IN DEPTH STUDY OF GARMENTS MERCHANDISING MANUAL

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

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DHAKA, BANGLADESH
MAY, 2012

APPROVAL

This Project titled “In depth study of garments merchandising manual” submitted by Md.Kamruzzaman , Niaz-Al-Mahmud & Md.Enamul Haque to the department of “Textile Engineering, Daffodil International University,” has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc in Textile Engineering.& approved to its style & contents. The presentation has been held on 22nd April, 2012.

DECLARATION

We hereby declare that, this project has been done by us under the supervision of **Mr. Mohammad Abdullah Al Mamun, Assistant professor, Department of Textile Engineering, Daffodil International University.** We also declare that neither this project nor any part of this project has been submitted elsewhere for award any degree or diploma.

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ABSTRACT

In this project report we have worked on the "Manual of Garments Merchandising". A project paper or a thesis paper is a paper that provides the reader with sufficient information about a particular topic. Our thesis paper introduced as "In depth study of a Garments Merchandising Manual" will be presented to you as a basic manual for merchandising. In preparing this project paper the needs of both the teacher and the taught have been kept constantly in view so that it may be a useful guide to those who are willing to get a merchandising job as well as to those who are already in the job. Because, this paper will provide a fresh idea about each important term, document & responsibilities needed for merchandising job. The research on this topic including the areas of working is as follows –

Responsibilities related with job – If anybody gets involved with any type of job, he must have some responsibilities to perform confined to some terms and conditions. He has to sustain certain responsibilities following rules and regulations with complete dutifulness, reliability and loyalty in order to continue his job. We'll know about every job responsibilities of a merchandiser from this paper.

Knit or woven merchandising – As we go through the further pages, various terms (such as – merchandising and its details, terms related with merchandising, L/C, B/L, P.O., P.I. quality control & management, testing method of garments, etc.) used in merchandising job will come in front of us which have elaborately discussed for being easy to understand. The terms and definitions and other discussions will be very much helpful to the one who would like to get involved in merchandising job.

It should be kept in mind that the writings are based on the information of the merchandising for woven wearing apparel. Woven merchandising differs mainly from the other (knit or sweater) during consumption calculation. For woven apparel manufacturing, the consumption is calculated for fabric while yarn consumption is calculated for knit or sweater manufacturing. Besides, other terms are about similar.

ACKNOWLEDGEMENT

At first we are grateful to Almighty Allah to complete this project work with a successful ending. We must express our gratitude to the honorable persons who have made significant contributions in preparing this report. Their insights, advice and suggestions helped us a lot. We would like to pay special thanks to **Prof. Dr. S. M. Mahbub Ul Haque Majumder, Dean,Faculty of Science & Information Tecnology , Daffodil International University**

We are very grateful to our respected teacher **Prof.Dr.Md.Mahbubul Haque,Head of the department Textile Engineering, Daffodil International University,** for his support and guidance.

We would like to express our heartiest thanks to our respected and supervising teacher **Mr. Mohammad Abdullah Al Mamun, Assistant professor; Department of Textile Engineering; Daffodil International University,** for continuous guiding us about the development and preparation of the report. He has enriched us with necessary ideas and concepts for incessant improvement of the report.

We would like to express our sincere gratitude to **Managing Director of Standard Group,** for providing us to work in his organization within a congenial atmosphere during the project period.

We recognize and pay our gratefulness to **Mr. Aziz, B.C Manager of Standard Group,** for providing sincere help in all technical matters while working in the organization. Her instruction and inspiration play a vital role in this project and also help for successful ending of the project.

Our sincere appreciation goes to the entire "**Standard Group"** team for extending their hands of co-operation throughout the project period.

Finally, we must acknowledge with due respect the constant support & patients of our parents.

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01. ABOUT MERCHANDISING

1.1 Merchandising

The "Merchandising" is known to the persons specially involved in garments trade. The term merchandising has been derived from the merchandise. Merchandise means goods that are bought and sold.

The term "Merchandising" may be defined as-Person who merchandises the goods, specifically for export purpose. Garments merchandising means buying raw materials and accessories, producing garments, maximizing merchandising sales using-"product selection, product packaging, and product display that stimulates consumer to spend more," maintaining required quality level and exporting the garments within schedule time. This includes disciplines in pricing & discounting, physical presentation of products & displays & the decisions about which products should be presented to which customers at which time.

From the above definitions, we can say that a person involved in garments merchandising needs a wide range of knowledge and skill to perform his job successfully.

The word "Merchandising" comes from the word "Merchant". A merchant is the one who is involved with business. But the difference between a merchant and a merchandiser is that a merchandiser himself is not a businessman. His function is just to process the business activities on behalf of the owner of the company.

A merchandiser works as a communication manager between buyer and seller. He communicates with the buyer or his representative and makes a bridge between the buyer and the seller. So, the merchandiser is also involved with business but the profit or loss is not directly related to him.

A merchandiser always has to be concerned about buyer's satisfaction as well as the owner's profit.

In a word, the "Merchandiser" is termed as the person who trade-offs the goods, especially for export purposes. The job or activities of a merchandiser is known as "Merchandising".

Merchandising is a marketing practice in which the brand or image from one product or service is used to sell another. The job itself is Technical and general as well. For example, a merchandiser should be like the ten headed 'Ravan', i.e. he should take care of everything of a product form order to shipment. In over-all sense, garments merchandising generally includes the following activities-

- Getting an order of a particular garment.
- Buying raw materials & accessories.
- Producing garments.

- Maintaining required quality level.
- Exporting the garments within schedule time.

1.2 Basic qualification of a merchandiser

- For a merchandiser, the most important quality is that he must have to be educated.
- He must be very skilled in English language as he has to communicate with the foreign buyer and supplier.
- He must have to be computer literate, i.e. a good idea about computer operating e.g. office program like Ms Word, Ms Excel and Ms Access etc.
- He must have enough knowledge about browsing e.g. e-mail sending and receiving, net searching etc.
- He must have good knowledge of exporting & importing countries.
- Knowledge of shipping & banking procedure.
- Knowledge of duty rates & customs regulations.
- He must know the procedure of international buyers.
- Adequate knowledge of factory profile.
- Good knowledge of mathematics.
- He must have excellent power of motivation to improve public relation.
- He should have excellent behaviors & personality.
- Must be an intelligent man & be a hard worker.
- Should be goal achiever.
- He must have a good appearance and should be smartly dressed.
- He should be capable of thinking at multi-level stage because he has to maintain communication outside the factory with buyer and supplier as well as inside the factory with various sections like sample, marker, sewing etc.
- Should not be bureaucratic.
- A merchandiser should have adequate knowledge regarding following:
  - Different types of raw materials-fiber, yarn, fabric, garments etc,
  - Different types of wash/dry processing,
  - Different types of dyeing, printing, finishing, embroidery, garments manufacturing process of fabric,
  - Different types of accessories & trims & current market price of them,
  - Different types of textile testing method,
  - Different types of machines & its operation related in textile,
  - Different types of garments inspection system.

A merchandiser always should have a mentality to impress the buyers by means of:

- Right Product,

- Right Qualities,
- Right Quantities,
- Right Time,
- Undamaged condition.

1.3 Process flowchart for merchandising

Merchandising

Co-operation with buyer

Collection Order

Costing

Send to the buyer

If “OK” then sample production (according to buyer necessity)

Get approval

Bulk production

Line balancing

Production follows up

Inspection

Finishing & delivery

Banking procedure

Shipment

When an export order is placed to a merchandiser, he has to schedule the following main function to execute the export order perfectly on time-

- Fabric requirement calculations.
- Accessories requirement calculations (thread, button, interlining, label, poly bag, carton etc.)
- Sourcing of accessories.
- Possible date of arrival of fabrics and accessories in the garments factory.
- Costing.
- Garments production planning.
- Pre-shipment inspection schedule.
- Shipping documents.

All the main functions, mentioned above are important but the procurement of fabric and accessories are most important as because there are many technical parameters involved in specification in this area. In most collection of fabric for the garments to be made is a major problem. To procure a fabric we should clearly specify the technical specification of the fabric during placing a fabric supply order. The following list of points should be considered in preparation of the contract before placing a fabric purchase order.

1.4 Merchandiser is a data base between buyer & seller

Merchandiser is he who builds up relationship with the buyer and acts as a seller. He plays a vital role in an organization in a sense that he bears more responsibility than other in regards to execution of an order .the responsibility which he bears on the job are as follows:

- He represents as a buyer to the factory.
- He represents as a seller to the buyers.
- He inspects quality as a buyer (from the buyer point of view)

- He negotiates a price for the sellers.
- He looks at the deal from sellers point view.
- He looks into the business to flourish more in the future.
- His object is to satisfy the buyers to progress more of the future business.
- His aim is to impress the buyers.

1.5 How merchandiser can achieve success

- He should be hard worker.
- Should be responsible for the job.
- Should not be bureaucratic.
- Must have knowledge in computer literacy specially e-mail, website, & Internet Browsing, Windows, MS word, MS Access, MS Excel & MS Power Point etc.
- Should be smart.
- Should be able to work intelligently.
- Should have ability to improve public relation.
- Should have well behaved personality.
- Should have good knowledge on calculation.
- Should be goal achiever.

Should have knowledge about international marketing. Preference given to those who .Possess:

- Knowledge about production.
- Knowledge about quality.
- Knowledge about machines and its operations…

1.6 Essentiality of merchandising

- Learning the customers about the product or service in an effective and creative way.
- Establishing a creative medium to present merchandise products in 3D environment, thereby enabling long lasting impact and recall value.
- Setting the industry apart in an exclusive position.
- Establishing linkage between fashion, product design and marketing by keeping the product in prime focus.
- Combining the creative, technical and operational aspects of a product and the business.
- Drawing the attention of the customer to enable him to take purchase decision within shortest possible time, and thus continuing the selling process.

1.7 Main function of a merchandiser

- Calculation of fabric consumption.

- Calculation of the required accessories.
- Sourcing of fabric.
- Sourcing of accessories.
- Costing(material cost+business running cost/business overhead cost)
- Pricing of garments(costing+profit)
- Communication to buyer
- Possible date of fabric and accessories in house/in garments factory.
- Garments production planning.
- Pre-shipment inspection(raw material inspection)
- Final inspection.

1.8 Merchandising chronological processes

A. Salesman samples, counter sample, approval sample, photo sample, pre-production sample, production samples, shipping samples.
B. Swatch and trims, trim's related affairs communication in international business.

02. TECHNICAL TERMS IN MERCHANDISING

First pattern

The first physical version of any garment as per the artwork done by designer and developer.
Human mind → Sketch→ paper pattern →Sample
Purpose : See the design work and test the fitting
Status : Nothing specific
Materials : Available
Price : Not confirmed
Quantity : 1 (for customer) + 1 (for merchandiser)
Delivery : as per Urgency.

Second Pattern

Usually designer / developer always ask for some Change to the first pattern.
Second pattern is made as per comments.

Counter sample

Where first pattern is made on designers artwork, counter sample is to make not on designers artwork, has to follow another sample given by the merchandiser.
Purpose : See the WORKMANSHIP Test the FACTORY SKILL
Status : Nothing specific

Materials : Available
Price : Not confirmed
Quantity : 1(for customer) +1(self keeping)
Delivery : As per request

Salesman Sample

Sample is made up when price is confirmed and orders are on speculation, usually in L size in all color combination of expected order. Buyer held a meeting with its customer and records their response on order quantity per color, size etc. and finally place order to their vendor:

Purpose : Sales meeting by Retailers, Market Appraisal, Demand / Order forecast
Status : Final stage of the order confirmation
Materials : Available
Price : Not confirmed
Quantity : There is minimum quantity per color combination
Delivery : Very important to meet the delivery date.

Photo sample

Samples are made with actual color and material to be worn by the models on the event of shooting for catalog.

Approval sample

In any discrete period of time, whenever it required any revision in the sample, a new sample is made some times mock up is workable too) as per new specification.

Size set

Consists of 1 pc from each size for each color combination

Mock up

Any part of the garment to make for particular purpose, not complete garment.

Pre production sample

When material for bulk production arrived, factory makes a sample with the actual material and sends to buyer.

Production sample

It is a reference to the buyer that bulk is being produced as per specifications. Buyer wants to be assured that correct material is sourced and line workmanship confirmed with the quality level.

Accessory

(Clothing) A subsidiary item of dress such as a scarf, belt, gloves, umbrella.
(Sewing machine) A supplementary part or component of a sewing machine used to diversify its function.

Grain line

A line which is marked on the pattern of garments.

C.B.L & C.F.L

Centre Back Length & Centre Front Length.

F.D.I

Foreign Direct Investment.

Ticket number

Indication of coarseness or fineness of sewing thread.

CAD
Computer Aided Design.
CAM
Computer Aided Manufacturing.
Pattern
An ornamental design or decorative element in a fabric and it is a hard paper.
Marker
It is a thin paper which contains all the necessary pattern pieces for all sizes for a particular style of garment.
Spreading
Spreading means the smooth laying out of the fabric in superimposed layers of specific length.
Seam
The line of joining the fabric.
WWSC
Wash With Similar Color
RSWD
Re shape Whilst Damp
TAP
Total Acceptable Product in a lot
AQL
Acceptable Quality Level
PD
Plain Dyed
WR
Water Repellent
WP
Water Proof
TC
Tetron & Cotton
SD
Solid Dyed
YD
Yarn Dyed
Sorting
Separate the garments piece by size & color.
Allowance
Excess fabric near the seam line.
SMV
Standard Minute Value
TST
Total Standard Time
N.S.A
No Sewing Allowance
Fabric cutting
In garments industries fabric is cut from lay and spreading with accuracy and properly which is

term as fabric cutting.

Sewing

Joining the fabric by the use of needle & thread is called sewing.

Seam: A line along which two more fabrics are joined by fusion, gluing, sewing, stapling or alternative method is termed as seam.

Stitch

Loop or loops of one or more threads when bounds with each other by interlacing, interloping or interl9ooping or any combination during sewing.

Sewing needle

A sewing needle is a long slender tool with a pointed tip.

Bobbin thread

The thread which comes from the bobbin of the sewing machine.

Cover thread

The thread which appears on the shell side of the material to be sewn and link different needle threads together.

Sewing thread

A variety of yarn, regardless of fiber that is for hand or machine sewing.

Fusing

As an alternative method of joining of fabrics, fusing is the widely used method among the three available methods.

Welding

The joins of interning and fabrics in the garment by fusing method cannot be used to bear high pressure or load.

Molding

It cannot be joined one or more plies of fabrics by this method but is placed as a alternative method of joining.

03. RAW MATERIALS OF TEXTILE

3.1 Fiber

Any natural or manmade substance which has high length to width ratio & being proceed into fabric.
Natural-Cotton, wool; Manmade-Nylon, polyester etc.
Properties of fiber

Primary	Secondary
High length to width ratio	Flammability
Tenacity	Luster
Tensile strength	Color
Flexibility	

3.2 Yarn

Yarn is the assemblage of fibers twisted or laid together to form continuous strand suitable for use in weaving, knitting, etc.

3.3 Fabric

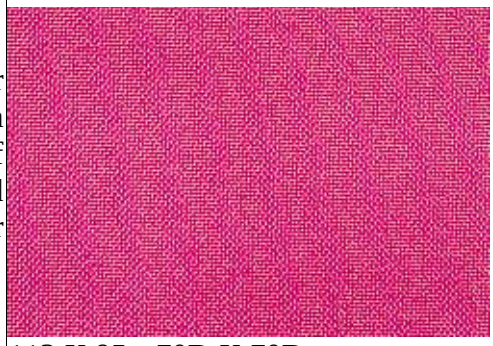
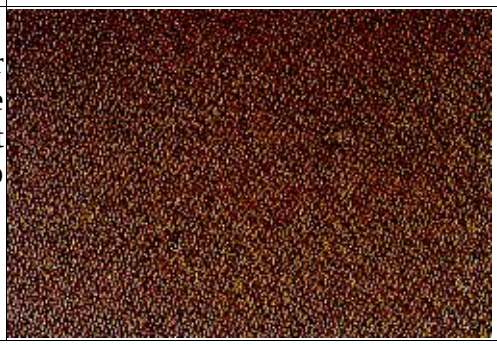
Fabrics are manufactured assembly of fibers and/or yarns, which have substantial surface areas in relation to the thickness and sufficient strength to give the assembly inherent cohesion.
Types of fabric-(a) woven, (b) knitted, & (c) non-woven.

3.3.1 Woven fabric

Woven fabrics are formed by interlacing two sets of yarns at right angles to each other. The set of yarns which lie in the lengthwise direction is known as warp and the widthwise group of yams is known as weft.
There are three basic weaves in common use for the majority of fabric: plain weave, twill weave and satin weave. For each type of weave, different kinds of fabrics can be formed by varying the yarn count and the density of warp or weft yarn.

