to undergo the next process.

## **9. Inspecting cut components:**

To maintain the cutting quality, standard cutting components are checked randomly by quality checkers. If defective components are found, they replace those defective parts. Details of cut part inspection are explained in Chapter 10.

## **10. Sorting printed and embroidery panels:**

As per order requirements, printing and embroidery is done on cut panels. Size-wise sorting is done after receiving printed and embroidered panels. The checking of printed and embroidered panels is also done by the cutting department

## **11. Re-cutting panels:**

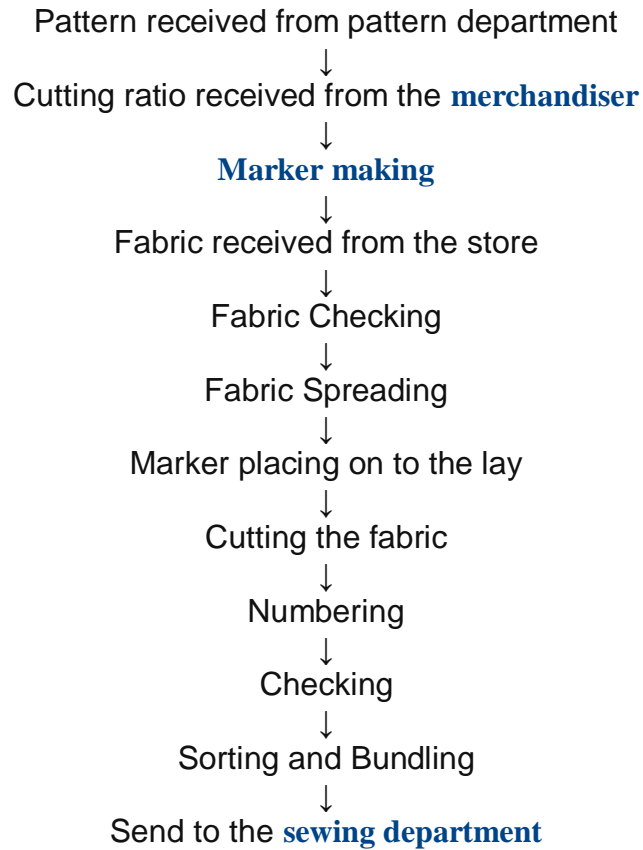
Re-cutting is done for garment components that require to be replaced in bundles. Re-cutting requests are received from the sewing department for defective garment parts. Re-cutting is also done for block panels cut for the printing and embroidery processes. After receiving garment panels from the printer or embroiderer, these panels are reshaped.

## **13. Fusing garment components:**

Fusing in garment components is done to stiffen parts of a garment. If needed, fusing is done at the cutting section (e.g. fusing of the collar and cuff components of formal shirts)



## Process Flow Chart of Fabric Cutting Department



### List of Machines Used in Cutting Room in Apparel Industry :

1. Automatic spreading machine
2. Automatic cutting machine
3. Manual cutting with straight knife
4. Round knife cutting machine
5. Band knife cutting machine
6. Die Cutting machine
7. Computerized automatic cutting machine

## Factors affecting the cutting processes :

1. Nature of fabric ( grain line shade, twill etc.)
2. Thickness of fabric.
3. Design characteristics of finished garment.
4. Machines and tables used.

## Cutting Room Terminology:

1. **Band knife:** An endless blade vertical knife, around which work piece is moved over the large cutting table.
2. **Bias:** ‘Cut on the Bias’ – cut at an angle to both the warp and the weft of the cloth, at 45 degree.
3. **Baker’s trolley:** A wheeled rack used to transport sections of the lay from the cutting table to the band knife and from the band knife to the sorting operations.
4. **Block cutting or blocking out:** Cutting roughly around a part which is subsequently cut very precisely, by various means. Also for splitting the lay, to assist handling to the band knife.
5. **Bowing:** A fault in woven cloth in which the weft is not straight across the piece but has curve.
6. **Clicker press:** Used for parts of intricate nature and repetitive, also for parts requiring a high degree of accuracy.
7. **Cross:** ‘Cut on the cross’ – Cut at right angles to the grain of the cloth (On bias).

8. **Damage:** A fabric fault. It may be generated during handling fabric inside factory or faulty fabric sent the fabric supplier.
9. **Die cutting:** Used where accuracy is important and there is enough repetition.
10. **End loss:** The cloth at the end of the lay that is not covered by the marker.
11. **Face one way spreading:** The face side of each ply faces the same way (up or down)
12. **Face to face spreading:** Method of spreading in which the cloth is alternately facing up or down, as a result of continuous to and fro movement of the roll over the lay.
13. **Face to face one way spreading:** Used for directional fabric where the pile (direction) is required to lie in the same direction to the plies.
14. **Layout (pattern layout):** The geometrical layout of the pattern pieces in a garment, which is cut around to produce the parts of the garment.
15. **Marker:** A man who prepares the pattern layout and/or who marks the layout onto the lay or onto a paper or a cloth. A piece of paper, cloth etc. representing the layout.
16. **Notch:** A small cut into the part, which aids the location during assembly by indicating to the operator some requirement for matching with other notches or positions in the garment.
17. **On the fold:** Method of finishing the cloth so that it is folded to half of its width.
18. **Shading:** Means color in cloth. It is commonly used to imply that a particular bit/roll of cloth is different in shade from another bit.
19. **Shade Numbering :** Process of numbering parts to ensure they are of same shade.

20. **Slub:** A local thick place in the yarn in a cloth usually caused by error but in some cloths it is introduced purposely.
21. Quality control of garments cutting section plays a vital role in garments because the right measured cutting is required to get the right shape of garments product. Cutting is the first working department of garments production. Before making a cloth you have to cut off individual parts as per the approved pattern, whereas proper measurement must be ensured so that all cutting parts are 100% accurate.

## Quality Control of Garments Cutting Section:

Quality control of the cutting section mainly divided into four parts. Those are:

1. Marker Inspection
2. Spreading Control
3. Cutting Quality control
4. Piece Goods Inspection

### **In Marker Inspection following things are inspected:**

1. Marker Length
2. Marker width
3. Lay quantity
4. Style/Lot
5. Ratio
6. The measure of all individual parts marked in marker

### **Following work in Spreading Quality control:**

1. Cut numbers
2. Ends
3. Leaning
4. Tension
5. Narrow Goods
6. Remnants
7. Counts
8. Ply Height
9. Fabric Fault

### **Cutting Quality Control:**

1. Number of parts

2. Miss cut
3. Ragged cutting
4. Notches
5. Matching plies

### **Piece Goods Inspection:**

1. Quantity
2. End out
3. Knot
4. Spot
5. Hole
6. Thick yarn
7. Missing yarn
8. Shading
9. Slab

### **How to Calculate Size Wise Cut Quantity from the Size Ratio in an Order:**

How to calculate size wise cutting quantity for 10000 pieces? For example, suppose we have received a production order of 10000 pieces and the order size ratio is S:M:L:XL = 1:2:2:1. Please help me with the formula. ... asked by Mala SN

Mostly when apparel buyers place an order with suppliers, they provide total order quantity and what sizes to be made and in which ratio garments to be made for different sizes. Later when cut order plan is made size wise quantity is calculated.

Mathematical calculation is used to convert ratios into quantity. You can use following steps to find size wise quantity.

Step#1. Calculate sum of all ratios. Here size ratio (1:2:2:1),  $1+2+2+1 = 6$

Step#2. Divide total order quantity by sum of ratio (here 6)

Step#3. Multiply the result by ratio of a particular size

If we consider above data for example, size wise cutting quantity will be

$$\text{Quantity in S} = (10000 / 6) * 1 = 1666.66 = 1667$$

$$\text{Quantity in M} = (10000 / 6) * 2 = 3333.33 = 3333$$

$$\text{Quantity in L} = (10000 / 6) * 2 = 3333.33 = 3333$$

$$\text{Quantity in XL} = (10000 / 6) * 1 = 1666.66 = 1667$$

So we can write the formula as following

Quantity of a size = (order quantity X ratio of the particular size)/ (Sum of ratio of all sizes)

The above calculation can be made easily by using excel sheet. You can create a table with formula. Later when you get order and size ratios, enter those on the specific cells; you will get actual cut quantity. For reference I have shown you a simple cut order plan (for single color) in the following table.

Cut order plan sheet for single color

You can download above cut order plan (in excel format) just by sharing on Google+ or Twitter or liking our Facebook page. Just click on one of the following buttons.

## Cut Order Planning

Order No.	XYZ
Order Quantity	10000

Size ratio					
XS	S	M	L	XL	2XL
	1	2	2	1	

	Color		XS	S	M	L	XL	2XL	Total
Original Qty			0	1667	3333	3333	1667	0	10000
Extra Cutting	0%		0	0	0	0	0	0	0
Total Qty.			0	1667	3333	3333	1667	0	10000

[www.onlineclothingstudy.com](http://www.onlineclothingstudy.com)

### Approach to Wastage Calculation in cutting section:

Normally, wastage is calculated as the difference between the input and output expressed in percentage (%).

$$\text{Wastage} = \frac{\text{Input quantity} - \text{Output quantity}}{\text{Input}} \times 100$$

Now the approach towards wastage calculation involves two things.

1. Estimation of output quantity where the initial quantity and wastage% are known.
2. Estimation of input quantity where the final quantity and wastage percentage are known.

### 1. Estimation of output quantity:

The output quantity can be estimated when the input quantity and wastage percentage are known.

By using the formula,

$$\text{Output quantity} = \text{Input quantity} - \text{wastage\%}$$

For example, in knitting, if the yarn input is 1000 kgs and the knitting wastage is 3% then the fabric output quantity is,

$$\text{Fabric output} = 1000 \text{ kgs} - 3\% = 1000 - 30 = 970 \text{ kgs}$$

## 2. Estimation of input quantity:

In apparel industry, buyer or customer gives the order quantity which is the final output quantity that the exporter has to deliver. So to produce this order quantity they have estimate the initial quantity by adding wastage percentage to the final output quantity.

### Fabric utilization:

It means how much fabric is being utilized in cutting for garment patterns out of total fabric laid for cutting. Generally, fabric constitutes 60% to 70% of the total garment cost. So, through effective fabric utilization factory can save lot of money from fabric.

### Calculation of Fabric utilization:

Fabric utilization is calculated by weight.

**Step 1:** Measure the lay length or marker length that should be used in bulk cutting.

**Step 2:** Calculate weight of that lay .

Fabric Weight = Fabric width X Lay Length X GSM X No. of plies (You can also calculate multiple lays) or  $1.2A * GSM * \text{no. of plies}$

**Step 3:** Cut the patterns and collect all waste fabric and weigh waste (C). Normally includes losses, cut waste.

**Step 4:** Weight of the fabric of cut panels  $D = (B - C)$

**Step 5:** Fabric utilization% = Weight of cut panels (D)/Total weight of the lay (B)\*100%

For the accuracy you can do this exercise with multiple lays and take average of them  
Example: For better understanding I have shown an example in the following.

**Step 1:** Assume that

- a) Measured lay length = 3 meters
- b) Fabric GSM = 150
- c) No. of Plies = 5 and
- d) Fabric width = 1.2 meters,

**Step 2:** Calculated weight of the lay =  $3 * 150 * 5 * 1.2 = 2700$  grams

**Step 3:** Weight of the collected waste after cutting = 300 grams

**Step 4:** Weight of the cut panels =  $(2700 - 300) = 2400$  grams

**Step 5:** Fabric utilization percentage =  $(2400/2700 * 100) = 88.9\%$



## **How to Minimize the Wastage during Fabric Cutting:**

The minimize steps of wastage during fabric cutting are given below-

1. Reduce the Ends of ply losses
2. Minimize the Selvage losses
3. Reduce the Loss of fabric ends
4. Careful about Fabric Purchase
5. Identify Fabric defects

### ***1.Reduce the Ends of Ply Losses:***

- i. Some allowance is needed in the end of each piece of fabric during **fabric spreading** because of limitation of the utilized machine for fabric extensibility and fabric spreading and this allowance is usually 2" in each end and on each ply 4" fabric wastage.
- ii. This wastage varies with the durability of the fabric.
- iii. This wastage can be reduced by observing and controlling carefully of how much allowance need for various fabric.
- iv. Moreover, this wastage may be reduced for lager marker length and increase for smaller marker length.

### ***2.Minimize the Selvage Losses:***

- i. Each fabric has two selvages along its wide. Mostly, selvage part is cut out. The amount of cut out is considered 3% (approximately) along with wide.
- ii. The amount of fabric wide to be used depends on the quality of selvage, width, flatness and alignment of selvage.
- iii. The more fabric width, the less will be fabric wastage.

### **3. Reduce the loss of Fabric Ends:**

- i. Moreover seen that fabric length varies than fabric multiple of lay length. As a result, during the preparation of fabric lay the last or end remnant of fabric roll are separated by **cutting**.
- ii. Fabric wastage increased for this splice or remnant.
- iii. The lager fabric length in a roll, the lowest wastage by identification of splice in marker and proper controlling and by reusing of the remnant.

### **4. Careful about Fabric Purchase:**

- i. Fabric length is identified by **fabric manufacturer** and supplier on fabric roll.
- ii. Some timeless fabric is wound on a roll than identified length. So it should be measured by fabric purchase.

### **5. Identify Fabric Defects:**

- i. There are two defects as group shading and **running shading**.
- ii. If group shading is present in fabric it must be rejected.
- iii. But if running shading is present, the fabric can be used by marker.

## CHAPTER 18

# PRINTING SECTION

### What is printing in garments?

Printing is a process of decorating textile fabrics by application of pigments, dyes, or other related materials in the form of patterns. ... Printing styles are classified as direct, discharge, or resist. In direct printing, coloured pastes are printed directly on the cloth.

### Common Methods of Fabric Printing:

The common methods of **fabrics** printing are-

1. Block print,
2. Batik print,
3. Screenprint,
4. Roller print,
5. Transfer print,
6. Jet print.

### Requirements of Good Quality Print:

Whatever the method used for **printing** textile fabrics, it is essential to prepare the dye in such a manner so that the following requirements are fulfilled to produce good prints.

1. A suitable print paste is made up which contains all the dyeing assistants necessary for good dye take-up and fixation on the fabric. The print paste also contains a thickening agent, which may be a natural gum or starch product.
2. The thickened print paste must be of the right viscosity so that it does not spread from the area to which it is applied and it must then be dried on the fabric.
3. The printed fabric must then be given a **treatment** that allows the printing paste to act as a localized dye bath. So that the dye is transferred from the paste to the fabric without **spreading** into surrounding areas of fabric. This is normally achieved by steaming the **fabric** so that the hot and wet conditions allow **dyeing** to take place.
4. The fabric then must be **washed** to remove the unfixed dye, thickening agents, dyeing assistants, etc. without causing **staining** of unprinted areas.

### Process Flow Chart of Textile Printing Section

(A typical flow chart of printing in textile industry)

Artwork from **merchandiser**



Design input



Design development





## **Style of printing:**

Sometimes we use various types of technique in different printing methods to perform the printing effect easily. This effect of printing is called style of printing. Style of printing mostly depends on the behavior of the dye and chemicals to be printed. It can be divided into following groups:

- a) Direct.
- b) Dyed.
- c) Azoic.
- d) Metal.
- e) Block.
- f) Crepe or crepon.
- g) Printing of lining.
- h) Discharge
- i) Resist.
- j) Raised.

## CHAPTER 19

# EMBROIDERY SECTION

### What is Garment embroidery?

What is garment embroidery? In short it's the process of sewing a design onto a piece of clothing or fabric. Embroidery machines use the jacquard as a template to stitch your artwork onto the garment.

### Types of Embroidery Used in Garments:

Different types of embroidery used on garments are mentioned below:

1. Whitework embroidery,
2. Candlewick embroidery,
3. Cross stitch embroidery,
4. Pulled thread embroidery,
5. Hedebo embroidery,
6. Drawn thread embroidery,
7. Hardanger embroidery,
8. Crewel embroidery,
9. Surface embroidery,
10. Goldwork embroidery,
11. Redwork embroidery,
12. Blackwork embroidery,
13. Bluework embroidery,
14. Sashiko embroidery.

### Process of Embroidery in Apparel Manufacturing Industry:

All the processes of embroidery have presented below:

1. Embroidery is a decorative stitch that is placed on the garment to enhance its properties or advertise the brand of the garment.
2. Some styles need the pocket, front, or sleeve to be embroidered. It is the embroidery section supervisor's responsibility to get the correct embroidery disk or tape from the production coordinator.
3. This tape is placed on the machine and the machine is set up to run 20 embroideries at once based on machine capacity.
4. The supervisor will adjust the machine speed so that it is suitable for the different fabric and **embroidery types**.
5. The approved standard will be hanging with the machine and follow according to style.
6. When the embroidery operation is completed in the embroidery section then all the pieces are checked 100% through the needle detector machine and send to the cutting section.
7. Finally **cutting section** will include all the parts together and deliver to the **sewing line**.

8. The cutting quality **inspector** must check each cut received from embroidery 100% for its **quality** and quantity.
9. Cutting in-charge has to follow the bundled chart and ensure the entire cut received is as per its Quantity and number sequence.
10. Any panel is to be returned in the embroidery section for rectifying should be noted down in this report and should ensure that each panel will be returned to each bundle after correction or replacement.
11. Q.A (**Quality assurance**) Manager and Cutting in-charge must ensure each bundle which is going to be issued to the sewing line will be 100% correct and acceptable with quantity too.
12. Full responsibility delegated to the embroidery section or plant about **standard quality** and each panel must be check for quality point advised by the QC (**Quality Controller**) and its Quality Manager. QC has to submit this report to the QA Manager on daily basis.
13. Before **sewing** line input, Q. I (Quality in-charge) will check each bundle which is going to be passed through the metal detector machine, also will be 100% correct and acceptable with quantity.