Plain weave

Each weft yam, in this simplest type of weave, goes alternately under and over each warp. It is used to a considerable extent than any other weaves. With plain weave, the following common fabrics can be formed:

NAME OF FABRICS	EXAMPLES
Chiffon A very lightweight, sheer silk or manufactured filament fabric made in a plain weave with fine, hard spun yam of approximately the same size of warp and weft and the number of ends and picks per inch. End uses: Ladies' evening wear, dresses and scarves	 113 X 95 70D X 70D
Corduroy A kind of cut-pile fabric with plain woven base. End uses: Trousers, jackets, suits	 64 X 128 12 X 16
Duck A broad term for wide range of strong, firm, plain weave fabrics made of cotton, linen or blends with man-made fibres. Different types of duck include those with single warp and single weft, double warp and single weft, and double warp and double weft. Canvas and duck are sometimes used interchangeably, but canvas often refers to heavier construction. End uses: Trousers, belting, sail cloth, canvas	 70 X 40 10// X 10//
Georgette A sheer, lightweight, plain weave silk or man-made fibre fabric with a fine crepe surface; double S- and double Z-hard twist yarns are used alternatively both in warp and weft. End uses: Women's wear	

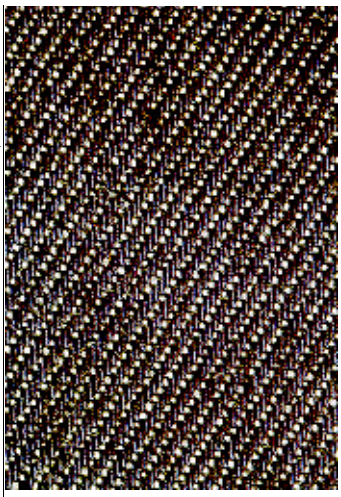
	192 X 93 75D X 75D
Poplin A durable, closely woven fabric having fine cross ribs produced by employing warp yarns that are finer than weft yarns, and/or with two or three times as many ends per inch as picks. Similar to broadcloth but with heavier rib and heavier weight. End uses: Men's shirts, trousers, nurse uniforms, dresses and curtains	 133 X 72 40 X 40
Oxford A soft, porous, lustrous, light to heavy weight fabric with two fine warp threads and one weft yam. End uses: Men's and women shirts, sportswear and dresses	 100 X 50 40// X 21/ 2

Twill weave

A weave in which each warp or weft yarn floating over/under two or more weft or warp yams to form diagonal ridges across the fabric. The direction of a twill can be described as Z twill (the diagonal running upwards from left to right) or S twill (diagonal running upwards from right to left).

The common fabrics made in the twill weave are as follows:

NAME OF FABRICS	**EXAMPLES**

Denim A medium to heavy fabric made of coarse, hard twist cotton warp yams dyed in many plain colors crossed with white weft. End uses: Workmen's overalls, jeans, skirts	 80x46 10x7
Drill A light to medium fabric made of coarse, hard twist cotton yams with 3/1 twill (for thicker fabric) or 2/1 twill (for lighter fabric). Drill can be used undyed, dyed, warp striped or printed. End uses : (For thicker fabric) sportswear, uniform (For lighter fabric) jeans, trousers	 128x60 20x16
Flannel A soft, loosely woven fabric with a brushed surface, either in plain or twill construction. End uses: Trousers, jackets and sportswear.	 42X44 24x13

Tweed A fairly coarse woollen fabric made with 2/2 twill construction. It may be solid coloured, a mixture of colours, striped or checked. End uses: Warm trousers, jackets, suiting and coats	 36x32 40/2 + 5(fancy) x 15+5(fancy)

Dungaree
Very similar to denim, but warp and weft are dyed.
88 ends/inch, 66 picks/inch
End uses: overalls

Gabardine
A smooth, tightly woven fabric made of worsted, cotton or polyester with 2/2 or 2/1 twill. Gabardine can be recognized by its steep twill weave which shows a fine wale on the face but the line is not noticeable on the wrong side of the fabric.
Fine cotton gabardine: 162 ends/inch, 104 picks/inch
Lower quality: 108 ends/inch, 76 picks/inch
End uses: slacks, skirts, suits and (polyester gabardine) for raincoats

Satin weave
In basic constructions, satin weave woven with long float yams from 5 ends or wefts up to as many as twelve float yarns. These constructions can produce smooth, lustrous fabrics. However, the long float fabrics have more exposed yarn to catch on rough objects so that these constructions are not as durable as short float fabrics that are made with plain or twill weave.
The satin weave can be further classified either as warp-face or weft-face construction.
Warp-face satin weave: The fabric consists almost warp float on the surface. In this construction, the warp yam lies on the surface of the fabric as it passes over and under warps yams. So that the luster effect appears in the direction of the warp.
Weft-face satin weave: This weave is also called the sateen weave. The construction is the reverse of the warp-face satin weave, the weft yams float over the warp yams so that the luster appears in the weft direction.
The following common fabrics are made with satin weave:

NAME OF FABRICS	**EXAMPLES**

Damask A Jacquard weave fabric with a warp satin design and a filling sateen as background or the reverse. End uses: Tablecloth, draperies, upholstery and ladies' evening dresses	 108 x 56 32x32

Amazon
A 5 thread warp satin with worsted warp and woolen weft.
99 ends/inch, 44 picks/inch
End uses: dresses

Dimity
A fabric woven in 4 thread warp and weft sateen weave. The weave shows the same stripes or checked effect, may be plain or printed.
54 ends/inch, 78 picks/inch
End uses: aprons, bed covers and dresses

Doeskin
A very fine fabric made of a high quality of merino wool, usually woven in 5 ends warp satin.
50 ends/inch, 20 ends/inch
End uses: men's coats, dresses

Lasting
A very strong, hard, smooth fabric made of worsted yarns or cotton. woven in 5 ends warp satin.
112 ends/inch, 70 picks/inch
End uses: trousers, shoe tops and bag linings.

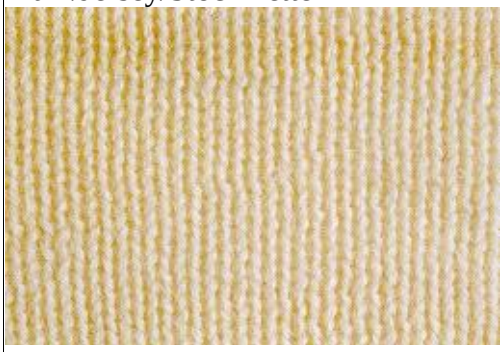
3.3.2 Knitted fabric

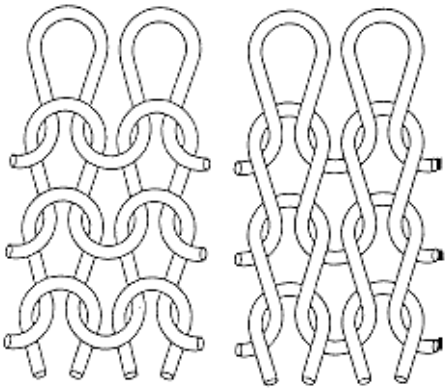
Knitted fabrics are made by intermeshing of loops of yarn, and can be composed of any kind of fibre, yarn, stitches or patterns for apparel, home-furnishing, and industrial end-uses. Knitted fabrics can be divided into two general types: weft knitted and warp knitted.

Weft knitted fabrics

Weft knitted fabrics are the knitted fabric in which a yarn forms loops across the width of the fabric; they can be either hand-made or machine processed.< as are fabrics knitted weft common>

Plain/Jersey/Stockinette





Characteristics:

- Curl easily at both ends
- Fairly elastic
- Smooth side is the front, while the back is rough
- Unravel readily from both ends
- V-shaped loops shown in the front, while semi-circular needles loops shown in the back

End uses:
Underwear, shirts, dresses, sweaters, stockings, T-shirts

The 1 x 1 rib is the simplest rib fabric in which the structure includes alternate wale of plain and reversed plain stitches.

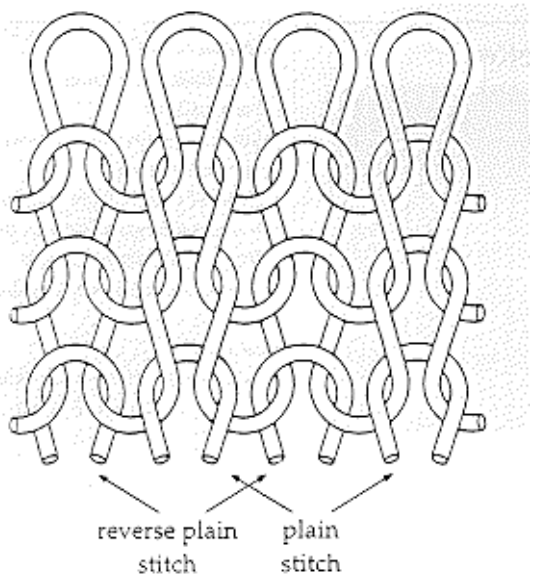
Examples of the other typical constructions of ribs of different width are 2 x 2 rib, 3 x 3 rib or 6 x 3 rib.

Rib (Double jersey)

Characteristics:

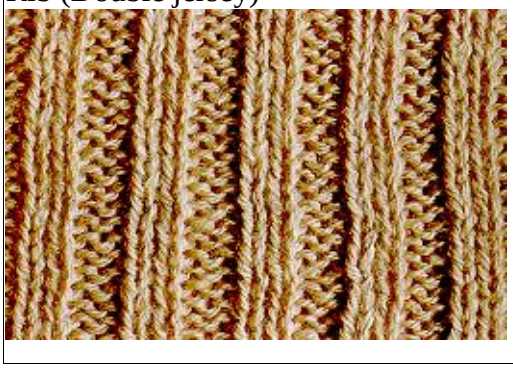
- A broken stitch will cause laddering
- Consume more quantity of yam than a plain fabric
- Does not curl at both ends
- Good stretchability in widthwise direction

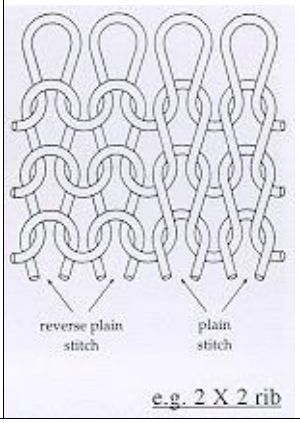
End uses:
Cuffs, collars, waistbands, sweaters, garments



e.g. 1 X 1 rib

Rib (Double jersey)





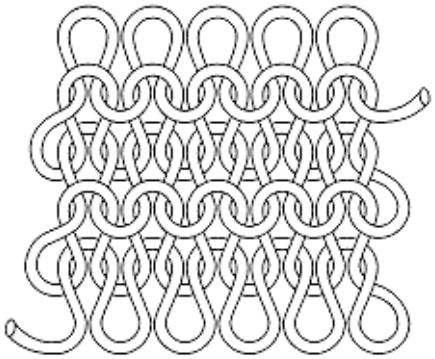
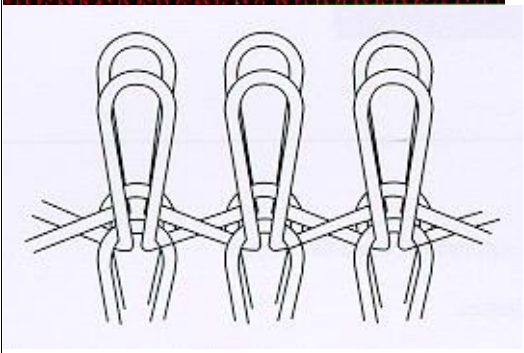
e.g. 2 X 2 rib

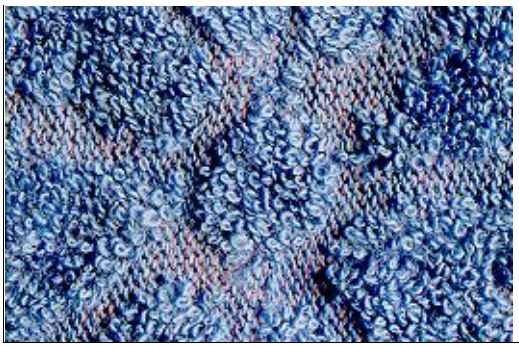
Purl

Characteristics:

- Better extensibility in lengthwise direction
- Both sides of the fabric having similar appearance to the reverse side of plain knitting
- Does not curl at both ends

End uses:
Children's wear, sweater

 Interlock  	Characteristics: Better insulation Better stability in construction Can only be unraveled from the last end No tendency to ladder No tendency to curl when cut Smooth surface on both sides End uses: Ladies' dresses, blouses, T-shirts, sweaters, outerwear, sportswear, underwear
Terry knit	Characteristics: A broken stitch will cause a run More flexible and more absorbent than woven terry cloth

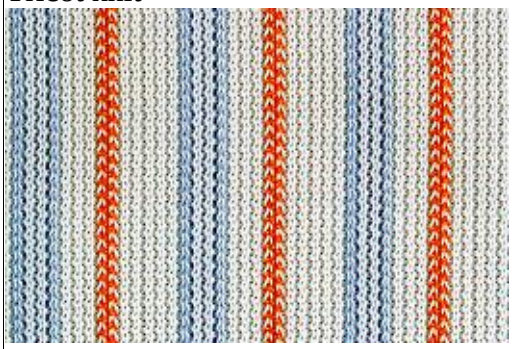
	Not as durable as woven terry cloth End uses: Robes, beachwear, fashion apparel

Velour knit
Characteristics: Better drapability, soft handle, suede-like surface
End uses: Men's shirts, women's dresses

Pile knit
Characteristics: Better drapability, can be laundered and cold tumble-dried, fur-like surface
End uses: Fur fabric, rugs

Warp knitted fabrics
Warp knitted fabrics are knitted fabrics in which a series of yams run in the lengthwise direction to the fabric.
There are two major types:
(1) Tricot knits are made with fine yarns and usually have a plain or simple geometric design.
(2) Raschel knits are made with heavy yams with an intricate, lace-like pattern.

The common warp knitted fabrics are as follow:

Tricot knit 	Characteristics: Good abrasion resistance Good dimensional stability Good drapability Good wrinkle resistance High water and air permeability High elasticity in the crosswise direction High tear strength No tendency to ravel No tendency to ladder Soft in handle End uses: Lingerie, blouses, shirts, dresses, Outwear
Raschel knit	Characteristics:

	Good abrasion resistance Good dimension stability Good shrink resistance Good wrinkle resistance No tendency to ravel End uses: Sheer laces, nets, draperies carpets, jackets, trousers, pantyhose

3.3.3 Non-woven

Fabric made directly from fibers which are held together by bonding agents or by some other bonding method. There are many types of fibers which can be used to produce non-woven fabric such as cellulosic fiber (e.g., cotton), animal fiber (e.g., wool) and synthetic fiber (e.g., rayon, acetate, nylon, polyester, acrylic).

General Characteristics

The properties of non-woven fabric are various. They depend upon the combination of factors in production, such as:

- The types of fibers used
- The choice of bonding process and bonding agent
- How the fibers are aligned (e.g., fibers remain parallel to each other or are in crosswise direction at right angles to each other)

The appearance of the fabric may be paper-like, felt-like or similar to that of woven fabric. It may have a soft, resilient handle, or be hard and stiff, with low pliability. It may be as thin as tissue paper or as thick as floor covering. Moreover, it may be translucent or opaque, with a porosity ranging from high to impermeable, and strength ranging from low to high.

General End uses

There are three main end uses for non-woven fabrics, these being: disposable goods, consumer durable and industrial products.

- Disposable goods
  Medical, surgical applications (such as diapers, wipers, bibs and face masks)
- Consumer durable
  Household articles (such as clothing, drapery, towels, tablecloths, blankets, carpet backing, lining and interlining)
- Industrial products
  For technical uses (such as filters, packing materials and road building materials)

3.4 Trims and Accessories

3.4.1 Introduction

To full fill the design objectives we need different kind of materials. Fabrics are the main material, which used for garment manufacturing. We need other materials also, which make the garments aesthetic, functional and commercially required. Usually other than fabrics this material used for making garments are called trims and accessories.

3.4.2 Trims

The raw materials used in sewing room other than fabric are called Trims.
On the other hand we can say that which materials are directly attached with the fabric to make a garment are called trims. Like: Threads, buttons, lining, Interlining, zippers, labels, care labels, etc. (Interlining is used as shape forming / preserving materials.)

3.4.3 Accessories

The materials, which are used to make a garment attractive for sale and packing, other than fabrics and trims, are called Accessories.

List of Trims and accessories

SL	Trims	SL	Accessories
1	Label (S)	1	Poly bag
2	Button	2	Elastic bag
3	Zipper	3	Mini Poly bag
4	Padding	4	Master Carton
5	Interlining	5	Inner carton
6	Down	6	Size clip
7	Elastic	7	P. P. band
8	Thread	8	Tag pin
9	Twill Tape	9	Brass pin
10	Stopper	10	Collar stand
11	String/ Draw Cord	11	Safety pin
12	Piping Cord	12	Gum tape
13	Emblem	13	Arrow sticker
14	Logo print	14	Scotch tape
15	D- Ring	15	Barcode Sticker
16	Swivel Hook	16	Defect indicator
17	Eyelet/ Grommet	17	Tissue paper
18	Collar Stay	18	Back board
19	Cord Bell	19	Neck board
20	Buckle	20	Butterfly
21	Rivet	21	Numbering stickers
22	Weaving belt	22	Hanger

23	Hook & Eye	23	Size sticker
24	Velcro tape	24	Carton pad
25	Seam sealing tape	25	Both side tape
26	Shoulder pad	26	Plastic staple
27	Cable (Steel ware)	27	Iron seal
28	Adjuster	28	Clip
29	Recco	29	Ball Chain
30	Elastic Threads	30	Size Tag
31	Shoulder Tape	31	Carton Sticker
		32	Safety Sticker
		33	Plastic clip

Trims

Trims cover all the items used in the garment except the basic fabric. There are hundreds of items used to manufacture the garment's, by the customers.