## CHAPTER 20

# WASHING SECTION

### Definition Of Garments Washing

It is a technology by which outlook, size, comfort, and fashion of garments or apparels are modified and given old garment effect is called garment washing. Varieties type of chemicals or materials may be needed to do the specific wash.

### Objects Of Garments Washing

**To develop softness of fabric –**

Size materials in garments are washed out by washing. For this reason hardness of the fabric is removed. In some cases, an additional softener is used to soften the fabric.

**To introduce fading effect –**

Dye or pigment in the garment is washed out by washing which introduce fading effects in fabric.

**To create new fashion –**

The washing process of garment brings a different outlook (faded, color tinted etc.) of garments which are used for creating.

### Different Types of Garments Washing:

Primary garment washing are classified into two types, these are-

1. Dry process or Mechanical process,
2. Wet process or chemical process.

#### 1. Dry process or Mechanical process:

In this type of clothing wash, there are some processes which have done without using any chemical or without using any garment loading washing machine are called Dry process or Mechanical process. Sometimes the dry process can be done by using a mechanical method.

*Various types of dry processes applied in garments washing are mentioned below:*

- Sandblasting process,
- Hand sanding or Hand brushing process,
- Machine sanding process,
- Overall wrinkles process,
- Permanent wrinkle process,
- Grinding process,
- Destroy process,
- Tacking process,
- P.P spray process,

- Whiskering process,
- Curing process,
- Tearing process,
- Hand scrapping process.

## **2. Wet process or Chemical process:**

There are some processes in garment washing, which can be done by using chemical and garments loading **washing machine** is called Wet process or chemical process.

*Different types of wet processes applied in garment washing are mentioned in the following:*

- Normal wash or rinse wash,
- Silicon wash,
- Pigment wash,
- Caustic wash,
- **Bleach wash,**
- **Enzyme wash,**
- Stone enzyme wash,
- Acid wash,
- Stonewash,
- Tie wash,
- Super whitewash,
- Tinting,
- Deep dyeing,
- Over dyeing.



## CHAPTER 21

# SEWING SECTION

### SEWING:

After receive the garments components from cutting section, all the garments parts are joined and sewn as sequentially. Obviously all the components are sewn respects on buyer requirement.

Sewing section is the most important department of a garment manufacturing industry. Sewing machines of different types are arranged as a vertical line to assemble the garments. Sequence of types of sewing machine arrangement depends on sequence of assembling operations.

### Process flow of sewing section:

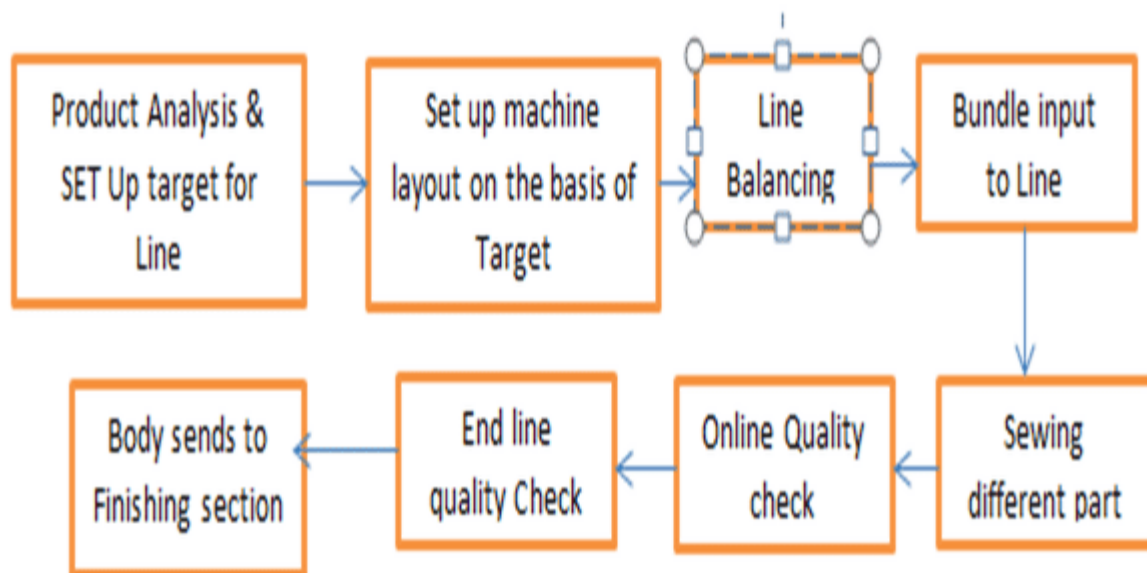


Fig: Diagram in how sewing section perform

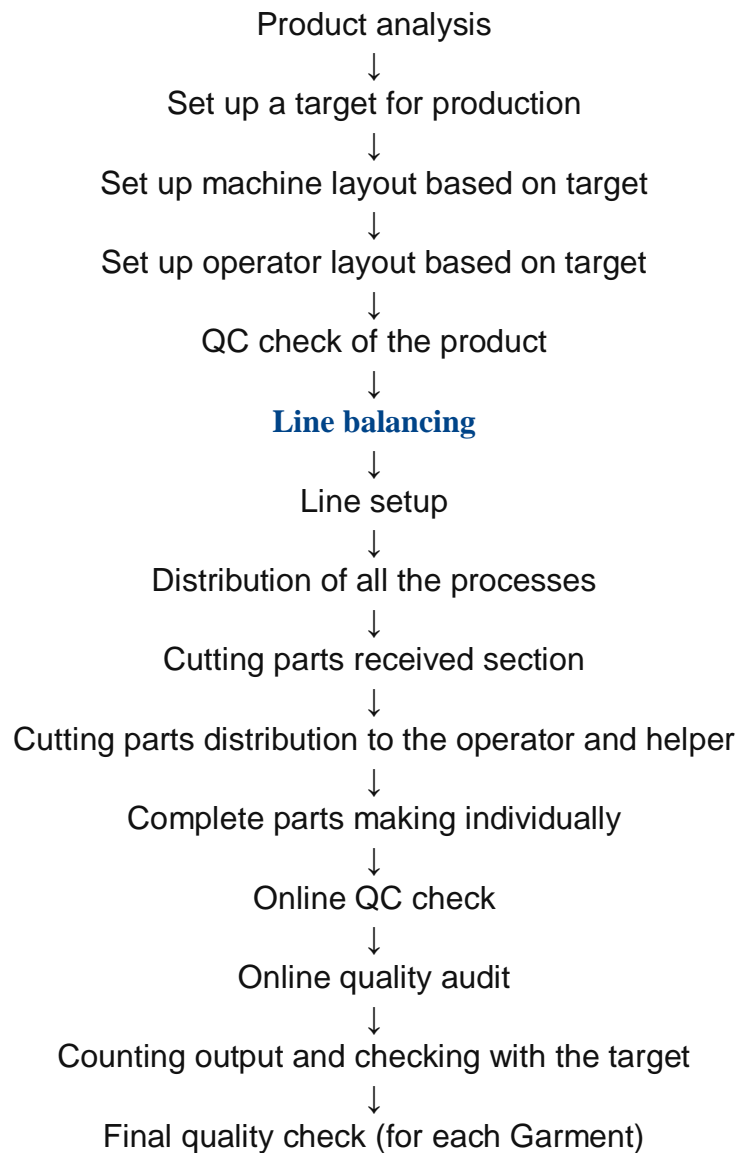
### Machine used in the sewing section:

#### Single Needle Lock Stitch machine

- ❖ Double needle Lock stitch machine
- ❖ Vertical Lock stitch machine
- ❖ Single needle Chain Stitch machine
- ❖ Pointer (collar, cuff)
- ❖ Halamark m/c
- ❖ Overclock Machine (5Thread)

- ❖ Feed off the Arm machine
- ❖ Flat bet fusing machine
- ❖ Continuous fusing Machine
- ❖ Kansai machine etc.

## Process Flow Chart for Garments Sewing Department



## 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.

## Process Breakdown of Basic Shirt (Full Sleeve):

**Table – Basic Shirt Manufacturing Process:**

SL No.#	Process name	Machine & Attachment
<b>Collar</b>		

1	Collar top part Fusing	Continues Fusing m/c
2	Collar finish pattern mark on Collar	Pencil and pattern
3	Collar trim	Overclock m/c (without thread and needle )
4	Collar run stitch (top and in part)	SNLS
5	Collar Turn	Hand work
6	Collar point	Pointer + Collar stay
7	Collar outline (1/4 top stitch)	SNLS
8	Collar band fusing	Continuous fusing m/c
9	Collar band hem	SNLS
10	Finish pattern mark on collar pattern	Pattern .pencil
11	Collar and collar band attach	SNLS
12	Collar band turn	Hand work
13	Collar band (1/4 top stitch)	SNLS

14	Collar Band point	Pointer
<b>Cuff</b>		
15	Cuff fusing	Continuous Fusing machine
16	Cuff hem	SNLS
17	Cuff Run stitch	Vertical Lock stitch machine
18	Cuff turn in pair	Hand word
19	Cuff outline (1/4 top stitch)	SNLS
<b>Front part</b>		
20	Front Pair tuck + care label joint	SNLS
21	Front BTN placket make	Kansai machine + folder
22	Front Placket Fusing	Flatbed fusing machine
23	Box placket make	SNLS + Folder
24	Pocket positioning	Pattern
25	PKT Rolling	SNLS

26	PKT iron + scissoring	Iron + scissor
27	PKT Attach to front + placket close	SNLS
<b>Back part</b>		
28	Main and size label joint	SNLS
29	Label attach to Bk part	SNLS
30	Yoke attach to BK part	SNLS
31	Yoke top stitch	SNLS
<b>Sleeve part</b>		
32	Gamble attach to body	SNLS
33	SLV placket fold and iron	Iron + folder
34	SLV Placket attach	SNLS
<b>Assembly</b>		
35	Shoulder Joint	SNLS

36	Shoulder top stitch	SNLS
37	SLV Joint to body	Overlock m/c
38	Armhole Top stitch	SNLS + Folder
39	Collar joint to body	SNLS
40	Collar Closed	SNLS
41	Collar to Stitch	SNLS
42	Side seam	Feed off the arm machine
43	Cuff attach to SLV	SNLS
44	Bottom hem	SNLS + Folder
44	BTN Hole	BTN Holing Machine
45	BTN Attach	BTN Attaching machine

### **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.

**For making a basic shirt, we need 7 types of sewing machines. They are given below:**

1. Plain Machine or Lock Stitch Machine
2. Over lock or over edge Stitch Machine
3. Button Holing Machine
4. Button Attaching Machine
5. Feed of the Arm
6. Kansai or Multi needle chain stitch machine
7. Single Needle & Double Needle Chain Stitch Machine (with or without edge cutter & thread cutting mechanism)

**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.



### **Button Holing Machine:**

- Stitch group: lock or chain stitch
- Arrangement of button hole size being small or larger
- Arrangement of stitch density being increased or reduced.
- Button hole can be made to cut the hole before or after sewing a button hole.

### **Button Attaching Machine:**

- Productions lock stitch, chain stitch or hand stitch.
- Various types button clamps needs for attaching various sizes and types of button.
- The bottom may be 2 or 4 holes. 4 whole button may be sewed by cross or parallel.
- If chain stitch is used, the sewing looks nice, but the security of stitch is comparatively less.
- In case of lock stitch used no possibility of sewing opening. But not looks nice. In fully automatic machines, button feeding and positioning inside the button clamp is performed by a hopper and pipe.
- It can attach predetermined number of buttons at a predetermined distance in acyclic order.

### **Feed of the Arm:**

- Number of needle: 2
- SPM: 3000 -3200
- Number of thread: 4 threads
- Twist per inch: 15 – 20
- Stitch group: chain stitch
- Mainly sewing shirts, Jeans, Gridding goods & double stitching pants

### **Kansai or Multi needle chain stitch machine:**

- Number of needle: 6-17
- Number of thread: 12 – 34
- SPM: 4000 – 4500
- Stitch group: Chain Stitch

### **Chain Stitch Machine:**

- No. of needle: one or more needle
- No. of thread: one or more thread (Single thread or multi thread)
- SPM: 1800-6000
- Stitch length : 1.4 to 4.5 mm
- Automatic thread trimmer
- Various types of feed mechanism is adjusted to the machine.
- Used in knitted wear and jeans.

## **The function of different sewing machine:**

### **Plain sewing machine:**

- Hem joining
- Pocket joining
- Side joining
- Band Tack
- Sideband joining
- Top Seam
- Zipper join
- Zipper top join
- Hood Tuck

### **Overlock sewing machine:**

- Hood outer part join
- Hood inner part join
- Inner & outer part join
- Servicing join
- Sleeve join
- Front & back part join
- Hem servicing join
- Side seam

### **Flatlock machine:**

- Top seam
- Armhole top seam
- Front & back join top seam
- Back tape join

### **Bar tack machine:**

- Tuck

### **The feed of the arm:**

- Shoulder top seam

### **Flatlock cylinder bed:**

- Sleeve hem

### **Button attaching machine:**

- Button attach

### **Eyelet machine:**

- Eyelet attach

### **Basic parts of sewing machine:**

- **Bobbin:** The bobbin is a cylinder on which lower thread is wound in a plain machine.
- **Bobbin Case:** It holds the bobbin..
- **Needle Clamp:** It is used to holds & tightens the needle.
- **Needle Bar:** It is used to hold the needle
- **Pressure Regulator:** The pressure regulator is used to adjust the pressure foot of the sewing machine.

- **Needle take –up:** It takes up the needle to its heights position of the sewing machine.
- **Tension post:** It gives proper tension to the needle thread of the sewing machine.
- **Feed dog:** Feed dog is a critical component of a sewing machine that moves the fabric forward after Sewing.
- **Scale:** It controls the density of the stitch per inch.
- **Throat plate:** A throat plate is a basic component of a sewing machine where a stitch is formed.
- **Spreader:** It is used to give zig-zag stitches.
- **Knife lever:** It moves the knife up and down to cut fabric
- **Thread take-up lever:** The thread take-up lever moves up and down, holding the thread following the needle.
- **Thread guide:** It guides thread to the needle.
- **Looper:** It creates a loop of thread in the overlock & flat lock machine.

### Different types of stitch:

#### ➤ Lock stitch:



#### ➤ Chain stitch



➤ **Over edge stitch:**



➤ **Tuck stitch:**



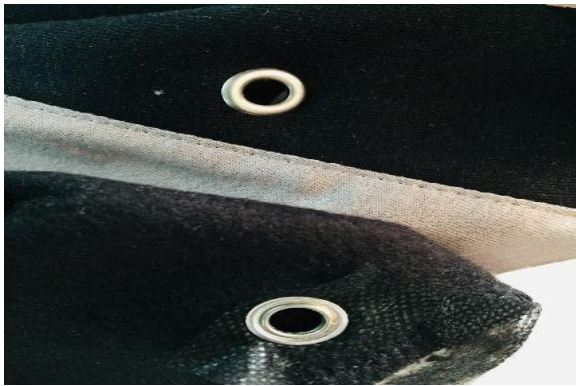
➤ **Button hole:**



➤ **Button attach:**



➤ **Eyelet attach:**



**Different types of stitch defects:**

**Broken stitch:** In the middle of Sewing, breaking the thread is called a broken stitch.

**Causes:**

- Unskilled operator.
- Incorrect machine adjustment.
- If thread breaks during trimming.

**Skip stitch:** If the stitch is not locked properly.

**Causes:**

- Incorrect selection of needle size and thread according to the fabric.
- Incorrect machine adjustment.
- Bad quality sewing thread.

**Jam stitch:** Double stitches in the same position is called jam stitch.

**Causes:**

- Unskilled operator.
- Incorrect machine adjustment.

**Puckering:** After Sewing, if fabric is creased.

**Causes:**

- Incorrect fabric grain line.

- Improper maintenance of sewing allowance.

**Oil spot:** Any types of oil mark on the fabric.

**Causes:**

- Incorrect machine maintenance
- Oil leakage in the machine.

**Raw edge:** Uncut edges of fabric is called raw edge.

**Causes:**

- Wrong marking.
- Improper machine adjustment.
- Careless operating system.

**Needle Hole:** Any type of hole in the fabric due to the broken needle.

**Causes:**

- Broken needle.
- Wrong needle number used.
- Careless operating system during the repair.

**Mismatch Stripe:** Mismatch stripe after Sewing.

**Causes:**

- Incorrect cutting.
- Improper machine adjustment.
- Unskilled operator.

**Dirty Mark:** Any types of dirty marks occurred in the fabric.

**Causes:**

**Uncut Thread:** Uncut thread after Sewing.

**Causes:**

- Incorrect adjustment of auto trimming machine.
- The carelessness of the operator and helper.
- Incorrect thread trimmings part.

## **Sewing machine layout planning:**

### **Different Types of Line Layout**

Though there are multiple options of sewing line layout to choose from, most garment manufacturers are comfortable with straight lines having center table in between two rows of machines.