Accessories

- Zipper / fastener:
  - Teeth : Nylon, Metal.
  - Color : Tape color, Teeth color
  - Size : #3, #5, #8 etc.
  - Length : As per requirement 18cm,72cm
  - End : Close end (C/E),open end (O/E)
  - Slider : One way, Reversible
- Sewing thread
  - Shade, Color fastness etc.
  - Tensile strength, Elasticity, Shrinkage, Moisture Regain, Abrasion, Resistance etc.
  - 30s, 60s, 20s/2, 40s/9 etc.
  - Labels: Main, Size, Care, Content, Price, Patch etc.
- Button: Horn, Metal etc.
- Elastic: Cotton, Polyester etc.

- Eyelet: Antique Matching etc.
- Velcro: Hook and Pile
- String/ cord: Cotton, polyester etc.
- Tag pin
- Plastic clip
- Sticker: Hook and pile
- Hanger
- Scotch tape
- Carton: 3ply, 5ply,Size(L,W.H)
- Gum tape
- Blister Bag
- Poly bag
- Tags :Price tag, Hand tag
- Etc.

04. DIFFERENT PROCESS IN GARMENTS

4.1 Dyeing

To make finished garments attractive to consumers, they are usually colored, either by dyes or pigments. Based on financial and technical considerations, dyeing can be done at different stages of the manufacturing process and they can be categorized into five major types.

1. Mass pigmentation,
2. Fiber dyeing, including intermediate products,
3. Yam dyeing,
4. Piece dyeing, and
5. Garment dyeing.

4.1.1 Mass pigmentation

This dyeing method, which is also known as dope dyeing, is mainly used in the production of synthetic filaments. During the spinning process of the polymer, pigments are added to the molten polymer or its solution. When the polymer is spun into filaments, the added pigments are encased in the filament, so coloring it and giving it very good all round fastness properties.

4.1.2 Fiber dyeing

In this method, dyeing is carried out on loose stock or tow before the fiber is spun into yam. This process is most common in the production of woolen materials. With the exception of mass pigmentation, fiber dyeing produces the best results of all dyeing methods. This is because dyes penetrate well into fiber, resulting in level (even) dyeing with excellent fastness properties. Even if the dyeing is not entirely level, later blending and spinning operations will mix the fibers, producing an even color. This method can also produce mixture effects and color blends, generally known as mottled effects.
The main drawback of dyeing at this stage is its high production cost and the possible delay in overall production planning. Hence it is suitable only for very large orders.
A dyeing process for wool that takes place nearer to the finished yam stage than fiber dyeing is top dyeing. "Top" is wool that has been combed to take out the short fibers, turning the fiber into a loose rope structure about 30 mm thick. This method can still basically be classified as fiber dyeing, with similar applications and limitations.

4.1.3 Yarn dyeing

In the yam dyeing method, coloration is carried out after the fiber has been spun into yarn. As with fiber dyeing, the aim of the process is to ensure that the dye penetrates into the core of the yam.
Yam dyeing is mainly used to produce interesting checks, stripes and plaids with different colored yarns in the weaving and knitting process. In addition, denim fabric, sewing threads and threads for embroidery are all dyed at the yarn stage. There are several ways of dyeing yarn, depending on the physical form in which the yam is dyed: hank dyeing, package dyeing and slasher dyeing.
Hank Dyeing

Hank dyeing is most commonly used for dyeing wool and acrylic yarns. In this method, the yam is prepared in the form of hanks, which are then hung and submerged in the dye bath of a large container known as a hank dyeing machine. Dye liquor circulates in the machine, so ensuring an even distribution of color to the hanks. Color penetration of the dyed yam is very good and the yarn retains good handling properties.

Package dyeing

Package dyeing is mainly used for dyeing yam made from cotton and synthetic fibers. In this method, yam is wound onto perforated spools to form cheeses or

cones. These packages of yarn are stacked on perforated rods in a rack and then immersed in a tank. Dye liquor is forced through the cones or cheeses in the tank under pressure. This method enables dyes to penetrate into yarns with high twist, such as sewing threads.

Wrap dyeing

Warp dyeing is mainly used in the production of denim fabrics. It is mainly used in the production of denim fabrics. In this method, dyeing is done by continuously passing warp yams in sheet form (slashed dyeing) or in rope form (rope dyeing) through several solutions of vat dyes for short intervals. Because of the very short dyeing time and the fact that warp yarns are highly twisted, there is little penetration of the dye into the yam. This results in very poor rubbing fastness, which accounts for the interesting fashionable effect seen in denim fabrics. The dyed yams are then sized and wound onto a warp beam, ready to be used in the weaving process.

4.1.4 Piece dyeing

Piece dyeing is the most popular production method for dyeing fabric, since it gives the greatest flexibility to the manufacturer in terms of inventory (the stock of materials) for large or small orders and for fashion colors. If very large yardage in one shade is required, fabrics can be dyed continuously, while small amounts of fabric can be processed in batches.

Not all goods can be dyed at this stage, however, since technical difficulties such as fabric distortion, higher risk of unlevel dyeing and comparatively poor penetration (resulting in inferior fastness properties) can occur with this method.

Piece dyeing can be carried out in a number of ways, the most common of which are: jig dyeing, winch dyeing, jet dyeing and pad dyeing. The first three methods are used for batch wise dyeing, while the last is used for continuous dyeing.

Jig dyeing

Jig dyeing is most common in the dyeing of woven cotton fabrics. In this method, the fabric is held on rollers in open width form and is transferred repeatedly from one roller to another through a solution of dye. The process is similar to the movement patterns of an auto reverse cassette tape. Jig dyeing inevitably causes tension in the fabric and is therefore not suitable for knitted fabrics or ones which are easily distorted.

Winch dyeing

This type of dyeing takes place in a winch dyeing machine, which essentially consists of a dye vessel fitted with a driven rotor (or winch). When in operation, the winch rotates drawing an endless piece of fabric through the dye liquor. The fabric is usually dyed in rope form, in contrast with Jig dyeing. Winch dyeing

exerts less tension on the dyed fabric, and so is ideal for dyeing woven as well as knitted goods, much of the original fullness and softness of the fabric being retained.

Jet dyeing

Jet dyeing is comparatively modem and is useful for dyeing easily distorted fabrics such as texturized knitted goods. In this method, fabric is dyed in rope form, being carried through a narrow throat Oct nozzle) by dye liquor which circulates at a high velocity. This dyeing method is particularly useful in the dyeing of polyester goods, since this is best carried out at 130^{o}C.
The advantage of this method is that it uses no moving parts, so that there is no friction or tension on the fabric. The dyed fabric is therefore free from the creases and rope marks which are sometimes found in winch dyed fabrics. Another advantage of jet dyeing is that, because of the rapid circulation of the dye liquor, the levelness of the dyed fabric is better than that obtained by other methods.

Pad dyeing

Pad dyeing is carried out with the fabric in open width form. The fabric is passed through a solution of concentrated dye liquor and is then squeezed evenly by a pair of heavy rollers to force the dye into it. Pad dyeing is usually done in a continuous dyeing range, and is useful for dyeing a large yardage of fabric. The dyeing can be done in one operation, with the padding being followed by drying, fixing of the dye and successive washing-off and drying operations. The method is particularly suitable for the dyeing of 100% cotton and polyester/cotton blended fabrics.

4.1.5 Garment dyeing

Garment dyeing is an economical dyeing method, being the cheapest to use when it is practical. It also minimizes the risk of building an inventory that could be affected by changes in color fashions. This method is, however, technically the most difficult to control. The difficulties can include distortion of the garment, seam puckering, poor penetration of color (especially in the seams) and comparatively poor fastness properties. In this method, the garments are loosely packed in a plastic-net bag and are dyed in a rotating drum dyeing machine, which is similar in construction to the domestic washing machine. They may also be dyed in a paddle dyeing machine.
Garment dyeing is traditionally used for non-tailored garments such as pantyhose, gloves and sweaters which, because of their single component nature, are not easily distorted. However, current fashion trends also require some cotton jeans and jackets to be dyed in finished garment form.
In the dyeing process, dyes are used as the major ingredient. The following tables provide a general description and uses of the commonly used dyes for cellulose fibers, protein fibers and synthetic fibers.

DYE CLASS	GENERAL DESCRIPTION	USES
Direct	Complete color range; simple application; cheap moderate fastness but can be improved by after treatment with copper.	Commonly used for medium quality textiles, mainly cellulosic; may also be used for wool and silk,
Azoic	Color range rather limited – orange, red, navy among the best; bright shades at moderate cost; difficult to apply; rubbing fastness may be poor if applied incorrectly; also known as ice color because of use of ice in application.	Mainly used for cellulosic fibers, for printing as well as dyeing.
Reactive	Complete color range; simple application; forms direct linkage with fiber, resulting in very good fastness; more expensive than some other classes of dye.	Most common dye in the dyeing of cotton today because of highly fashionable color range and good fastness properties; useful for cellulosic, protein and nylon fibers; also popular printing
Sulphur	Limited color range with dull colors - black, khaki and brown; needs skill in application; may result in the tendering (weakening) of the cellulose due to the formation of sulphuric acid in the dyed material; inexpensive; quite popular for lower quality products because of price.	Used for heavy cotton goods as well as for linen and jute.
Vat	Incomplete (No brilliant red) but adequate color range; requires much skill in application; has best all round fastness properties; most expensive; has decreased in popularity due to increased use of reactive dyes	Used for high quality cotton goods; special use is in the dyeing of denim fabric.

Table 1 Dyes for cotton and other cellulosic fibers

DYE CLASS	GENERAL DESCRIPTION	USES
Acid	Complete and bright color range; easy application; performance may vary among individual dyes-they generally have moderate fastness properties	Used mainly for wool and silk, But also on polyamide.
Acid (Milling)	This class of dyes may be included with acid dyes; complete color range but color tends to be duller; moderate price. Have the best color fastness among acid dyes.	Useful for woolen tops because of good fastness. They are useful for polyamide as well.
Metal complex	Adequate color range but even duller shades than acid milling class; dye fastness among the best because of metal atom in the dye; relatively difficult to apply and expensive.	Most useful for woolen goods.
Chrome (Mordant)	Very dull but adequate color range; complicated application method; best all round fastness properties; chromium metal required in the dyeing process; moderate price.	Useful for woolen goods that require maximum fastness properties.
Reactive	Specific dyes which differ from those used for dyeing cellulosic fiber is needed; difficult to apply; fastness poor if application faulty; expensive.	Useful for bright and fast Colors for wool.

Table 2 Dyes for protein fibers

DYE CLASS	GENERAL DESCRIPTION	USES
Disperse	Good shade range; sparingly soluble, fine dispersion in water; only dyes which sublimate (that is, they vaporize without going through a liquid phase) under heat; suitable for all synthetics bit with different fastness properties; moderate price.	Most useful for polyester, both for dyeing and printing.
Acid, including acid milling	Same as for wool.	Suitable for polyamide.
Basic	Complete and brilliant color range; careful application required to prevent unevenness in dyeing and adverse effect on the handle of the fiber.	Traditionally used for hemp and jute; now mainly used for acrylics.

Table 3 Dyes for synthetic fibers

Fastness is the most important requirement for a good dye. It refers to the degree to which a dye can withstand later treatments such as washing and rubbing. The tables below show the fastness properties of the commonly used dyes.

DYE CLASS	FASTNESS TO				
	WASHING	LIGHT	DRY CLEANING	PERSPIRATION	RUBBING
Direct	moderate	moderate	Good	good	very good for most shades
After-treated Direct	very good	very good	Good	good	very good
Azoic	good	good	Good	good	depends on dyeing techniques
Reactive	good to very good	good	Very good	very good	very good
Sulphur	good - sensitive to chlorine	good	Good	good	poor to moderate; depends on color and depth
Vat	excellent	excellent	Good	excellent	very good

Table 4 Common fastness properties of dyes for cellulosic fibers

DYE CLASS	FASTNESS TO				
	WASHING	LIGHT	DRY CLEANING	PERSPIRATION	RUBBING
Acid	Poor	good	Good	moderate	very good
(Acid milling)	good	very good	Good	moderate to good	very good
Metal complex	very good	excellent	Good	good	very good
Chrome (mordant)	excellent	excellent	good	good	good
Reactive	very good	very good	good	very good	good

Table 5 Common fastness properties of dyes for protein fibers

DYE CLASS	FASTNESS TO				
	WASHING	LIGHT	DRY CLEANING	PERSPIRATION	RUBBING
Disperse	moderate to good; better on polyester	moderate to excellent depending	Good	good	good

		on fiber			
Acid	poor	good	Good	moderate	very good
(Acid milling)	good	very good	Good	moderate to good	very good
Basic	very good	Poor to moderate	Good	good	good

Table 6 Common fastness properties of dyes for synthetic fibers

4.2 Printing

With advances in technology, printing is now the simplest and cheapest method used to produce single or multi-colored patterns on fabrics. Although there are a number of printing methods, because of their importance and popularity, only the following four methods will be discussed:

1. Roller printing
2. Flat screen printing
3. Rotary screen printing
4. Transfer printing

4.2.1 Roller printing

Roller printing is a fully automatic mechanized method in which the printing is done with the aid of engraved copper rollers.

Although roller printing can produce very fine and intricate line designs (e.g., designs with half - tone effects can be produced), the colour quality of the printed fabric is rather dull when compared with fabrics produced by screen printing. Hence, roller printing is now only used to print low quality, mass-produced standard fabrics for items such as pyjamas and shirts.

4.2.2 Flat screen printing

Flat screen printing which is one of the more important printing methods, can be done by three different methods, ranging from manually operated (hand screen printing), semiautomatic carriage printing to fully automated screen printing. The major advantages of this method are its flexibility in the printing of different designs on different types of fabrics, and its ability to produce printing of high quality fabrics.

4.2.3 Rotary screen printing

This rotary screen printing method, which utilizes seamless cylindrical screens made of nickel foil instead of flat screens, was developed to provide a printing method that combined the advantages, and eliminated the limitations, of both the roller and flat screen printing methods. Its high production rate, versatility and acceptable printing quality have led to rotary screen printing fast becoming the

most popular printing method for textiles, both in Hong Kong and in other parts of the world,

4.2.4 Transfer printing

Transfer printing is a process in which a design is transferred from one surface to another, normally by heat and pressure. The major advantages of this printing are easily to operate and have low reject rates as well as many complex designs can be produced accurately.

Three types of printing style by which a pattern can be printed onto a fabric, are commonly used:

- the resist style
- the discharge style
- the direct style

A) The resist style

This is one of the oldest printing styles, in which two resulting patterns ("white resist" & "color resist") can be obtained:

In "white resist", the principle involved is to produce a white pattern in the area printed with the resists, on a dyed background. Moreover it is also possible to produce a colored resist pattern over a dyed ground, thereby enabling greater design flexibility.

Nowadays, printing by the resist style is becoming less popular, and is not often used in Hong Kong.

B) The discharge style

The discharge style is more popular than the resist style, but it is difficult to produce. In it, the pattern is produced by the chemical destruction of the original dye in the printed areas. Hence, this style is used only when very intricate and fine colored lines are to be printed.

C) The direct style

The direct style is the easiest and least expensive of the three printing styles to operate. It involves the printing of a pattern with dyes directly onto white fabric. Unlike the resist and discharge styles, printed color covers the dyed fabric only, without destroying the ground color. This style is suitable for the printing of both simple and complicated designs, and color matching with the original design sketch is easy. Thereby, this is the most popular and most extensively used style for mass produced printed fabrics.

4.3 Finishing

The term 'textile finishing' in its widest sense covers all textile wet processes; in this sense, finishing can be said to include preparation and coloration. A more restricted but common interpretation is that textile finishing is the third and final stage in the treatment of textiles to prepare them for garment manufacturers or consumers.

The general aim of finishing is to improve the attractiveness and/or serviceability of a fabric.

Finishing can:

- Improve the dimensional stability of the fabric
- Modify the handle of the fabric
- Improve the appearance of the fabric
- Modify the serviceability of the fabric
- Improve the durability of the fabric

The finishing methods can be classified according to the special effects that they produce on the fabrics. These effects include:

- stabilizing effects
- textural effects
- functional effects

4.3.1 Stabilizing effects

It is often vital to incorporate stabilizing effects into fabrics because the shrinkage of a fabric is of primary importance to finished garments. Garments made from fabrics with uncontrolled shrinkage may become too tight to wear after laundering, and may even alter in shape.
Numerous methods may be used to control, or even eliminate relaxation shrinkage.

Mercerization

The mercerization of cellulosic goods can remove the strains caused during fabric formation. However mercerization is sometimes used as a preparatory process; if this is the case, the mercerized fabric will be stretched again in the subsequent dyeing and finishing operations. The finished fabric will therefore still shrink during laundering, unless it receives another shrinkage control treatment before being dispatched to the garment manufacturer Mercerization is not suitable for protein fibers such as wool and silk.