In this article I will be showing you different types of line layout found in garment industry. This article would not tell you which line layout is good and which one is not so good when compared with others.



**Line with center table and operators facing same direction  
(Figure-1):**

In the line a centre table is placed in between two rows of sewing machines. All operators sit on workstation facing same direction. Operators pick bundles from center table and after stitching dispose bundles on the center tables.



Figure 1: Straight line.

**2. Line with center table and operators facing opposite direction  
(Figure -2)** Machine layout is same as above one. Difference is on operators' sitting position. Operators sit on the machine keeping center table left side. This layout is more convenient to all operators for picking up work from left side.



Figure-2. Straight line operator facing opposite direction

### 3. Straight line without center table and one row of machines

In this layout no center table is used for material handling. Instead cutting and finished garments are kept on hangers, on baskets or on trolleys. See the different form of layout where machines are placed in a straight line but no center table is used.

**(a) Overhead material movement (Fig-3):** Garment components are placed clipped on hanger. and transported on a rail.



Fig. 3: Straight line layout with overhead material transportation

**(b) Trolley for material transportation (Fig-4):** In this layout instead of center table trolleys are used for material transportation.



Fig-4: Straight line layout with trolleys



**(c) Line having individual disposal basket (Fig-5):** Instead of centre table individual disposal baskets are provided to operators.



Fig-5: Straight line layout with individual disposal basket

#### **4. Side by side machine layout (Fig -6):**

In this layout sewing machines are placed side by side. Two rows of machines are faced each other. This type of layout is used for single piece production system.



Fig -6: Side by Side machine layout

## 5. U-shaped line layout (Fig - 7):

This kind of line layout is used in lean manufacturing. Machines are placed side by side and U-shape is formed to make a line. Operators sit inside. No center table is used. This line layout is also known as modular line.



Fig. 7: U-shaped line layout.

## 6. Modular line layout:

In lean manufacturing, to reduce material transportation and increase the machine utilization sewing machines are placed in such a way that neither it forms a U-shape nor a straight line. Instead machines placed that suits better to work into multiple sewing machines sitting in single chair. I don't know what the exact name of this kind of layout is. This layout is named as modular layout to differentiate from the above one.

## 7. Machine layout in UPS system (Fig-8)

This is bonus for you. I found this while searching on the web. Machines are placed in straight line but in an angle. In the other UPS workstation machines can be placed side by side.



Fig-8: Line layout in UPS system



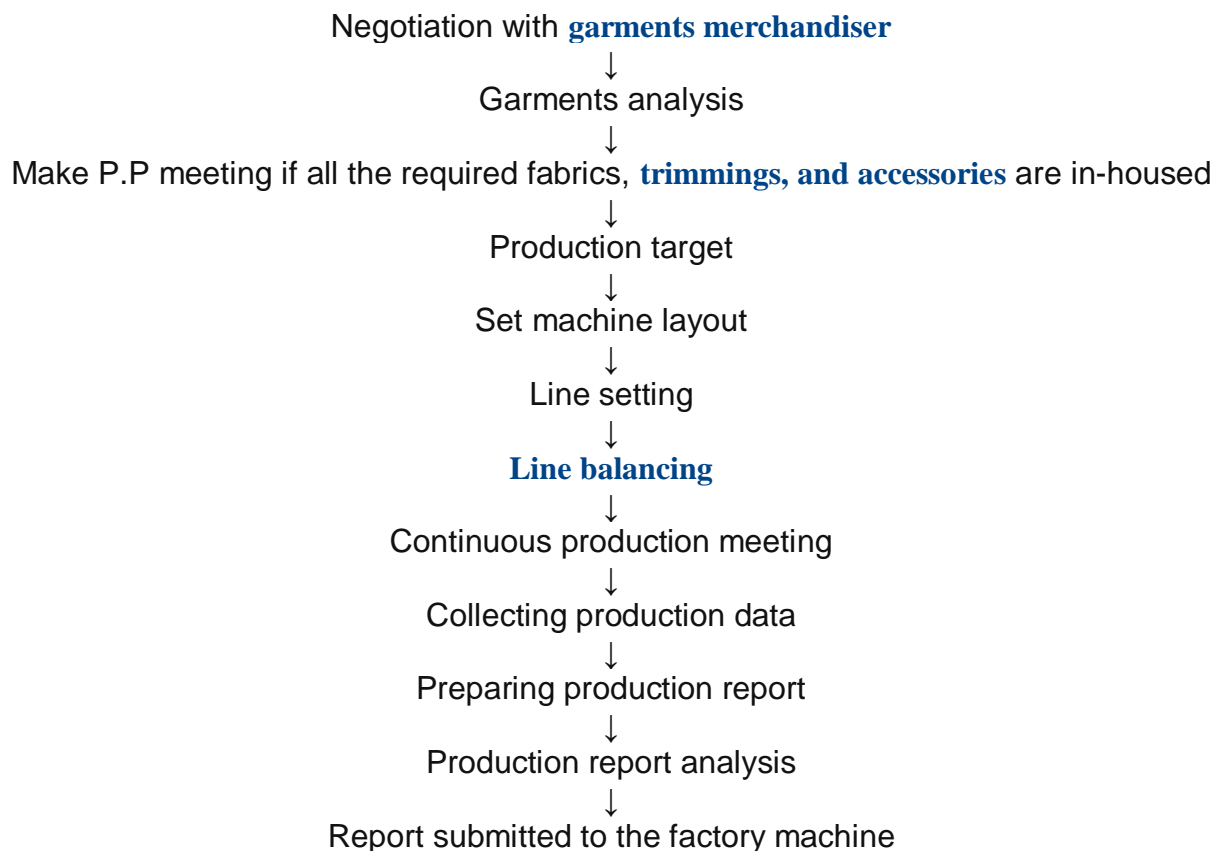
## CHAPTER 22

# IE AND PLANNING IN GARMENTS

### What is IE in garment?

At present Industrial Engineering (IE) is one of the important departments for each garment or textile factory. Today's maximum factory is run by industrial engineers, where they have to follow a process flow chart. By which they can easily control the whole garments production processes.

### Process Flow Chart of Industrial Engineering (IE):



When garments manufacturers had faced a threat of global competition, other manufacturers produced products at a lower cost; the garments industry started to set industrial engineering to produce more goods at a lower cost. Industrial engineering works to produce maximum output by limited minimum resources and every action taken to calculate what adds value to the product.

## Basic knowledge doing IE job in Garments:

Basic knowledge is about Industrial engineering such as efficiency, production, productivity, overall efficiency, on standard efficiency. Major KPI such as man to machine ratio, cut to ship ratio, order to ship ratio, on-time delivery percentage, average style changeover time, DHU, quality to the production, NPT, the major area of NPT. Skill matrix, what are the criteria of operator grading. Thread consumption, elastic, lace consumption knowledge. Identify bottleneck and eradicate bottleneck. Knowledge about stitches. making operation bulletin. Working under pressure and cope up with every situation. Well dress up and finally be smart. English knowledge is very important cause a lot of foreigners are working in this section. Mathematical knowledge such as CM, CPM, EPM, efficiency, rating. Knowledge about lean, 6S, kaizen, kanban, 6M,7M,8M.etc.As an IE we have a lot of responsibility. Have knowledge about IE like Manpower optimization, studying line capacity & production study, Layout setting, Analysis of method & trying to improve the process, finding bottleneck & line balancing and Target setting, Consumption of Elastic, piping & many things.