Stentering

Fabrics can be heat-treated to eliminate the internal tensions within the fibers, which are formed during manufacture. Without the setting process, the fabrics might shrink and crease during later washing, dyeing and drying processes. Hot air setting is by far the most popular heat-setting method, and is usually carried out in a machine called a pin-stenter. Overfeeding during the stentering process can remove some of the strains in the lengthwise direction of the fabric caused by tension applied during earlier processes. To achieve overfeeding, the wet fabric is fed to the stenter chain at a higher speed than that applied when the fabric is gripped by the machine. As stentering proceeds and the fabric shrinks, the distance along the selvedges diminishes, while the width is stretched to the

required dimension. This stabilizing process can be applied to cotton, woolen and synthetic fabrics.

Compressive shrinkage

This process is normally used for woven cotton fabrics. The use of the 'Sanforized' trademark on cotton goods designates fabric shrinkage of no more than one percent on repeated laundering. Such excellent dimensional stability can be obtained by passing the fabric through a compressive shrinkage process. After the process, the fabric is shortened in both width and length, giving it a tighter and closer weave and consequently a higher thread count.

Resin finishing

Cotton and cotton blended sheeting and poplins can be stabilized by a resin finish which is also used as a wrinkle-resistant or permanent press finish. This process not only improves the fabric's recovery properties, but also minimizes shrinkage during laundering of woolen goods. In this method, a surface coating of a polyamide resin is applied to mask the scales of the wool fibers forming a very thin, microscopic film on the outside of the fiber. In addition to controlling shrinkage, the coating tends to improve the wash-and-wear properties and resistance to abrasion of the woolen goods.

London shrinkage

This is a method used to eliminate relaxation shrinkage in worsted fabrics, where a cold water process is used for preshrinking the fabrics.

Decatising, crabbing & potting

These processes impart dimensional stability to woolen fabrics. Decatising is a setting process in which the fabric is wound around a perforated drum, through which steam is passed in alternative directions. It preshrinks the fabric, and improves its appearance, luster and handle. Crabbing and potting perform virtually the same functions, but use hot water instead of steam.

Chlorination treatment

This is a chemical method of treating wool so that the fabric is shrink proof. The chlorine smoothes the scales of the wool fiber, resulting in decreased shrinkage. If a strong chlorination treatment is used, however, the woolen goods suffer from a considerable reduction in wearing properties, a loss in weight and adverse effects in handle.

Super wash

The Super wash process, developed by the International Wool Secretariat in the United Kingdom, makes woolen garments home-washable and dryable. The Super wash method is a combined chlorination and resin treatment, which results in garments having a maximum shrinkage of three percent in length and one percent in width. The soft and resilient handle of the wool is retained, as are the weight and moisture regain or absorbency, appearance. And comfort.

4.3.2 Textural effects

There are a number of processes that modify the texture or the appearance of a fabric so as to increase its appeal to the consumer. Some of the commonly applied processes are considered.

Calendaring

This is essentially an ironing process which adds sheen to a fabric. After going through the preparation, coloration and finishing processes, the surface of a fabric is generally distorted, resulting in a loss of luster. In order to compensate for this and improve the fabric's luster, it can be calendared. This involves passing the fabric between hollow heated rollers under great pressure, the luster produced being directly proportional to the amount of heat and pressure applied. After calendaring, the fabric has a smooth and flat surface. This process is very popular with cotton fabric; woolen fabrics are rarely calendared, except for products such as sheen gabardine.

Shreinering

This is an inexpensive way of producing a very high degree of luster in cotton fabrics. Its operating principle is similar to that of calendaring, except that the upper heated roller is engraved with very fine lines which are set at a slight angle to the warp or weft of the fabric. After the shreinering process, the reflection of light from the ridges impressed on the fabric by the engraved roller will give it a luster that is similar to that obtained through mercerization. If the fabric has already been mercerized, this additional process produces a luster which simulates that of silk.

Embossing

Embossing produces a raised relief design which is permanent on thermoplastic, synthetic fibers but only temporary on cotton. This finishing effect can also be made permanent with the aid of chemicals known as resins, which have a binding action on fibers. A fabric is embossed by passing it between heated engraved

rollers that imprint or emboss the design on the fabric surface. Plain woven fabrics may, after embossing resemble fabric such as pique, which is generally more expensive. This process is not popular with woolen fabrics.

Raising

The process of raising is also known as 'napping'. It produces a fuzzy or hairy surface on a fabric by abrading (scraping) it and pulling the fiber ends to the surface. The degree of hairiness on the surface can be adjusted according to the technique used. The fabric to be raised should be made from soft twisted yarns; the fuzzy and soft surface of the raised fabric makes it warm, owing to the insulating air cells in the naps. The greater the extent of rising (i.e., the more numerous the air cells), the greater the warmth. Raising may also serve to cover any weaving imperfections, although too much raising will weaken the finished fabric and increase any tendency of the fibers to pill. Napped fabrics should not be confused with pile constructions that have been woven or knitted. In a pile construction, the thickness represents a true three-dimensional effect, which is produced by an additional fabric pile.

Shearing

Fabrics that have been napped usually undergo shearing to give them an attractive, smooth and level surface. This process is very popular with woolen materials as well as certain cotton fabrics. The fabric goes through the shearing device and all fibers longer than the setting are cut off, leaving an attractive surface resembling a pile effect.

Emerizing

This process, also called 'sueding', sands off uneven and protruding fibers on fabrics to produce a soft, chamois-like nap - the emerized fabric is sometimes known as imitation suede. The process involves the sanding of fabrics by passing them through a series of emery-covered rollers. It is most popular with high-grade worsted and some woolen fabrics, and is also used on felt hats.

Pressing

Pressing generally accomplishes the same result for worsted fabrics as calendaring does for cotton fabrics, i.e., it adds sheen to the fabric. The process may be carried out by either flat or rotary pressing.

Stiffening

The application of some starch during ironing makes the task easier and produces a smooth finish. This can be described as a stiffening process. Apart from starch, other substances such as flour, dextrin, glue and gum can be used as well although

their effects might only be temporary. The action of the stiffening agent gives the cotton stiffness, smoothness, weight and strength.

4.3.3 Functional effects

Specific types of garments should have specific performance characteristics, e.g., rainwear should be water-repellent. Various processes are thus needed to give such required characteristics as are not naturally contained in the fiber or fabric.

Resin Finishes (for cotton)

i) Wrinkle-resistant finish: this process is based on resin or reactants that combine chemically with the cotton fiber through a cross-linking process. The cross-linking joins the molecular chains of cotton together to provide greater rigidity and to prevent molecular slippage, thereby producing a fiber capable of returning to its original position after bending.
ii) Wash-and-wear finish: this is similar to the wrinkle-resistant finish but it usually has higher resin content. Garments made of fabrics that have undergone this finish may be commercially laundered. If the garments are washed at home, they will dry smoothly and require only very little ironing. This finish is very popular with lightweight cotton shirting materials and yard goods for home sewing.
iii) Permanent press finish: this finish is also commonly known as the 'PP' or 'durable press' finish. Its resin content is one of the highest resin finishes. This process is useful in the manufacture of garments such as trousers and pleated skirts, since it enables permanent pleats to be incorporated into a garment after it has been made up.

Water-repellent Finish

A water-repellent fabric is one that will resist and repel water absorption. However water can still penetrate such fabrics if they are exposed to water for a sufficient period of time, or subjected to high water pressure. These fabrics are in fact not waterproof, but are actually porous to air; this enables the body to breathe, making the fabrics comfortable to wear. Because of the differing effectiveness of various finishes, the following differing degrees of water repellence can be found:

- 'shower-resistant' garments which will protect the wearer from light rain
- 'rain-resistant' garments which will provide protection for a few hours in moderate rain
- 'storm-resistant' garments which will resist water penetration for many hours in heavy rain

There are two types of water-repellent finish: non-durable and durable. The non-durable finish is usually based on paraffin wax and, although it gives very good ratings of water repellency, it can only withstand very light laundering. The

durable finish, on the other hand, can endure both repeated washing and dry-cleaning. Durable finishes are more expensive to produce and are usually based on silicone products, which, since they are also used as fabric softeners can further improve the fabric handle.

Flame-retardant Finish

A flame-retardant finish has in the past been classified as a flameproof finish, which may mislead people into thinking that fabrics finished in this way will be non-flammable. The fabrics still remain flammable but show considerable resistance to the propagation of flame (catching alight), after flaming (the continuation of flame), and after glowing (the residual glow of the fabric after the source of fire has been removed). The rate of burning in such fabrics should also be reduced. Flame-retardant finishes are generally specific to each fiber, since each has different flammability properties.

Mothproof Finish

Woolen fabrics are sometimes mothproofed to make them less susceptible to attacks by moths. This process is of particular importance in warm and humid climates because of the growth of moths under these conditions. Mothproofing can be achieved through a number of organic substances capable of making a fiber poisonous to moths. Those woolen products which are not mothproof finished must be carefully treated to prevent moth damage. Such treatment includes brushing clothing after wearing and exposure to sunlight, and dry-cleaning it before storage. Naphthalene may also be used during storage for additional protection.

Mildewproof Finish

Mildew is a fungus that grows rapidly under warm and humid conditions. Cellulosic fibers are very susceptible to mildew attack, while wool and silk are also susceptible to a lesser extent. Signs of mildew attack are various colored stains appearing on the fabric, black being the most common. Eventually the products may be degraded if left in unfavorable conditions for a long time. Mildew can be prevented by treating fabrics with non-toxic germicides such as metallic salts. Organic mercury compounds may also be used to prevent surface mildew growth on cellulosic fibers

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Antistatic Finish

Static electricity is most commonly found in synthetic fibers - natural fibers do not normally accumulate static charges. An exception to this rule is resin finished natural fibers; hence it is quite common to apply an antistatic finish to wash-and-wear and permanent press cotton fabrics, to improve their

serviceability. Several methods can be used to produce such a finish, the most popular one being to apply a finishing agent to the fabric to make it more water absorbent. This produces a conductive surface, which carries away the static charge.

Soil Release Finish

With the increasing use of synthetic fibers and permanent press finishes, soiling (the attraction of dirt particles to a fabric) has become a serious problem. A soil release finish assists the removal of dirt and stains from fabrics. This is particularly important in the case of permanent press cotton fabrics, which have been weakened by the resin finish, such that severe washing treatments might easily damage them. A soil release finish increases the moisture absorption of fiber and fabric. This improved 'wet ability' helps the removal of most oil and water based stains.

Soil repellent Finish

A soil repellent finish, sometimes known as a 'stain repellent finish', is effective against both water and oil stains. The main difference between this finish and the soil release finish is that the soil release finish helps to remove stains after a fabric has been soiled, while the soil repellent finish actually repels or resists the staining of the fabric.

Softening Finish

All natural fibers possesses some oily, fatty or waxy substance in the raw state. The fibers normally become harsher when this fatty matter is removed, such as after the preparation and coloration processes. The softening process restores the fabrics' original handle. Synthetic fibers may also be softened, in order to improve their naturally inferior handle properties.

4.4 Washing

In addition to finishing processes on textiles, special effects can also be imparted directly to the garments after manufacture. The garments would undergo washing processes that give them different handle or special color effects. The washing technique has developed and expanded considerably to become a finishing process of its own.

The most common equipment is the rotary drum type garment washer. The most popular item by far in garment washing is indigo denim jeans but there is an increasing trend for other casual wear items to be finished using this process. There are a number of different washing techniques commonly used and the basic procedures where the garments are washed are described in the following sections.

4.4.1 Traditional garment wash

This elevated temperature to yield a soft hand. In case of jeans made from indigo or sulphur slasher-dyed denims, it is necessary to remove the sizes (e.g., starch) by an enzyme (amylase) desizing treatment. Color fading will be occurred and the degree will depend on the treatment conditions, such as time, temperature and liquor ratio of washing bath.

4.4.2 Stone wash

To accelerate the washing effect, pumice or volcanic stones can be added for abrasion purposes. There are available today man-made stones of various sizes and shapes. When compared with the traditional garment wash, color fading is more pronounced but less uniform. In addition to the treatment conditions as described for traditional garment wash, the degree of color fading and change of garment hand feel depends very much on the stone ratio to fabric weight which can vary from 0.5 to 3: 1.

4.4.3 'White' washes

This category of washing technique is a variation of basic stone wash procedure and is normally applied to indigo-dyed jeans but can also be applied to other vat-, sulphur- or reactive-dyed garments. It can further be divided into two major groups according to its application methods.

The first involves the use of strong oxidizing agents such as sodium hypochlorite or potassium permanganate for bleaching the garments. The use of these agents is to obtain a much lighter shade than the previous two methods. Excess oxidizing agents must be removed after washing to prevent yellowing and tendering of the washed jeans.

In the second group of methods, the pumice stones are first pre-soaked in a solution of strong oxidizing agent (either sodium hypochlorite or potassium permanganate) and are applied to the garments by dry-tumbling. This will result in a localized washing effect with clear blue/white contrast. This is also termed as 'acid wash', 'snow wash' or 'ice wash'.

4.4.4 Enzyme washes

Cellulose enzymes are commonly used in this washing method. These enzymes differ from that of amylase, used for removal of starches, in that they are only selective to cotton of other cellulosic materials. Hydrolysis of the cellulose causes the fiber to become weaker and depending on the degree of treatment, some surface fibers will be removed when subjected to fabric-to-fabric or fabric-to-stone abrasive action. This washing method tends to produce a more level treatment especially when no stones are added during treatment and the general appearance and hand feel are superior to those of the other methods.

4.5 Embroidery

Embroidery is the art or handicraft of decorating fabric or other materials with needle and thread or yarn. Embroidery may also incorporate other materials such as metal strips, pearls, beads, quills, and sequins. Embroidery is most often recommended for caps, hats, coats, blankets, dress shirts, denim, stockings, and golf shirts. Embroidery is available with a wide variety of thread or yarn color.

A characteristic of embroidery is that the basic techniques or stitches of the earliest work—chain stitch, buttonhole or blanket stitch, running stitch, satin stitch, cross stitch—remain the fundamental techniques of hand embroidery today.

Machine embroidery, arising in the early stages of the Industrial Revolution, mimics hand embroidery, especially in the use of chain stitches, but the "satin stitch" and hemming stitches of machine work rely on the use of multiple threads and resemble hand work in their appearance, not their construction.

Embroidery can be classified according to whether the design is stitched on top of or through the foundation fabric, and by the relationship of stitch placement to the fabric.

In free embroidery, designs are applied without regard to the weave of the underlying fabric. Examples include crewel and traditional Chinese and Japanese embroidery.

Cross-stitch counted-thread embroidery. Tea-cloth, Hungary, mid-20th century

Counted-thread embroidery patterns are created by making stitches over a predetermined number of threads in the foundation fabric. Counted-thread embroidery is more easily worked on an even-weave foundation fabric such as embroidery canvas, aida cloth, or specially woven cotton and linen fabrics although non-evenweave linen is used as well. Examples include needlepoint and some forms of blackwork embroidery.

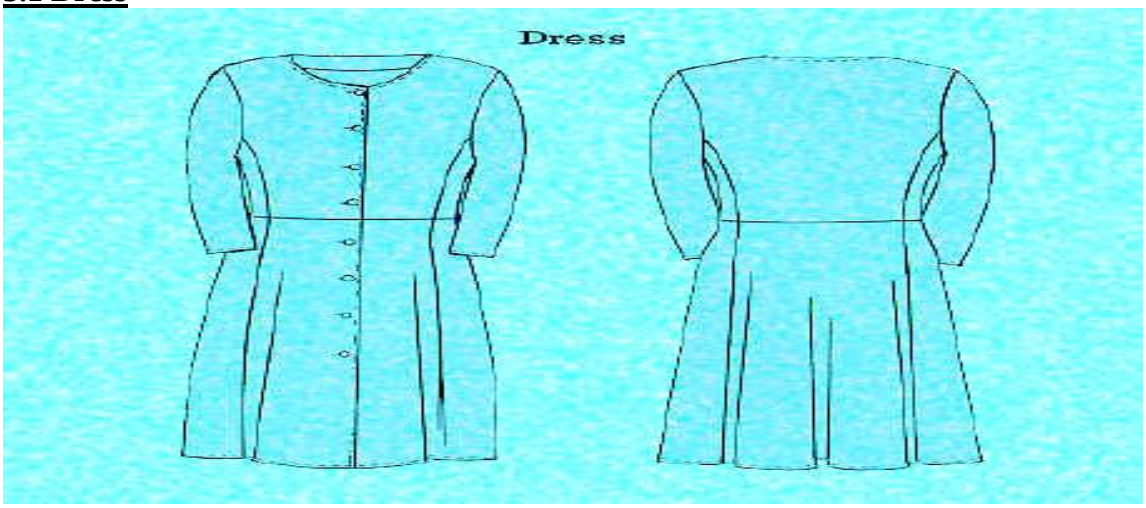
Hardanger, a white work technique. Contemporary.

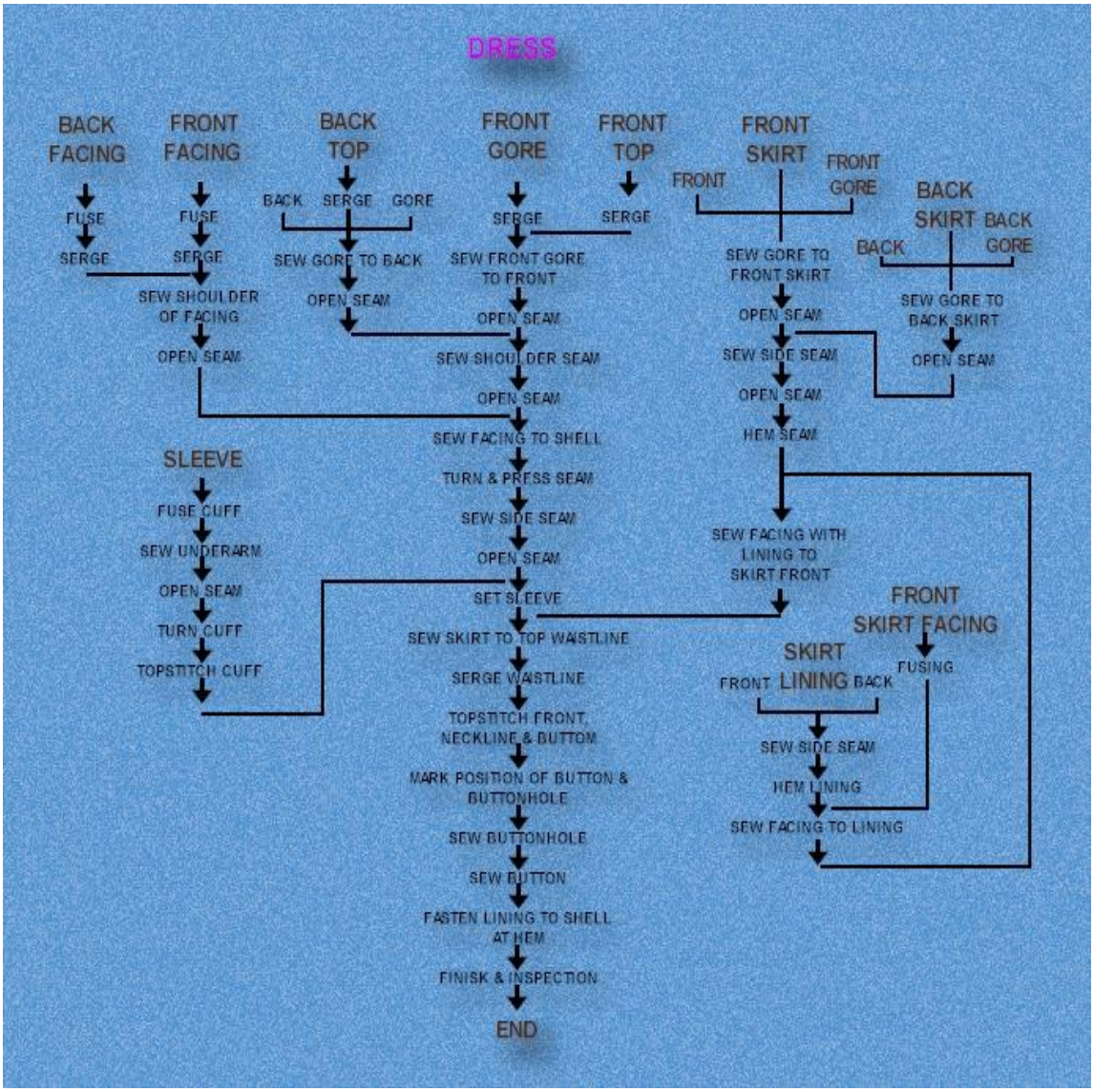
In canvas work threads are stitched through a fabric mesh to create a dense pattern that completely covers the foundation fabric. Traditional canvas work such as bargello is a counted-thread technique. Since the 19th century, printed and hand painted canvases where the painted or printed image serves as color-guide have eliminated the need for counting threads. These are particularly suited to pictorial rather than geometric designs deriving from the Berlin wool work craze of the early 19th century.

In drawn thread work and cutwork, the foundation fabric is deformed or cut away to create holes that are then embellished with embroidery, often with thread in the same color as the foundation fabric. These techniques are the progenitors of needle lace. When created in white thread on white linen or cotton, this work is collectively referred to as white work.