## What is garments production planning?

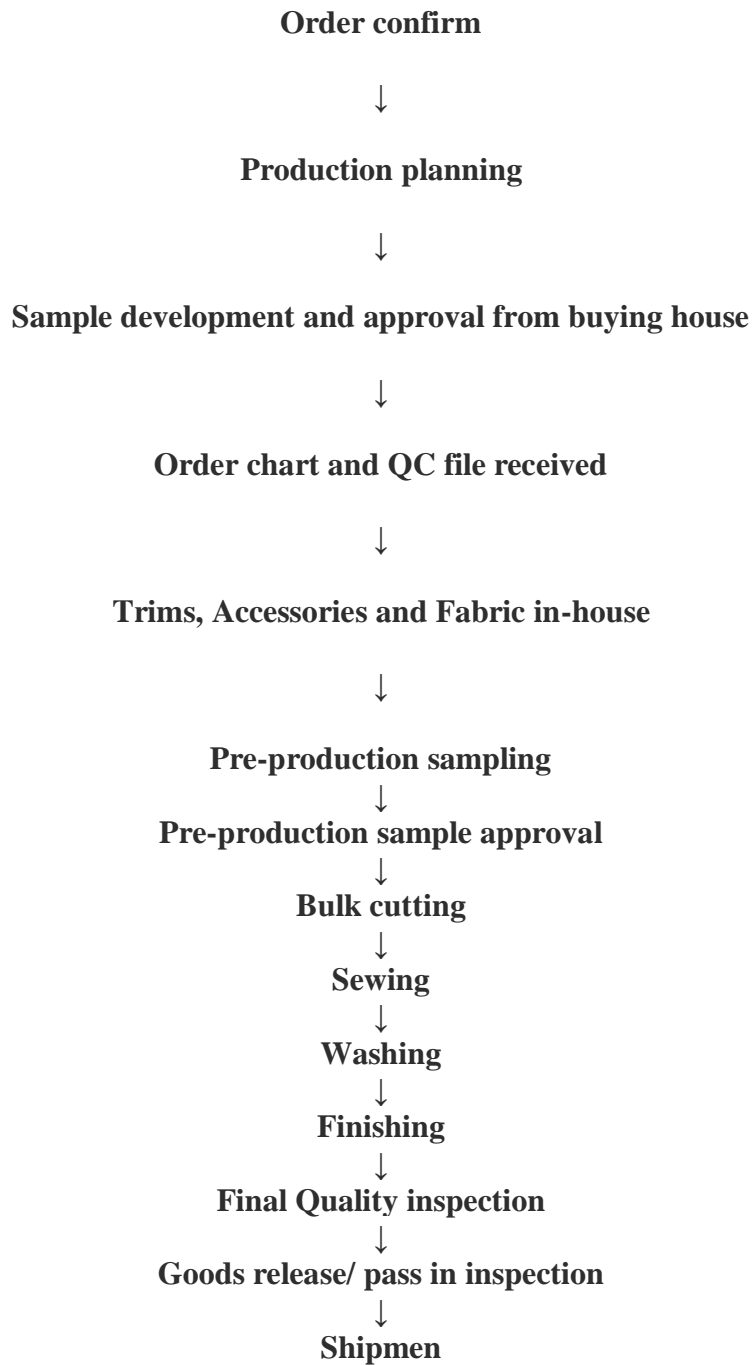


The main functions of productions planning and control (PPC) are follow-up and execution of garment export order, job scheduling, material resource planning, facility location, loading production, process selection and planning, capacity planning, line planning, estimating quantity and costs of production.

### Objectives of Garments production planning

1. Utilize full production capacity
2. Right product input right line
3. Meet customer given delivery date.
4. Execute whole garments manufacturing process
5. Give feedback to top management

## **Production planning process execution flow chart**



## **Cutting Plan:**

Cutting is not all about capacity, efficiency, and working hours. Cutting starts as per the planning sequence if the garments production preparation process has already been completed. Cutting delay for some quality issues of fabrics. Based on shade grading, shrinkage, there has a cutting plan.

## **Cutting Planning process:**

i. Cutting Planning is done based on the following:

- Production Plan
- Order details e.g. Size breakdown, Specifications, etc.
- Approved Shade Band chart, Approved fabric swatches.
- The Production Plan is received from the Production Manager, order details from Merchandiser, and Shade Band Chart from the QC Department.

ii. Based on the above information the Cutting In Charge prepares the Cutting Plan.

iii. The Cutting In-Charge informs Size, Ratio, and fabric width to the CAD department for marker preparation by preparing cutting lay order sheet.

iv. Once the Cutting In Charge has approved the marker after it has been checked for the pattern direction and tightness and consumption, it is further approved by the Production Manager for efficiency.

v. Cutting In-Charge requisition slip based on the consumption approved by Production Manager and give to the store's department for issuing of fabric.

## **Sewing Plan**

A Sewing plan depends on per hour production capacity, working hours, efficiency, order quantity, machine types, and product difficulties. The first day is to set the Line layout, 2nd day you will get output but production will be less than average.

### **Sewing planning for example:**

For a lot of 5000 pcs, Your sewing 1st-day production 300, 2nd Day 700, 3rd day 1000, 3rd Day 1150, 4th day 1150, 5th day, 6th day the rest 700 and layout of next lot. So your average production per day is 833.

## **Washing process Plan**

When it is coming to the wash process, generally a minimum of 3 days keep after the sewing completion date for the washing plant. In the garments industry, everything never going to happen as per planning. Sewing may take two days more than the planned date. So pressure going to hit on Washing and Finishing. A production planner has to follow up washing backlog with Washing factories; what goods are urgent, what washing delay is allowable. If garments manufacturer does not have own washing plant, they have to give subcontract in another factory. In this case communication with a washing plan, washing follows up are very much necessary for a production planner.

## **Finishing Plan**

The finishing process is very complex of fancy style. Casual styles are comparatively easier than fancy styles. Based on the buyer's product quality standard and the number of the finishing process, finishing the production plan can be done. If you have many lots in hand in finishing, you have to check which delivery is tight. Finishing is done on a priority base and Shipment date status.

## **Final Audit and shipment**

Final quality inspection is done when goods packing is already completed. If a final inspection fails and the buyer asks to recheck the whole quantity of goods, you will fall in trouble if you do not have time in hand to ship the goods. So it's really necessary to keep one week in advance when you do production planning.

## **Garments Production Planning and Execution Factors**

These factors are related to start and execute planning.

1. Order Sheet
2. QC File (Trim Card)
3. Approved sample
4. Size set cutting and approval status
5. Supplier raw materials quality clearance
6. Bulk cutting start date
7. Daily sewing production
8. Washing status
9. Finishing Backlog
10. Shipment date

## **Production planning software of Garments manufacturing**

Tough most of the garments factories do production planning in excel; there are many planning software in the market. Planning can be done internally through ERP. Planning software saves time, many data have to be input if you use excel. You can customize your file in Microsoft excel.

1. Excel
2. Fast react
3. APPS planning module
4. Gemserp
5. MAE
6. STAGE
7. Pro-Plan
8. SAP



## CHAPTER 23

# FINISHING SECTION

### What is finishing section in garment industry?

Finishing is the last stage of packed garments those are ready for sale. Therefore, it is one of the most important stage in whole garments manufacturing process. In a garment industry finishing section involves with garment washing, checking, final inspection, pressing, packing, etc.

#### Process Flow Chart of Garments Finishing:

Sewn garments received in finishing section

↓  
Initial **quality** check

↓  
Spot removing if there's any spot

↓  
Ironing or pressing

↓  
**Inspection**

↓  
Hangtag attaching

↓  
Folding

↓  
**Polybag**

↓  
Metal check

↓  
Packaging or **cartoning**

#### Functions of Finishing Department in Garment:

Activities of the finishing department are listed below

##### 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

### **3. 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.

### **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.

### **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.

# CHAPTER 24 SHIPMENT SECTION

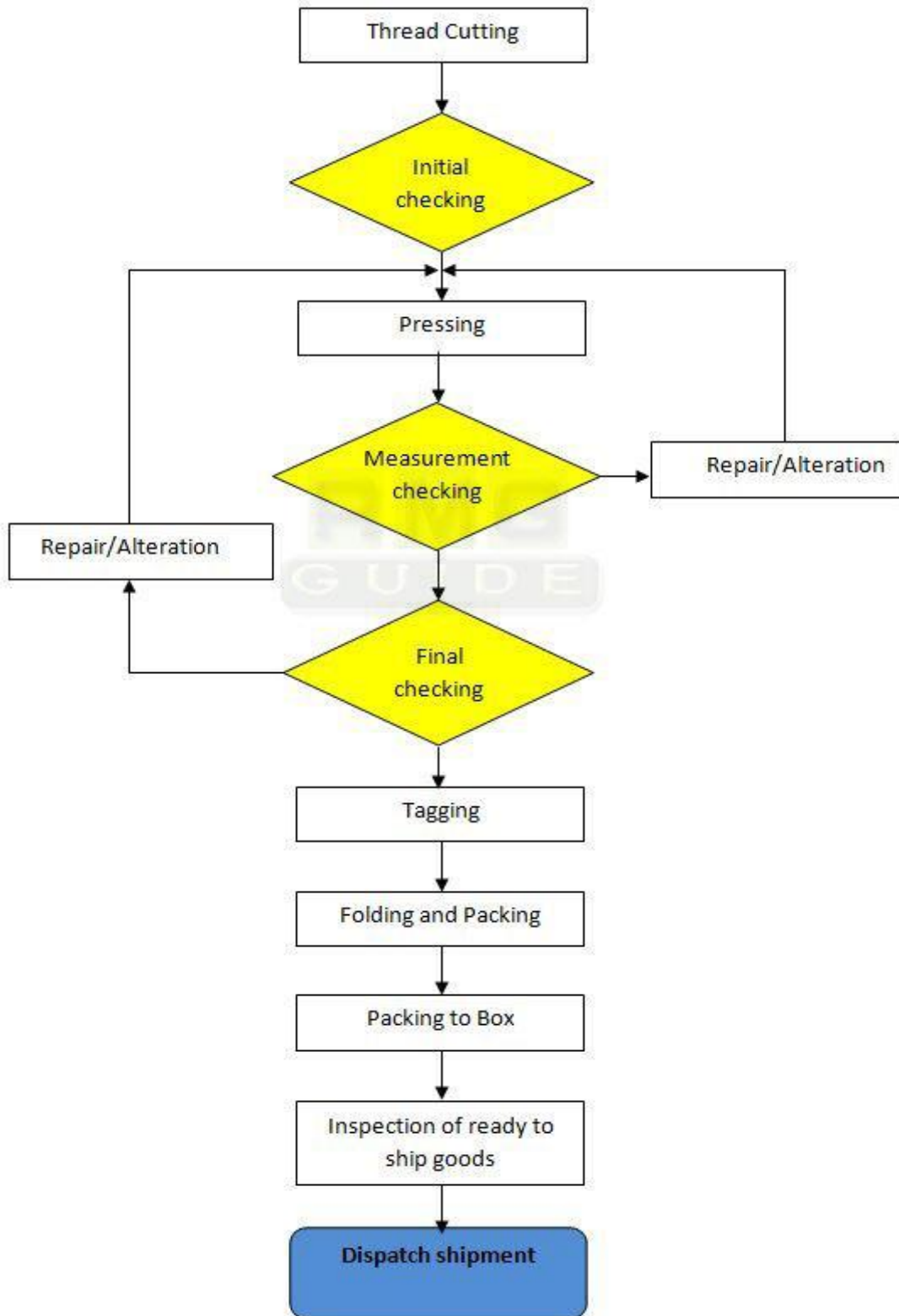
### Garments Export Process:

Garments export process means all the processes required from order receiving to shipment. Every garments merchandiser plays an important role in completing the **garments export orders**. It's not an easy task that we have normally seemed. **Garments merchandiser** has to sacrifice a lot of matter to earn profit from an export order. To perform all the required functions for the export order, the garments merchandiser should follow a process flow chart which will help him to do the right task at the right time. This article has shown all the required matters for completing the garments export processes.

### Process:

- When shipping a product overseas, the exporter must be aware of packing, labeling, documentation, and insurance requirements. It is important that exporters ensure that the merchandise is:
  - Packed correctly so that it arrives in good condition;
  - Labeled correctly to ensure that the goods are handled properly and arrive on time at the right place;
  - Documented correctly to meet U.S. and foreign government requirements, as well as proper collection standards; and
  - Insured against damage, loss, pilferage and delay.
- Most exporters rely on an international freight forwarder to perform these services because of the multitude of considerations involved in physically exporting goods.

## Garment Shipment Process Flow Chart



## CHAPTER 25

### Full form of all garments related abbreviation:

1. **AAMA-American Apparels Manufacturing Association**
2. **AAMC-American Apparel Manufacturing Corporation**
3. **AAQC-American Apparels Quality control**
4. **AGM- Assistant general manager**
5. **AQL-Acceptable Quality Level**
6. **AQM- Assistant Quality Manager**
7. **ASQ- American Society for Quality**
8. **BATEXPO-Bangladesh Textile Exposition**
9. **BGMEA-Bangladesh Garments Manufacture's and Exporter's Association**
10. **BJCP-Bangladesh Jute Cultivation Program**
11. **BJEC-Bangladesh Jute Export Corporation**
12. **BJMA-Bangladesh Jute Mills Association**
13. **BJMC-Bangladesh Jute Mills Corporation**
14. **BKMEA-Bangladesh Knitwear Manufacture's and Exporter's Association**
15. **BL-Bill of Lading**
16. **BOM- Bill of Material**
17. **BS- Bill of Sale**
18. **BS- British Standard**
19. **BSCI – Business Social Compliance Initiative**
20. **BTMA-Bangladesh Textile Mills Association**
21. **BTMC-Bangladesh Textile Mills Corporation**
22. **CAD-Computer Aided Design**
23. **CAM-Computer Aided Manufacturing**
24. **CAP-Corrective Action Plan**
25. **CBA-Collective Bargaining Agent**
26. **CBI-Center Back Line**
27. **CBM-Cubic Meter**
28. **CEO- Chief executive officer**
29. **CF-Cubic Feet**
30. **CFI-Center Front Line**
31. **CFO- Chief financial officer**
32. **CI-Commercial Invoice**
33. **CIF-Cost Insurance and Freight**
34. **CIP- Commercially Important Person**
35. **CM-Cost of Making/Cut and Make/ Cost of Manufacturing**
36. **CMT-Cost of Making with Trimmings/Cut, Make & Trim**
37. **CnF-Cost and Freight**
38. **CO- Certificate of Origin**
39. **COC-Code of Conduct**
40. **COD-Cash on Delivery**
41. **COO- Chief operating officer/ Chief Operations Officer**

42. CPM- Cost per minute
43. CPSIA- Consumer Product Safety Improvement Act
44. CRD-Cargo Receive Date
45. CT-Cycle Time
46. CTL- Consumer Testing Laboratories
47. C-TPAT - Customs-Trade Partnership against Terrorism
48. CWO- Cash with Order
49. D65-Artificial Day Light
50. DGM- Deputy general manager
51. DHU- Defects per hundred unit.
52. DMAIC- Define, Measure, Analyze, Improve and Control
53. DMD- Deputy managing director
54. DOP- Director of Operations
55. DPR- Daily production report
56. DTM- Dyed to Match
57. ED- Executive director
58. EDI- Electronic Data Interchange
59. EDT – Estimated Delivery Time
60. EMB- Embroidery
61. EMS- Environment management system
62. EPB-Export Promotion Bureau
63. EPI – Ends Per Inch
64. EPZ-Export Processing Zone
65. ERP- Enterprise Resource Planning
66. ETA -Estimated Time of Arrival
67. ETD -Estimated Time of Departure
68. ETP- Effluent Treatment Plant
69. FA- Final Audit
70. FBCCI- Federation of Bangladesh Chamber of Commerce and Industries
71. FDI-Foreign Direct Investment
72. FI- Final Inspection
73. FIFO- First In First Out
74. FM- Factory Manager
75. FOA-Free on Air
76. FOB-Free on Board/Freight on Board
77. FPT - Fabrics performance test
78. FQA-Final Quality Audit
79. FTC-Federal Trade Commission
80. GAT-General Agreement on Tariff and Trade
81. GCR- Garments Check Report
82. GDP-Gross Domestic product
83. GLM- Grams per linear meter
84. GM- General Manager
85. GMT-Garments
86. GNP-Gross National Product
87. GPQ- Guideline for production and quality

88. GPT-Garments Performance Test
89. GSD- General Sewing data
90. GSM - Grams per square meter
91. GSP-Generalized System of Preference
92. GW- Gross Weight
93. HOM- Head of manufacturing
94. HOO- Head of Operations
95. HOP- Head of production
96. HR- Human Resource
97. HRM- Human Resource Management
98. IC- Inspection certificate
99. ICB- Investment Corporation of Bangladesh
100. ICC- International Chamber of Commerce
101. IE-Industrial engineering
102. ILO-International Labor Organization
103. IMS-Industrial Management System/Service
104. IPC- In-Process Check
105. IPE- Industrial and production engineering
106. ISO-International Organization for Standardization
107. KPI – Key Performance Indicator
108. L/C-Letter of Credit
109. LCA- Letter of Credit Authorization
110. LDC-Least Developed Country
111. LG- Letter of guarantee
112. LIFO- Last In First Out
113. LT- Lead time
114. MD- Managing director
115. MDI- Managing for Daily Improvement
116. MMT-Measurement
118. MOQ- Minimum order quantity
119. MOU-Memorandum of understanding
120. MP- Man Power
121. MTD- Month to Date
122. NGC-New Generation Computing
123. NOC- No Objection Certificate
124. NPT-Non Productive Time
125. NSA-No Seam Allowance
126. OB- Operation bulletin/ Breakdown
127. OEE- Overall Equipment Effectiveness
128. OQL – Outgoing Quality Level/ Observed Quality Level
129. OZ- Ounces
130. P/C – Polyester + Cotton
131. PC- Production coordinator
132. PCD- Planned Cut Date
133. PD- Production director
134. PDCA- Plan, Do, Check, Act