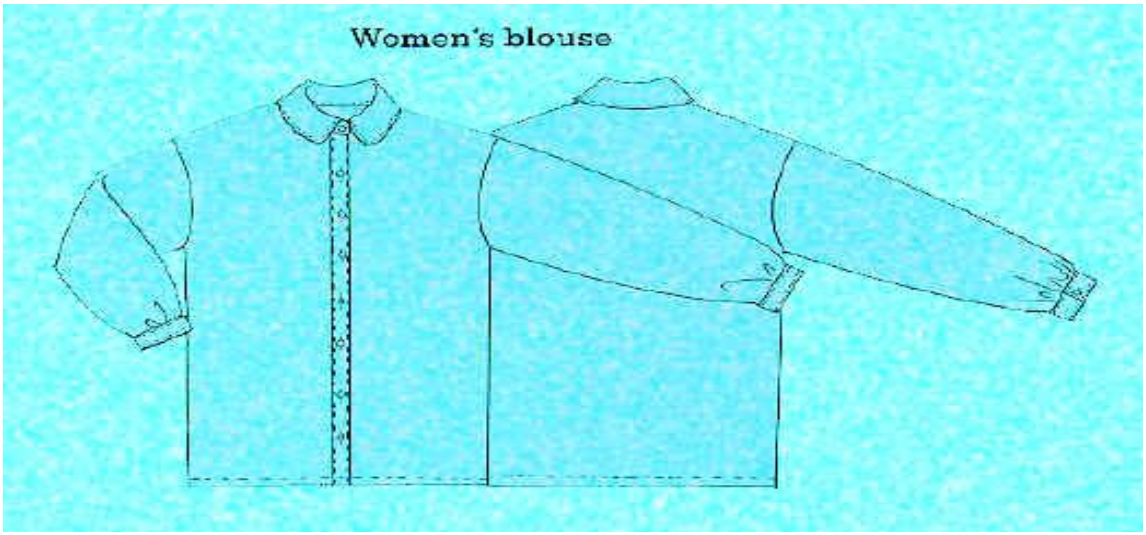
05. GARMENTS MANUFACTURING PROCESS

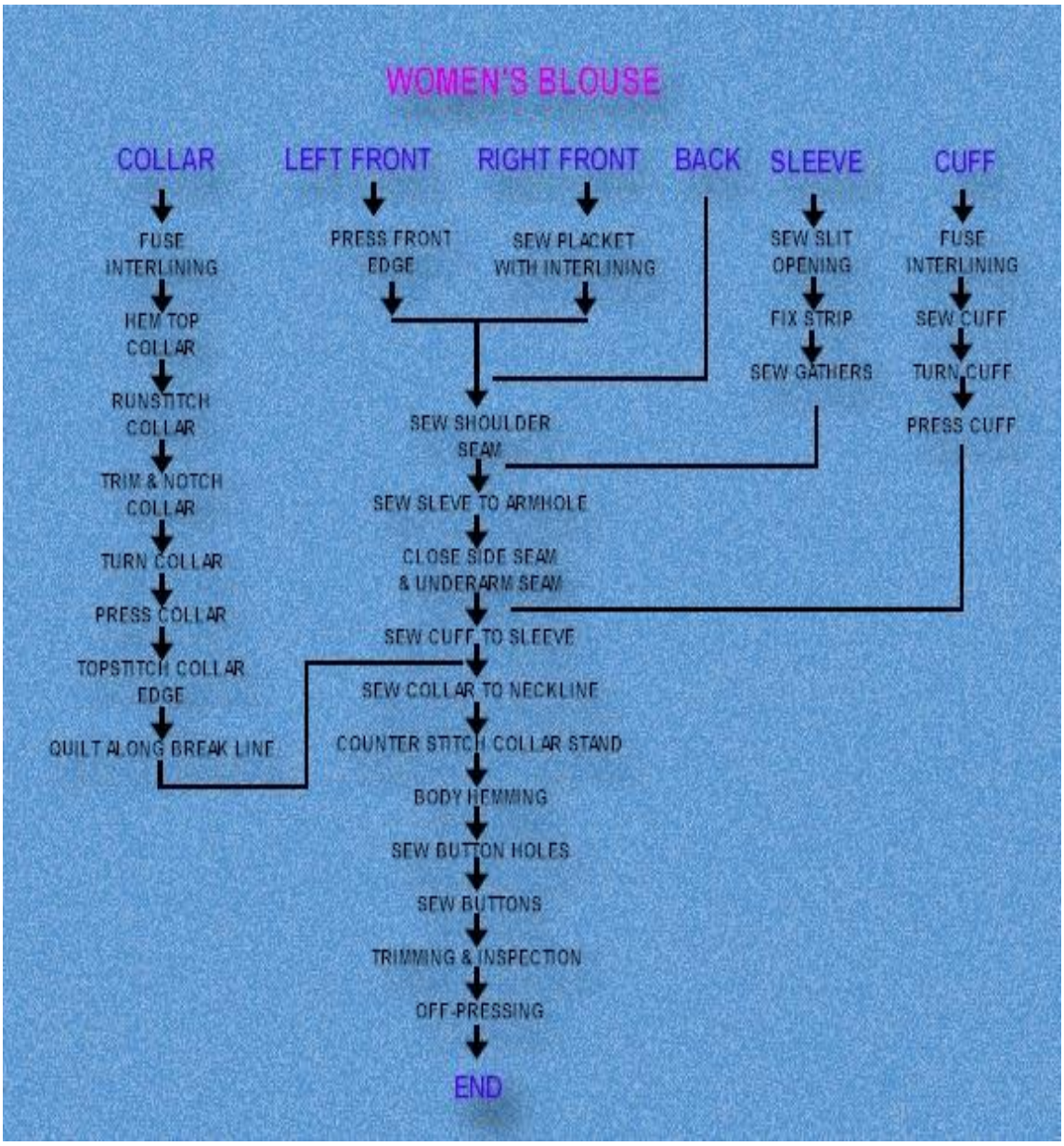
5.1 Dress



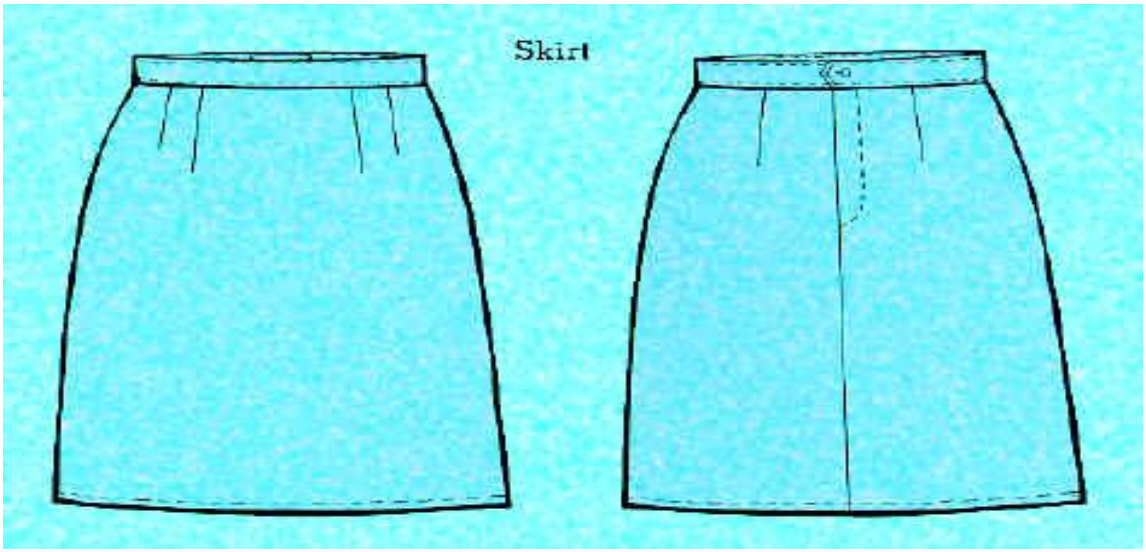


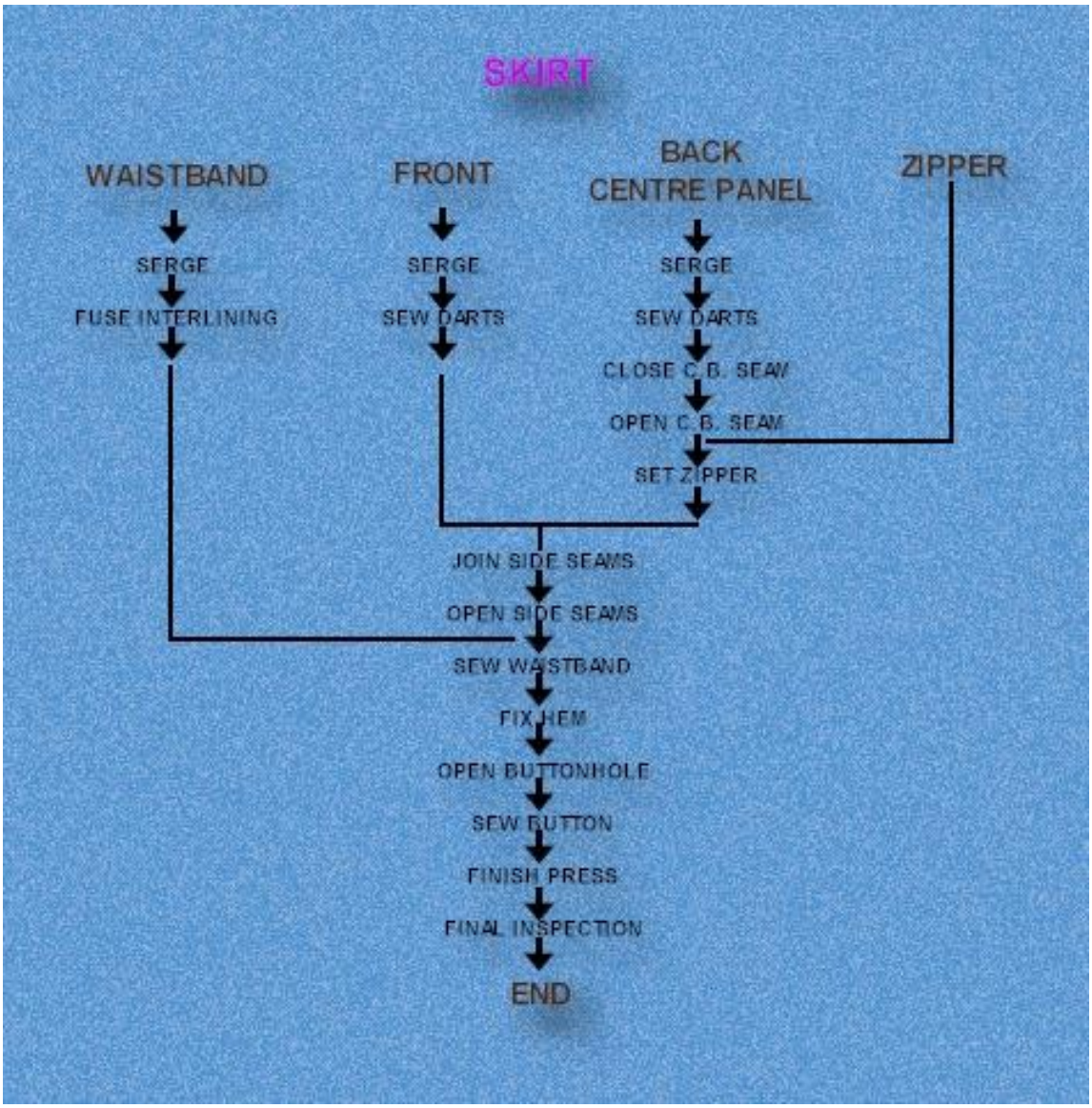
5.2 Women's blouse



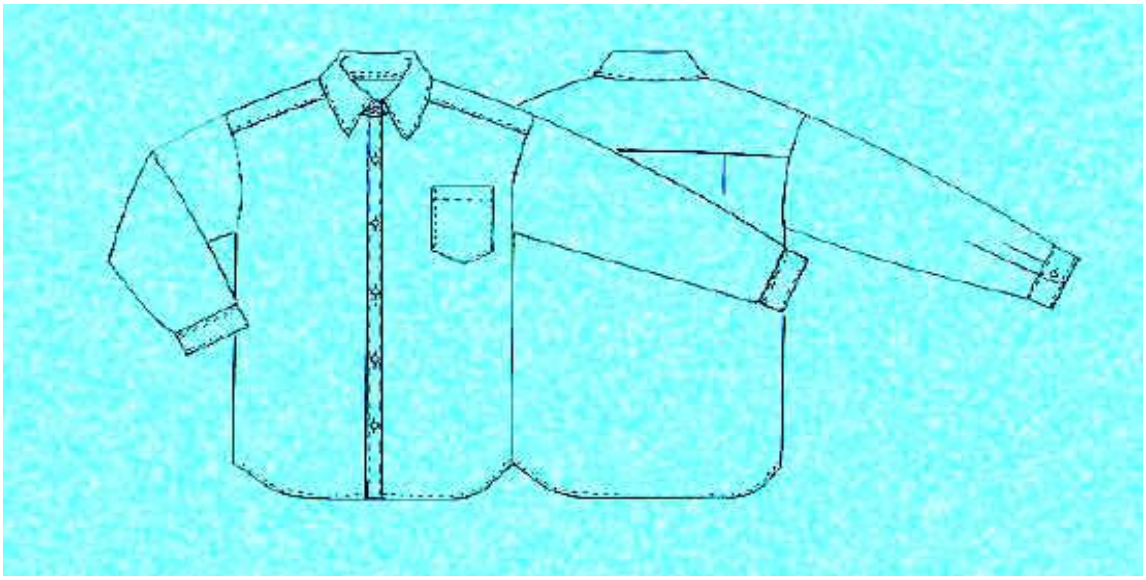


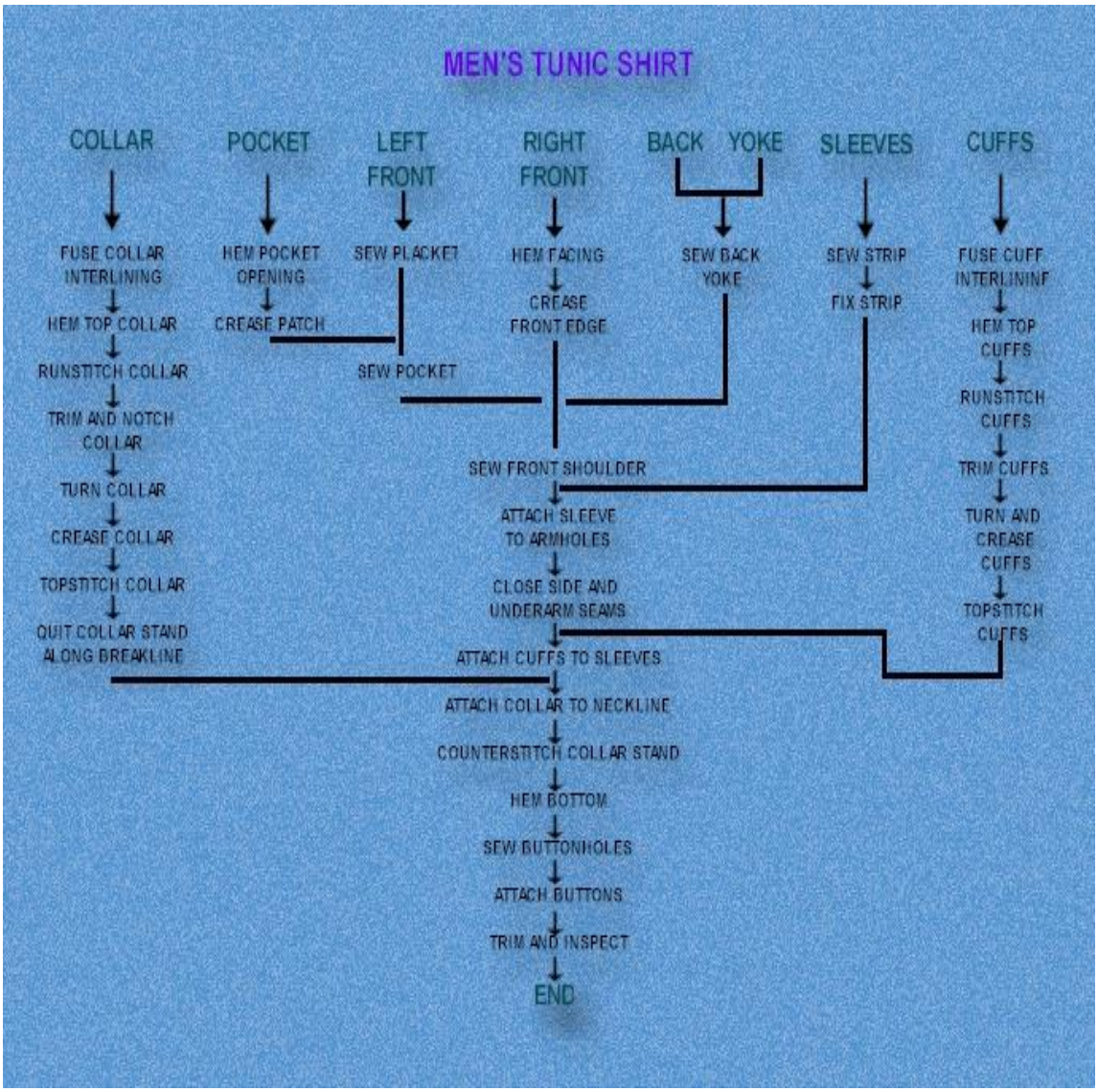
5.3 skirt



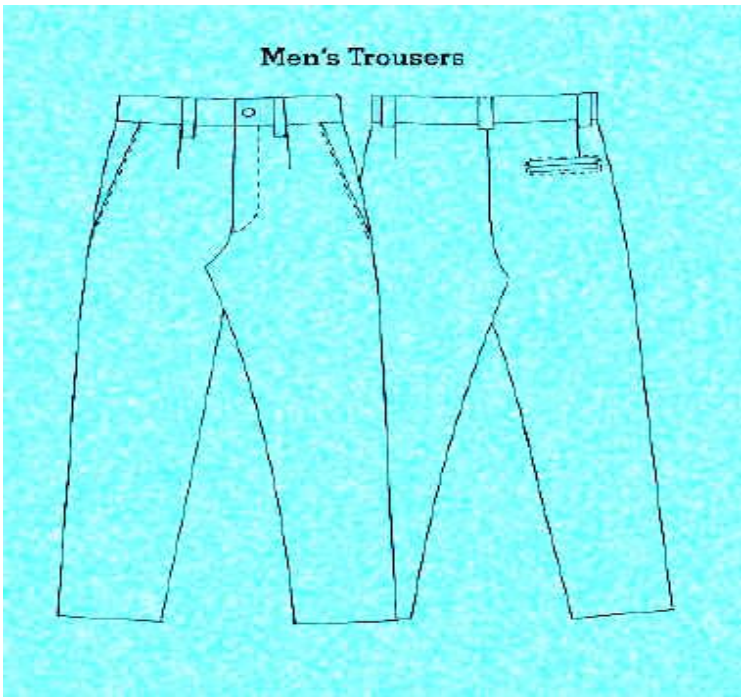


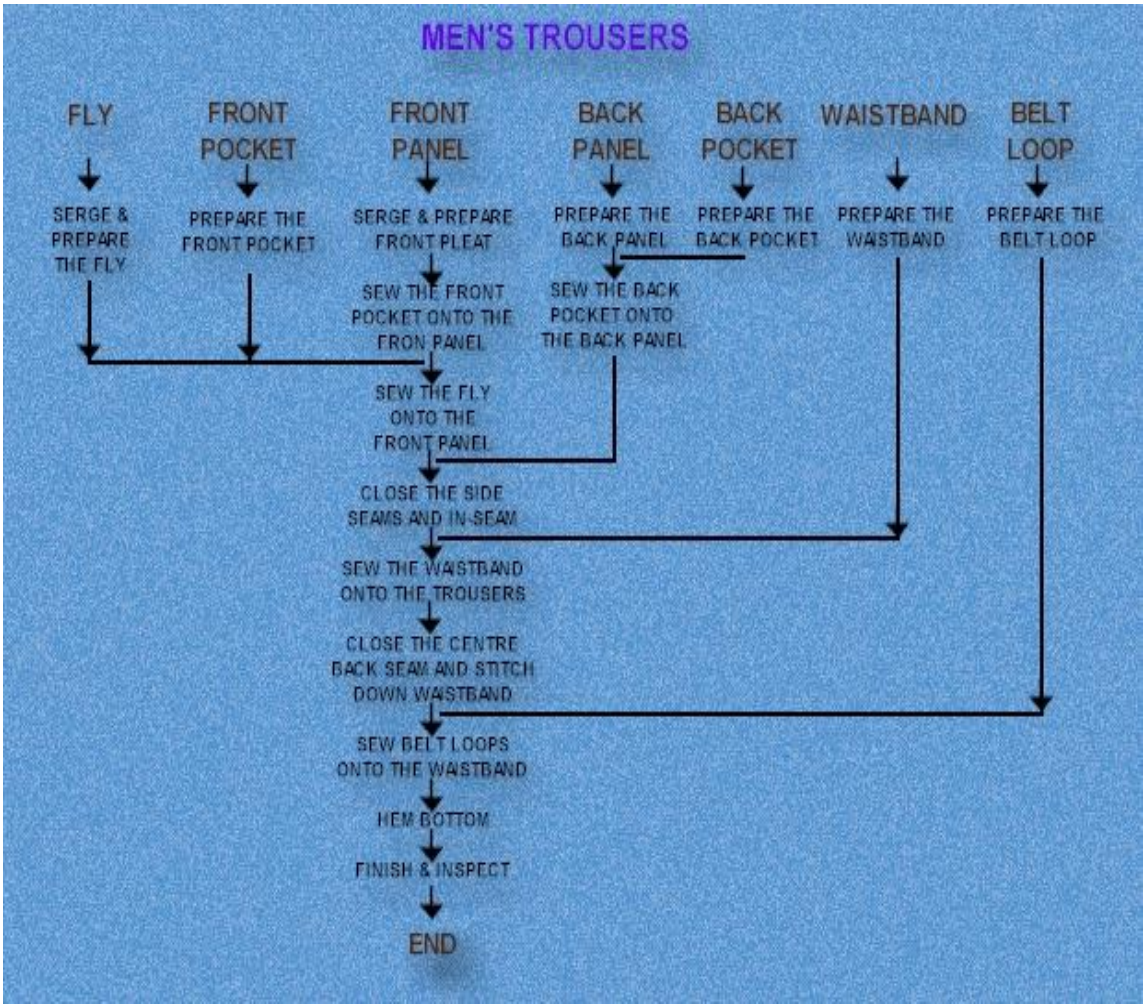
5.4 Men's tunic shirt



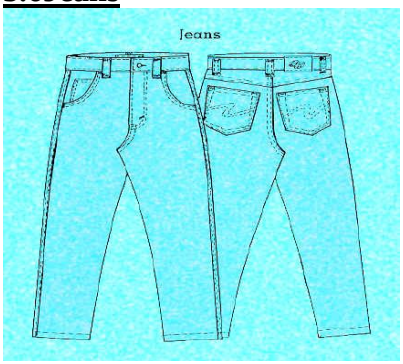


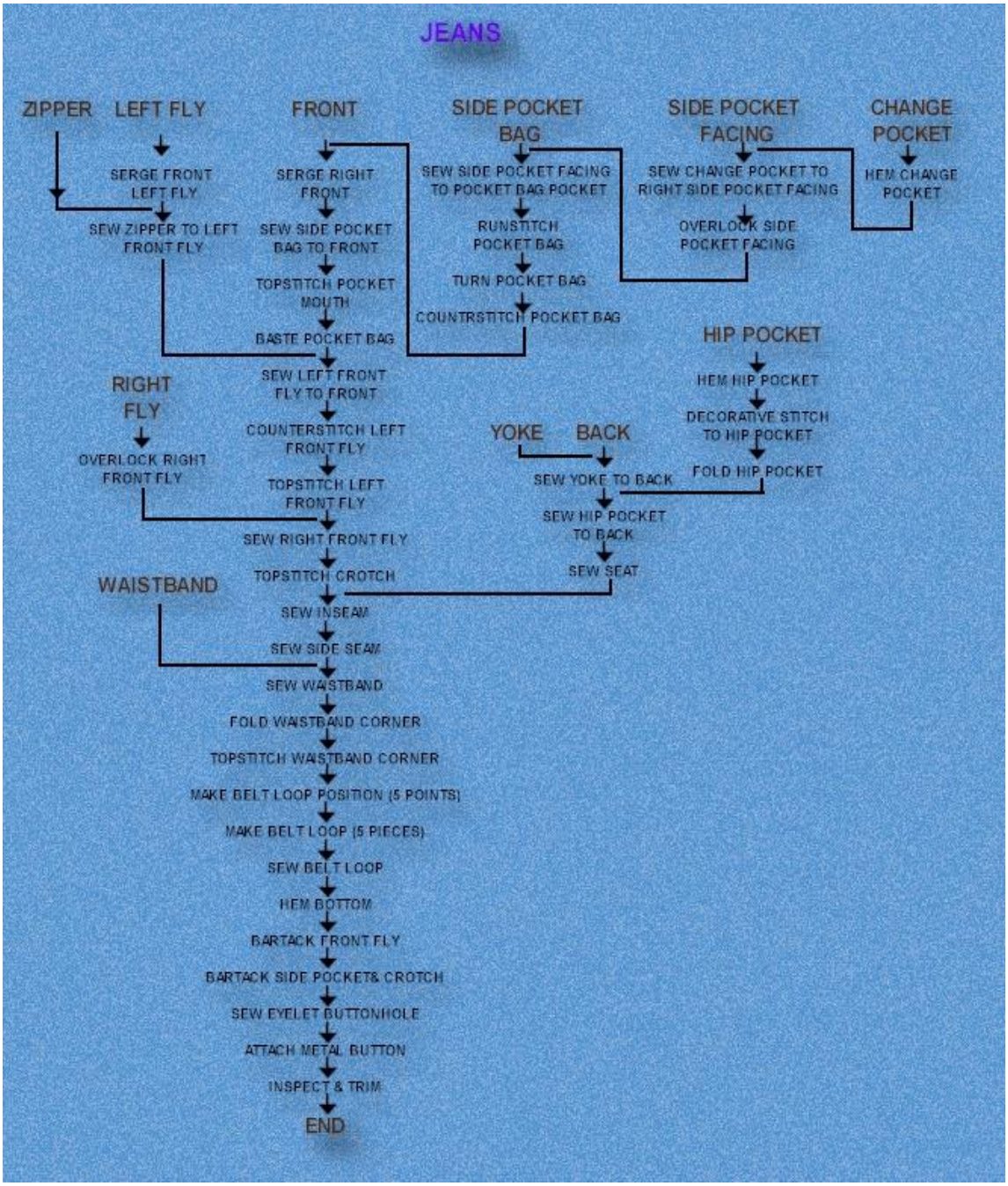
5.5 Men's trousers



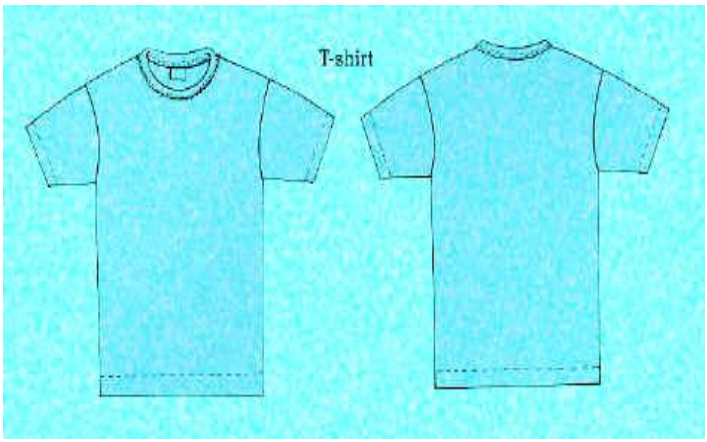


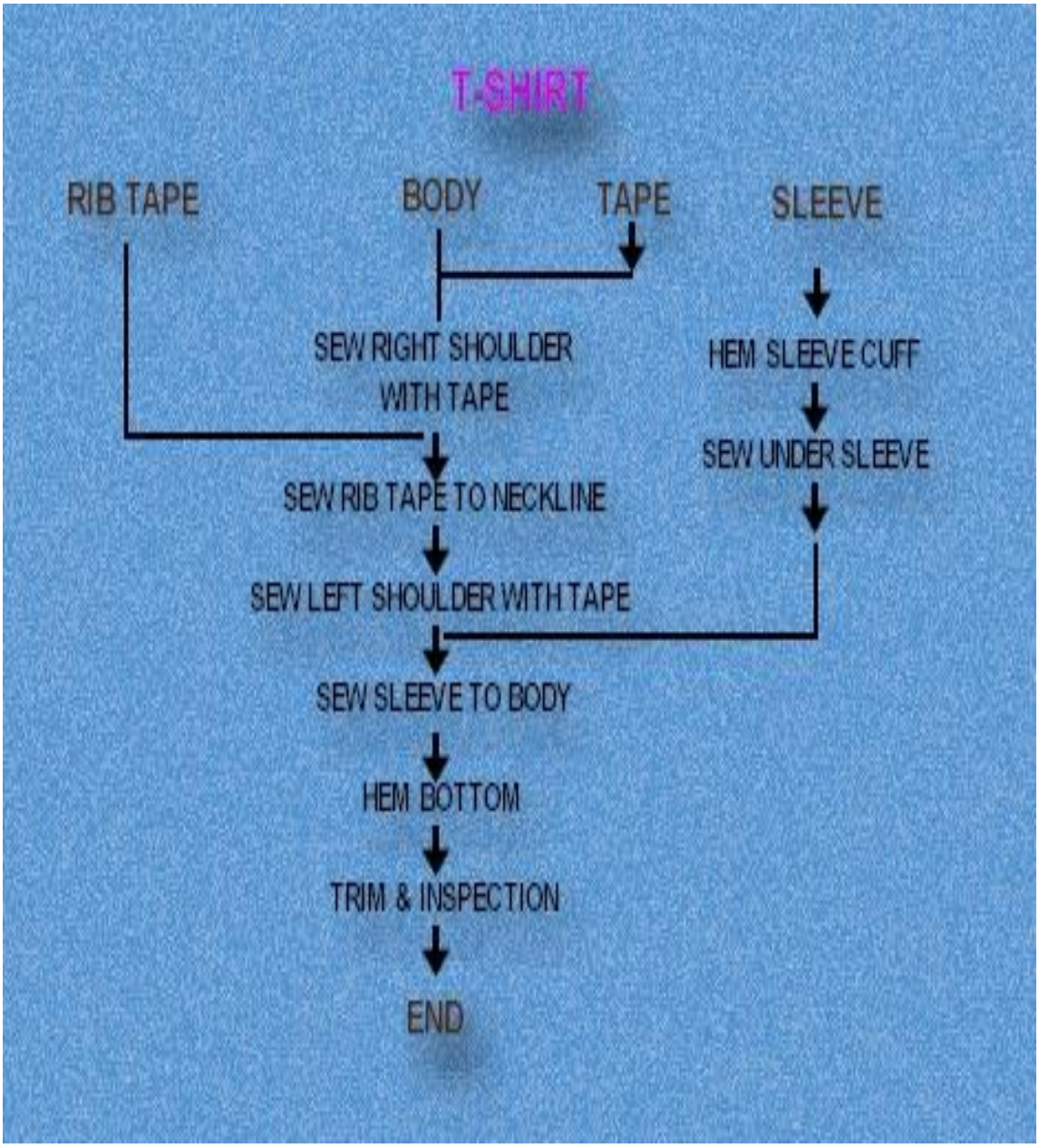
5.6Jeans



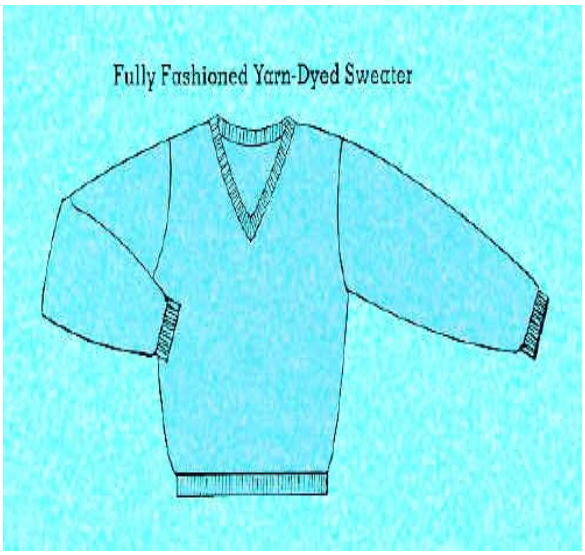


5.7 T-shirt





5.8 Fully Fashioned yarn-dyed sweater

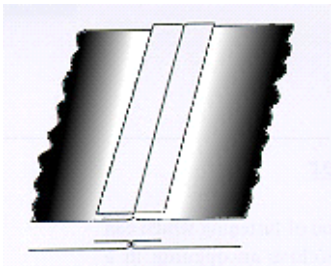


5.9 Seams

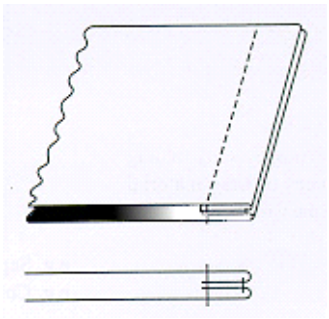
The application of a series of stitches or stitch types to one or several thickness of material for utilitarian, functional or decorative purposes (BS 3870 1991).
According to BS 3870: Part II: 1991, stitched seams can be divided into the eight classes, the commonly used seams for each class are shown as follows:

Class 1

Plain seam which is the most common type of seam is produced by a line of stitches joining two pieces of materials (face to face) together. It can be used on any part of a garment and on various styles;

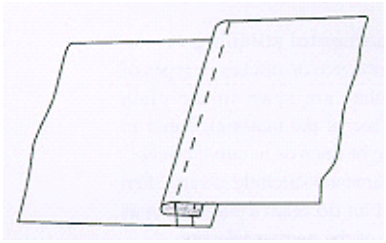


French seam is formed by joining the two pieces of fabric together, folded over and sewn again so that the folded edges are enclosed.
French seam, which is a self-neatened seam, can be used on the outer edges of collars, cuffs and pocket flaps as well as on the side seams, underarm seams of dresses, blouses etc.



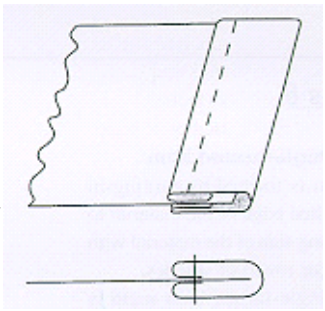
Class 2

Lapped seam
A seam which is formed by lapping two pieces of material, is common used in joining garment parts such as yoke, gusset to other garment parts.



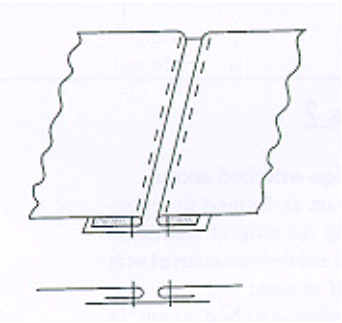
Class 3

Bound seam
A seam having its fabric edges bound with a strip of binding.
This bound seam is always used in edge neatening or for decorative purposes, mainly on high quality garments.



Class 4

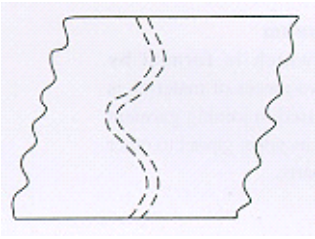
Channel seam



This seam is produced by folding the two pieces of base material inwardly to the wrong side to form a seam allowance and then stitching is applied at an even distance to join the separate pieces of material and the two folded edges together.
This channel seam is always used in fabric with contrasting colors or fabric properties as well as on the side seams of trousers and on all parts of fashioned garments.

Class 5

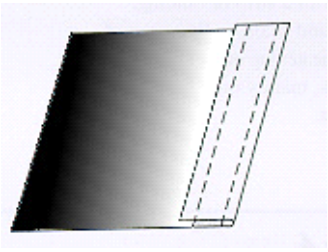
Ornamental stitching



Sequences of stitches or types of stitches are sewn in the plain surface of the material, either in straight lines or in curved lines. Ornamental stitching is very often used for decorative purposes or as part of the garment design.

Class 6

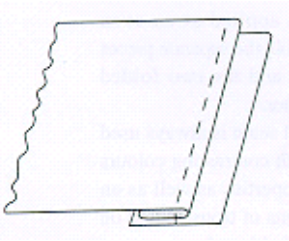
The single-turned hem



A seam is formed by turning-in the limited edge of the material to the wrong side of the material with a row (or rows) of stitches.
This single-turned hem seam is commonly used to finish the hem of blouses, coats, pajamas and trousers.

Class 7

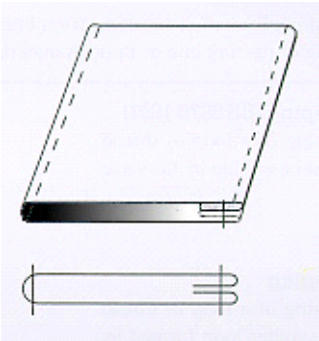
The edge-stitched seam



The seam is formed by edge stitching the strip of additional material and the base material with a row of stitches.
This edge-stitched seam is commonly found on hemlines and sleeve hems of ladies' pajamas, nightgowns, blouses and dresses.

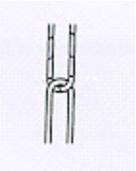
Class 8

The enclosed seam
This seam is produced by folding a strip of material, limited on both edges, inwardly to the wrong side and then half folding the strip of material lengthwise with a row of stitches on one edge or both edges. The enclosed seam is mainly used in making straps, belts, ties and the hanging loops of garments.



5.10 Stitches

One unit of conformation resulting from one or more strands or loops of thread interloping, interloping or passing into or through material (BS 3870 1991).

Interloping (BS 3870 1991) The passing of a loop of thread through another loop by the same thread.	
Interloping The passing of a loop of thread through another loop formed by the different thread.	
Interlacing The passing of a thread over or around another thread or loop of another thread.	

Stitch types

According to BS 3870: Part 1: 1991, all stitch types can be divided into the following six classes:

Chain stitches (BS class 100)

Chain stitches are formed using one or more needle threads, and are characterized by intralooping. One or more loops of thread are passed through the material and secured by intralooping with a succeeding loop or loops after they are passed through the material.

E.g., 101,103

Applications: basting, tacking, button sewing, label setting.

Hand Stitches (BS class 200)

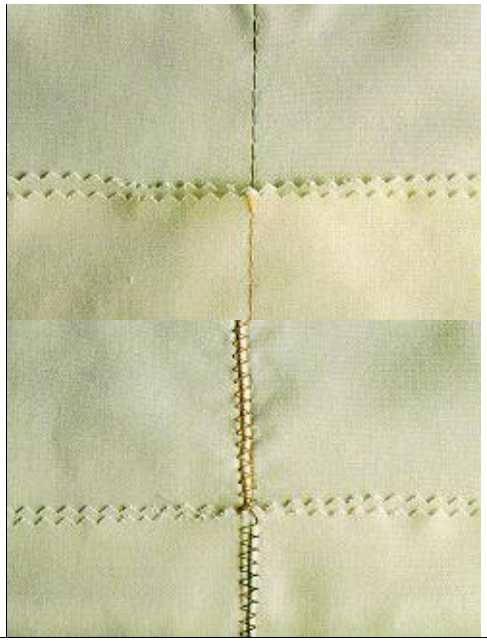
These types of stitches which originated as hand stitches are characterized by a single thread, which are passed through the material as a single line of thread and the stitches are secured by the single line of thread passing in and out of the material.

Lockstitches (BS class 300)

These types of stitches are formed with two or more groups of threads, and have for a general characteristic the interlacing of the two or more groups. Loops of one group are passed through the material and are secured by the thread or threads of a second group.

E.g., 301, 304

Applications: Seaming operation on all types of garment, run stitching.



Multi-thread chain stitches (BS class 400)

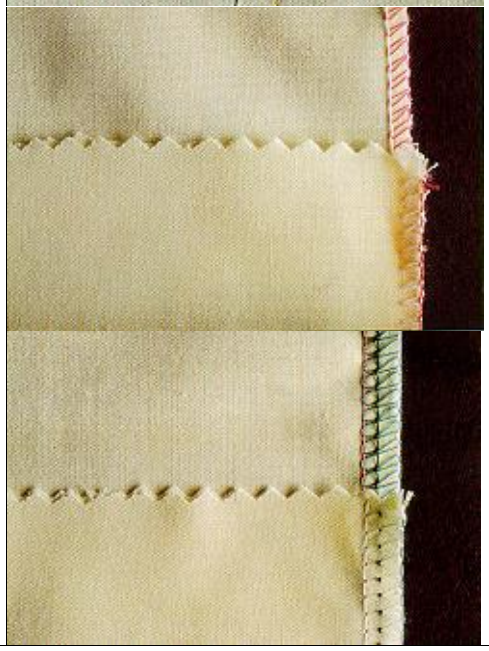
These types of stitches are formed with two or more groups of threads, and are characterized by interlooping of the two groups. Loops of one group of threads are passed through the material and are secured by interlacing and interlooping with loops of another group.

E.g., 401,404,406

Applications: seaming operation on all types of garment.

Overedge chain stitches (BS500)

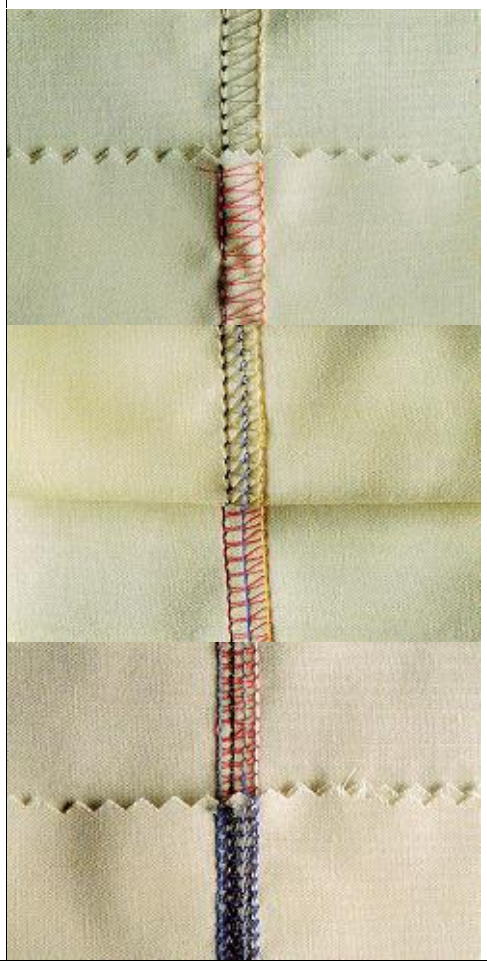
These types of stitches are formed with one or more groups of threads, and have the general characteristic that loops from at least one group of threads pass around the edge of the material. Loops of one group of threads are passed through the material and are secured by intralooping before succeeding loops are passed through the material, or secured by interlooping with loops of one or more interlooped groups of threads



before succeeding loops of the first group are again passed through the material.
This class of stitch is mainly used to prevent fabric from fraying at the edges.
E.g., 502, 514, 516
Applications: used in bolt end, seaming and serging operations.

Covering chain stitches (BS 600)

This types of stitches are formed with two or more groups of threads, which are interlooped with each other. And a cover thread is used to link different groups of needle threads together
Seams sewn with class 600 stitches are flat and have high elasticity.
E.g., 602, 605, 607
Applications : used in binding operations in knitted undergarments, athletic shirts and infants' wear.



06. TESTING METHOD RELATED WITH GARMENTS

6.1 Testing

When an article is produced, it has to be suitable for its end-uses - it must conform to a set of specifications that have been laid down for it. Quality in textile products can thus be defined as the extent to which an article conforms to its specifications.

For example, a shirt should not only be attractive and fit, but should also possess quality criteria such as shape retention after washing, resistance to color fading, or lasting wear. A method to evaluate the textile products relative to these quality aspects is to conduct tests that simulate actual wear conditions. This is done by taking a sample of the material and testing it (for example, by extending or tearing it) using various instruments. Experiments are conducted by research organizations, government standards institutions, consumer organizations, and textile buying offices to evaluate the quality of textile articles, and establish minimum performance requirements.

The following section will consider some of the common tests which are performed on textiles (most of the tests discussed are based on British Standards).

6.1.1 Abrasion resistance

The abrasion of a fabric is the rubbing away of its fibres and yams. The ability of a fabric to resist abrasion can be tested in a number of ways. One way is by the 'flexing and abrasion method' which can be used for all fabrics except floor

coverings. Using a flex abrasion tester, a sample of predetermined dimensions is pulled and rubbed in continuous cycles until it breaks. Its abrasion resistance is determined by the load applied by the tester, and the number of cycles taken to break the sample. Visual inspection of the abrasion is also made. The 'Martindale Tester' is also well known. In this apparatus, the sample fabric is rubbed against a standard fabric until it wears through.
[International testing standards: Martindale - BS 5690, JIS L-1096, Accelerator - JIS L-1096 (woven), JIS L-1018 (knit). AATCC 93]

6.1.2 Bursting strength

Some fabrics, especially knitted ones, are stressed in many directions at one time. The bursting strength of a knitted fabric is the ability of the material to resist rupture by pressure. To test the bursting strength of such fabrics, a hydraulic bursting strength tester can be used. A fabric sample is clamped over a thin flexible diaphragm, which expands as the pressure increases. The fabric eventually bursts, and the pressure gauge reading gives a measure of the bursting strength of the fabric.
[International testing standards: ASTM D3786, BS 4768, ISO 2360, JIS L-1096]

6.1.3 Color fastness

An important property of fabric is its colour fastness or ability to keep its original colour. To assess the amount of colour change or staining that takes place in a fabric, 'grey scales' are used. The grey scale for assessing colour change rates the results of a test from class 1 (poor, substantial change of colour) to class 5 (excellent, no change in original colour). Similarly, the grey scale for assessing staining rates the results from class 1 (heavy staining) to class 5 (no staining).
There are different types of colour fastness which need to be tested as the colour of a fabric can be affected by a variety of factors.