- 135. **PDM-Production Details Manual**
- 136. **PI – Proforma Invoice**
- 137. **PM-Production Manager**
- 138. **POM- Point of measurement**
- 139. **PO-Production Order/Purchase Order**
- 140. **PPC- Production Planning and control**
- 141. **PPE – Personal Protective Equipment**
- 142. **PPI – Picks Per Inch**
- 143. **PPM- Pre-production meeting**
- 144. **PP-Pre Production**
- 145. **PQI- Practice quality improvement/ Performance and Quality Improvement**
- 146. **PSI- Pre-shipment Inspection**
- 147. **PS-Production Sample**
- 148. **QA-Quality Assurance**
- 149. **QC- Quality controller**
- 150. **QC-Quality Control**
- 151. **QI- Quality Inspector**
- 152. **QIP- Quality Improvement Plan**
- 153. **QMS- Quality Management System**
- 154. **RCS- Recycled Claim Standard**
- 155. **RFD – Ready for Dyeing**
- 156. **RFID- Radio-frequency identification**
- 157. **RFT-Right First Time**
- 158. **RH- Relative Humidity**
- 159. **RMG-Ready Made Garments**
- 160. **RPM- Revolution per Minute**
- 161. **RQS- Requirement for quality system**
- 162. **RSL- Restricted Substances List**
- 163. **SAM-Standard Allowed Minute**
- 164. **SCM- Supply Chain Management**
- 165. **SKU- Stock Keeping Unit**
- 166. **SMV-Standard Minute Value**
- 167. **SOP-Standard Operating Procedure**
- 168. **SPC- Statistical process control**
- 169. **SPI- Stitch Per Inch**
- 170. **SPL- Stitch per length**
- 171. **SPM- Stitches per Minute**
- 172. **SPT- Stitch per tack**
- 173. **SQC- Statistical Quality Control**
- 174. **SQL-Submitted Quality Level**
- 175. **SRL- Sensory and Consumer Research**
- 176. **STP- Sewage Treatment Plants**
- 177. **T/C – Tetron + Cotton**
- 178. **TAP-Total Acceptable Product**
- 179. **TBA- To be announced**
- 180. **TBC- To be confirmed or to be continued**



- 181. TBD- To be discussed/ defined/ decide
- 182. TIN-Tax Identification Number
- 183. TLS- Traffic Light system
- 184. TNA- Time and Action Plan
- 185. TPM- Total productive maintenance
- 186. TQM – Total Quality Management
- 187. TRL- Technology Readiness Level
- 188. UPC-Universal Product Code
- 189. VMS- Visual Management System
- 190. VPR-Vendor performance Record
- 191. VSM- Value stream mapping
- 192. WAS-Weekly Audit Schedule
- 193. WH-Working Hour
- 194. WIP- Work In-process
- 195. WTO-World Trade Organization
- 196. WTP- Water Treatment Plant
- 197. XL- Extra Large
- 198. YTD- Year to Date
- 199. YY- Yields Per Yard
- 200. UD- Utilization Declaration
- 201. GOTS- Global Organic Textile Standard
- 202. **IESD- Industrial Engineering sewing data**
- 203. MTM- Measures time in terms
- 204. TMUS- Time measurement units.
- 205. OCR- Order completion report.
- 206. FGTN- Finished goods transfer note.
- 207. MOM- Minutes of Meeting.
- 208. FMCG- Fast moving consumer goods.
- 209. FMEA- Failure mode & effects analysis.

**Some Important Textile Unit Conversion Factor:**

**Table of Conversion Factor for Textile Calculation:**

To Change From	To	Multiply by
Centimeter	Inches	0.3037
Inches	Centimeter	2.54

Meters	Inches	39.37
Meters	Feet	23
Foot	Metre	0.3
Meters	Yards	1.1
Yards	Meters	0.91
Square inches	Square centimeters	6.4536
Square yards	Square meters	0.8361
Square meters	Square feet	10.76
Acre	Hectares	0.4047
Hectares	Acre	2.471
Kilometers	Miles	0.6214
Cubic Inches	Cubic Centimetres	16.387
Cubic Centimetres	Cubic Inches	0.061

Litres	Cubic Inches	61.02
Imperial Gallon	Litres	4.536
Ounces (oz)	Grams	28.35
Grams	Ounces(oz)	0.035
Pound	Kilogram	0.4536
Pound	Ounces(oz)	16
Ounces	Ounces	0.0625
Pounds	Grains	7000
Grains	Pounds	0.000142
Kilogram	Pound	2.205
Pounds per litre	Pounds per gallon	0.01
Pounds per square foot	Kg. per square meter	4.883
Pennyweight(dwt.)	Grains	24

## CHAPTER 26

# Qualifications for a good garment merchandiser:

A **garment merchandiser** should be achieved some important qualifications to be a qualified merchandiser. Those are discussed in the following:

### 1. Excellent Communication Skills:

To be a qualified merchandiser, it's a main and important issue. In which way the order will be completed, totally depends on the excellent communication skills of a merchandiser. If you can easily communicate with the buyer and manufacture then the whole process will be very easy to complete an order.

### 2. Excellent English Proficiency:

The current generation vastly depends on the English language to communicate with foreigners. English proficiency is a burning criterion for a garment merchandiser. It helps garments merchandisers to make excellent communication with the buyer.

### 3. Excellent Product Knowledge:

A qualified garments merchandiser should have needed excellent product knowledge. By which he/she can understand not only the correct information of the product from the buyer but also suggest the accurate information up-to-the manufacturer.

### 4. Computer Skills:

In the current situation, virtual media is one of the very easiest and popular ways to make communicate with others. All kinds of record-keeping and forming database, computer skills are a must for a garments merchandiser. It's seen that most of the buying house is totally technology-based. Where the buyer receives the daily updates via Skype, Viber, WhatsApp, etc. from a garments merchandiser. If you have enough knowledge of computer-based technology then your job will be very easier.

### 5. Excellent Consumption Calculation Knowledge:

A qualified garment merchandiser has the correct consumption calculation knowledge to earn profit from an order. Because an accurate consumption calculation is a key point for achieving a profit of that order.

### 6. Excellent Knowledge about the Factory:

Before placing an order into the factory, a garment merchandiser has to justify the current situation of that factory. Otherwise, it will create a heavy problem to submit the order in a timely. As well as, it will create a bad impression on the merchandiser. So, to be a qualified merchandiser, keeping excellent knowledge about the factory is a must.

### 7. Excellent convincing quality:

During completing an order, little problems will be created but there's a solution for every problem. Here, a garments merchandiser should have needed the excellent convincing quality to convince such kinds of problems by discussing with the buyer and make a correct solution to those problems.

#### **8. Quick Decision-Making Quality:**

When a garment merchandiser dealing with the buyer, sometimes have to require taking important decision for that order. This should be quick enough so that the normal flow of conversion hasn't faced any interruption. Actual product and manufacturing knowledge will help a merchandiser to take the correct decision in such cases.

#### **9. Ability to work in a Team:**

To be a qualified garment merchandiser, the ability to work in a team or group is an important criterion for a merchandiser. If you are in a team or group then you can easily get very important supports from your teammate, which helps you to complete your order very efficiently. In a large organization, you have to do your duty in a team or group. Where the success of an order will totally depend on team supporters or members.

#### **10. Excellent Knowledge of the World Market:**

If you want to be a qualified merchandiser then you have needed enough knowledge of the world current market. To make an accurate price it's a very important key point for a garments merchandiser.

#### **11. Excellent Analytical Quality:**

Analytical quality is an important key factor for a **qualified garment merchandiser**. Correct analysis of the situation helps to identify future demand and supply of goods.

## CHAPTER27

# DISCUSSION & CONCLUSION

## Discussion

**Newage group** is a garments manufacturer & exporter. it is committed to the best human workplace practices. Their goal is to continuously improve their Human resource policies and procedures through education, training, communication and employees involvement. Right from inception the policy of the company has been to provide total customer satisfaction by offering quality garment in time. Working on new concepts in styling & content of the garment is a continuous activity in **Newage group** with an objective to up the quality and the value of merchandise. To meet the commitments of quality and prompt delivery **Newage group** Decided to integrate the manufacturing process in a planned manner for achieving their goal, **Newage group** has recruited a high profiled human resource team. The production is controlled by skill persons. All of the decision makers of production sector in **Newage group** are skill workers.

The goal of **Newage group** is to get high production & to maintain the quality of the product at a minimum cost. **Newage group** is notable to produce all types of garment. I think their accuracy will increase to a maximum level. For sewing them is using modern m/c I think their product quality will be higher. For cutting they are using manual straight knife cutting m/c but if they use computerized cutting m/c their accuracy will increase & their efficiency will increase to a maximum level. I think if they improve the above things I think their product quality, their efficiency & their accuracy will be maximum.

## Conclusion

Now-a-days Textile field becomes very competitive & the buyer wants 100% quality product. For this reason it is very important to know about the latest technologies in textile sector. To produce a quality product, as a textile engineer I must have a vast knowledge about the

Production parameters & how to produce a high quality product. To accommodate the theoretical study with technical and practical things industrial training (Internee) is very important. In my training period I have observed that Crystal Composite Ltd. produce high quality fabric and fulfill the special requirements from the different types of buyers by following different internationally recommended standard method. In my training period I have learned many things such as different types of machines and their functions, techniques of productions and the

management system. In this training period I have also learned how the desired product is made ready for shipment from the starting to the end i.e. from merchandising to the packaging. In this training period I have got an idea about the responsibility of different departments of the factory. So I think this industrial training will help me in future.

***THE END***