1. Colour fastness to washing/dry-cleaning

The apparatus used for this test is known as a launderometer. Specific sizes for fabric swatches are prepare for laundering, one being retained for colour change comparison. The colour change is assessed by using the grey scales under standard lighting conditions. Any staining is measured in the same way.
[International testing standard, AATCC 61, BS 1006, DIN 54014, DIN 54011, ISO 105, JIS L-0844]

2. Colour fastness to dry and wet crocking

The crockmeter test determines the degree of colour which is transferred from one surface to another by rubbing. The test reveals the presence of surface dyes that have not been removed properly by rinsing, or a failure of the dye class to give good dye affinity and fixation. The test, which can be done under either wet or dry conditions, involves mounting the fabric sample in a crockmeter, which rubs it in continuous cycles against a standard white test fabric. A fixed pressure is applied for a set number of cycles, and the amount of colour which is stained onto

the white test fabric is then assessed by comparing it with the grey scale for assessing staining.
[International testing standards: AATCC 8, BS 1006 X12, ISO 105 X12, JIS L-0849, IWS TM 165, AS 2001.4.3]

3. Colourfastness to bleaching
In this test, after the sample is bleached, grey scales are used to evaluate the colour change, and the result is compared with commercially accepted standards.
[International testing standards: Hypochlorite - AATCC 3, ISO 105 NO1, BS 1006 NO1, JIS L0856. Peroxide - AATCC 101, BS 1006 N02, ISO 105 N02]

4. Colour fastness to perspiration
In this test, a fabric sample is soaked with a simulated perspiration solution. It is then subjected to mechanical pressure and allowed to dry slowly in certain atmospheric conditions for a period of time (as specified by testing standard). Changes in colour and staining are assessed by the appropriate grey scales.
[International testing standards: AATCC 15, BS 1006 E04, ISO 105 E04, JIS L-0848]

5. Colour fastness to light
It is important for fabrics such as curtains and upholstery to have good light fastness properties. In the test, a fabric sample is exposed to daylight under given conditions, including protection from rain, together with eight dyed wool standards. Its colour fastness is assessed by comparing the colour change of the sample with that of the standards. Results range from class I (substantial colour fading) to class 8 (no colour fading).
[International testing standards: BS 1006 B02, JIS L-0843, ISO 105 B02, AATCC 16E]

6.1.4 Dimensional stability

The dimensional stability test is designed to show how well a fabric keeps its shape after washing, Washing usually results in shrinkage, although some fabrics can expand, or gain, after washing, For this test, the washing time and temperature, drying procedure and restoration technique (such as ironing) are all specified, and options are available. The sample is measured in both the warp and weft directions (or wales and courses for knitted fabrics). The percentage of shrinkage (gain) is calculated and the results compared with commercially accepted standards.
[International testing standards: BS EN 25077, BS 4923, ISO 5077, ISO 6330, AATCC 135, AATCC 150]

6.1.5 Flammability

It is important to know both whether a fabric will bum or not, and, if it does, how quickly the flame will spread through it. The flammability testing procedure therefore determines both whether a fabric will ignite and the time that it takes to

bum. Standardized conditions are applied including the size of the sample, the flame length used, and the timing of the test. The fabric sample is first placed in an oven at about 105° C for 30 minutes, then put in a flammability tester where a flame is applied and the result observed. The fabric is then classified according to whether it burned, and if so, how long the flame took to spread.
[International testing standards: General Clothing Textiles - ASTM D1230, US CPSC CFR 16 Part 1610, Canadian Hazardous Products Act, UK Flammability BS 5438]

6.1.6 Seam strength/slippage

The seam slippage of a woven fabric refers to the ability of a seam to withstand forces trying to pull it apart. A strip of fabric is folded and stitched across the width of the seam. A load is then applied to the strip at right angles to the seam using 'grab-test' jaws, and the extent to which the seam opens is measured. The seam strength is recorded as the seam breaks under test conditions. The measuring equipment gradually increases the axial load on the sample (the load applied depends on the testing requirements) and the width of the seam opening at its widest place is measured to determine the seam slippage.
[International testing standard: ASTM D1683, ASTM D434, JIS L-1093/ 1096, BS 3320]

6.1.7 Tear strength

This term means the force required expressed in units of weight to tear a fabric. A fabric sample of standard dimensions (according to the testing requirements) has a slit cut into it. The testing apparatus then measures the work done in tearing a fixed distance through the cloth. The 'Elmendorf' is a popular tearing tester.
[International testing standards: Elmendorf - ASTM D1424, JIS L-1096 Tongue Tear (single/ double) - ASTM D226 1, JIS L- 1096, Wing-Rip - BS 4303]

6.1.8 Tensile strength

This term refers to the breaking load or force, expressed in units of weight, required to break or rupture a specimen. A number of methods can be used to test the tensile strength of a textile sample such as fibre, yarn or cloth. The sample is clamped between two sets of jaws, a force or load is applied to it until it ruptures and the average breaking load is recorded in the 'Strip Test', and the 'Grab Test'.
[International testing standards: One-inch Grab - ASTM C5034, ISO 5082, JIS L-1096, Strip Test - ASTM D1682, ISO 5081, BS 2576, JIS L- 1096]

07. INSPECTION SYSTEM

7.1 Fabric Inspection

The "10-point system" was published as a standard in 1955 by the Textile Distributors Institute and the National Federation of Textiles. The system may be used for any greige or finished fabrics, but mostly it is applied in inspection of....
Garment Inspection

The aim of garment inspection is to visually inspect articles at random from a delivery in order to verify their general conformity and appearance with instruction/descriptions and/or samples received.

Fabric inspection

10-Points system

The "10-point system" was published as a standard in 1955 by the Textile Distributors Institute and the National Federation of Textiles. The system may be used for any greige or finished fabrics, but mostly it is applied in inspection of woven finished fabrics.

This system assigns every identified defect a value depending on the gravity of the defect. The type and cause of the defect are not the most important criteria in assessing the quality of the fabric inspected; whether the fabric is of first or second grade depends on the size and the frequency of the defects.

The 10 point system classifies defects for warp and weft into four groups.

Size of Defect (Inches) Warp	Assigned Points
1 inch or less	1
1 to 5 inches	3
5 to 10 inches	5
10 to 36 inches	10

Size of defect (Inches) Weft	Assigned Points
1 inch or less	1
1 to 5 inches	3
5 inches to half width	5
Large than half width	10

In this system, one linear yard of fabric should not be assigned more than 10 points, regardless of the seriousness or frequency of the defects. A fabric is graded "first quality" if the total points accumulated do not exceed the yardage of the fabric, otherwise the fabric is qualified as "second quality". However there are some exceptions to the system. For instance sometimes fabric used for printing can still be considered a "first" even if the accumulated points exceed the allowed penalty points as the defects will be hidden after printing.

4-Point system

This system is similar to the 10-point system but assigns penalty points on a different basis. There are four categories of defects with assigned values, and faults are recorded according to the size and frequency irrespective of cause and type.

Size of defects (Inches)	Assigned Points
3 inches or less	1
Over 3 inches but not over 6 inches	2
Over 6 inches but not over 9 inches	3
Over 9 inches	4

Normally this system is used in inspection of knitted fabric although it still applicable to woven. Generally, one linear yard of fabric should not be assigned more than 4 points. Full width defects should score 4 points.

10 Defects per 100yds/m system

This method generally finds wide acceptance on the European Continent, whereby per 100 yards - 10 defects are tolerated; major flaws score 1 full point and minor 1/2 point. A combination of major and minor should not exceed 10 points in "full quality" fabric, and for "second quality" fabric, the limits can be considered between 11 - 14.

Although these systems are widely used, quality standards and fabric acceptance vary according to agreements between the buyer and the seller.

7.2 Garment inspection

The aim of garment inspection is to visually inspect articles at random from a delivery in order to verify their general conformity and appearance with instruction/descriptions and/or samples

received.

Stages of Garment Inspection

Different systems may be used by different organizations, nevertheless there are normally four stages of garment inspection:

- Pre-production check: this is done before production starts, where there is a final verification of the material used, style, cut and workmanship of the garment or pre-production sample.
- Initial production check: this is done at the start of production where a first batch of garments is inspected, to distinguish possible discrepancies/variation and to allow for the necessary corrections to be made before bulk production. The inspection is a preliminary stage covering mainly style and general appearance, workmanship, measurements, quality of fabrics, components, weight, color and/or printing.
- During production check: this is done during production to ensure initial discrepancies/ variations have been rectified. This inspection is in fact the follow-up of the initial production check and is generally carried out a few days after the initial inspection, especially if discrepancies have been detected at that time.
- Final random inspection: this is carried out when the production of the total quantity of an order or partial delivery is completed. A sample lot will be selected from the order and a percentage of the garments will be inspected, this percentage usually being stipulated by the buyer The AQL sampling inspection may be applied or another inspection system designed by the buyer.

AQL Random Sampling Inspection

The AQL random sampling inspection was derived from the mathematical theory of probability and is based on the sampling scheme defined in Military Standard 105D (MIL-STD-105D). This method constitutes taking random samples from a lot of merchandise, inspecting them and depending on the quality of the samples inspected, determining whether the entire lot is acceptable or not.

The MIL-STD-105D (also BS6001, ISO 2859, DIN 40080) provides the sampling plans, and these determine the number of samples to be inspected in lot size, in addition to indicating and the acceptable quality level (AQL) which represents the maximum number of defects per hundred units that, for the purpose of the sampling inspection can be considered satisfactory as a process average.

In general cases the buyer will determine which sampling plan and what AQL to adopt. The AQL 1.5 is applied when severe inspection conditions are required on high-class expensive

items. The AQL 2.5 is applied when textiles of normal/good quality are involved.

There are three types of sampling plans: single, double and multiple sampling plans. Each sampling plan can be performed at three levels: normal, tightened and reduced, depending on inspection requirements and quality of the products. In the garment industry, generally single and double normal sampling plans are applied; therefore only examples of these two will be provided.

The Sample Size Code Letter (Table 1) shows various lot sizes corresponding to a series of code letters. There are seven inspection levels, four for general inspection and three for special inspection. For garment inspection, general inspection level 11 is normally applied unless stipulated otherwise.

E.g. 1: Single Sampling Plan - Normal Inspection

Assume an AQL of 2.5% and a lot size of 600 garments. Referring first to Table 1, the number/ quantity 600 falls in line 9 in the "Lot or batch size" column, which also corresponds to the code letter "J" in the "General Inspection Levels 11" column. In Table 2, the code letter "J" has a sample size of 80 and under the column of 2.5 AQL, it can be found that the "AC" or acceptable number is 5 and the "RE" or rejection number is 6.

It means that after inspection of all 80 garments from the sample lot, if the number of defective garments found is 5 or less, then the whole lot of 600 garments is accepted; if the number of defective garments found is 6 or more, then the whole lot of 600 garments is rejected.

E.g. 2: Double Sampling Plan - Normal Inspection

Assume an AQL of 4.0% and a lot size of 2000 garments.

From Table 1, the number/quantity 2000 corresponds to the letter "K" in the "General inspection Levels II" column. From Table 3, "K" has two sample sizes. The first sample size is equal to 80 with an acceptance number of 5 or less and a rejection number of 9 or more defective garments. If after the first inspection, the number of defective garments amounts to 6, 7, or 8, then proceed to the second inspection. The second sample size is also 80 (making a total of 160 garments), with acceptance number 12 or less and rejection number 13 or more defective garments. The "AC" and "RE" for the second inspection are cumulative, i.e., the number of defective garments found in the first sample is added to the number of defective garments found in the second sample. Hence if the number of defective garments found in the first sample is 6 and in the second sample is 5, making a cumulative of 11, then the whole lot of 2000 pieces is accepted.

08. QUALITY CONTROL & MANAGEMENT

8.1 Quality Control & Description

It is important for the manufacturer that the quality of the goods be carefully controlled. In the beginning this will be done by you; it is your responsibility to check with the contractor to ensure that he is following closely the construction methods used in the production sample and that the quality remains constant. This is achieved by going to the contractor's factory and inspecting for yourself the quality of goods produced. Once the contractor finishes the garments, they are delivered for final quality inspection and shipping, or the contractor himself could be responsible for shipping the garments when completed. These days the industry is using more technology, which makes for better quality in production, increased efficiency and faster movement of goods from factory to store reorder information to suppliers as stocks drop.. The garments are grouped depending on the customer and the dates to be shipped. An order always bears two dates: the date after which shipping can begin and the date before which it must be completed to avoid cancellation. Late shipping must be avoided at all costs as the store could cancel its order.

8.2 Purpose of Quality Control

It is a long standing tradition of any organization to offer the customers first quality merchandise. The purpose off this quality control program is to assist manufacturers in meeting our high standards.

In addition, company's quality control program can be also help the suppliers with their operation. Quality control program not only help spot and reject defective items, but more importantly they pinpoint production operations that need special attention, there by reducing the number of defects in future production. This type quality control provides basis for management decisions in the manufactures plant.

For the purpose of this manual, the defect refers to a condition that renders merchandise of second quality and unacceptable because the defect is one or more of the following:

- It is conspicuous
- It will affect the salability of the product
- It will affect the serviceability of the product
- It is significantly different from the specification

It is understood that all performance and legal requirements be following to the letter (that is L/C or any other contract between the buyer & seller) with no deviation allowed, including

requirement for the following:

Flammability
Refurbishing (cleaning)
Labeling

A manufacturing realizes three major benefits from quality control program
Getting the most for the quality control dollar
Using the entire quality control staff most effectively
Ensuring that even with turnover of personnel quality is maintained.

8.3 Basic Information Relevant to Quality

- Measurement with Technical Spec.
- Style Description
- Fabrics Description
- Fabrics width /weight
- Washing Shrinkage if any

09. TEXTILE EXPORT CONTROL

According to the legal framework for the textiles export control system, all textile exports and re-exports from Hong Kong must be covered by valid export licenses issued by the Director-General of Trade.
There are four types of textiles export licenses which are commonly used:

- Export License (Textiles) Form 4 (TIG 353): commonly known as "white" license used for the export of
    i. re-export goods
    ii. samples
    iii. textile products not subject to quota restraint
    iv. unaccompanied personal effects
    v. bona fide gifts
    vi. piece knitted garments assembled in Hong Kong from knit to shape panels of foreign origin (for the USA market)
- Export license (Textiles) Form 5 (TIG 353A): commonly known as "blue" or "quota" license used to cover export of textiles subject to specific quota restraint, other than export to the USA under quota of piece-knitted garments made from knit-to-shape panels knitted in Hong Kong
- Export License (Textiles) Form 8 (TRA 534): "quota" license to cover export to the USA of piece-knitted garments made from knit-to-shape panels knitted in Hong Kong
- Special Export Licenses 8a (TRA 534A) and 8d (TRA 534D): for the export of knit-to-shape panels for the purpose of outward processing

Normally an export license is valid for 28 days from the date of issue or until the end of the restraint period, whichever is earlier. For EU, export licenses valid for 3 months may be issued on special request. Export licenses are not transferable.
Depending on the agreement with the importing country, applications for export licenses are to be made in triplicate or quadruplicate, the original being kept by the Trade Department, and the

remaining copies, to the exporter, the importer and the carrier as appropriate. (In case of exports to the EU, the Trade Department retains the duplicate with the remaining copies to the other parties)

Re-export

For re-export of textiles products of non-Hong Kong origin to overseas markets, applications should be made on Form 4 (TIG 353) in quadruplicate for all European markets, and in triplicate for all other markets. All applications, except those concerning re-exports of personal shipments and samples satisfying certain quantitative limits and licensing criteria, should be supported by photocopies of relevant import licenses (Textiles).

Country of Origin

A Certificate of Hong Kong Origin (CO) is to certify that the goods concerned are of Hong Kong origin. A CO is normally applied to facilitate customs clearance of consignments in the importing countries. Export license applications for restrained textiles exported to the United States (with some exclusion), the EU, and Norway must be supported by COs.

A CO is issued only when it has been established that the goods are the natural produce of Hong Kong or the product of a manufacturing process in Hong Kong which has changed permanently and substantially the shape, nature, form or utility of the basic materials used in manufacture. There are specific origin criteria applicable to individual types of products manufactured in Hong Kong, and specific conditions to the CO rules covering exports of certain products to certain markets.

In Hong Kong, quota is allocated according to the principle of past performance, i.e., it is allocated to those traders who have demonstrated capabilities of exporting particular products to the markets concerned. However if they are unable to maintain their export performance, the quota allocated to them will be lost.

Quota allocated is valid for a period of one year according to the following rules:

- A quota holder who used less than 95% of its quota holding in a particular category in the preceding restraint period will be offered an allocation equal to the amount it used;
- A quota holder who used 95% or more of its quota holding in a particular category in the preceding restraint period will be offered an allocation equal to 100%;
- A quota holder who falls under (2) and who did not transfer out on a temporary or permanent basis any of its quota holding in a particular category in the preceding restraint period will be offered an additional amount equivalent to the growth factor for that category.

The Trade Department allocates quota to individual holders but also runs a system whereby quota holders are allowed to transfer quotas. This transfer system facilitates optimum utilization of quotas by Hong Kong; those holders who no longer wish to use quota in a particular category can transfer them to other traders who need them, thereby creating a channel for quota for new comers.

There are two types of transfer, permanent and temporary.

[Transferor is the party who transfers; transferee is the party to whom the quota is transferred.]

Briefly:

- Permanent transfers (type B) - quota may be transferred permanently from one party to

another; the transferee becomes the quota holder and obtains the use of quota, and will be allocated quota units in the category transferred based on its actual performance.

- Temporary transfers - the transferee obtains the use of quota for the year in question; the performance against the transferred quantity is attributed to the transferor. There are two kinds of temporary transfers: straightforward temporary transfers (Type A) and swing transfers (Type S) which is a combination of a Type A and a swing (Swing may be defined as an exchange involving the surrender of quota in one category or sub-category in return for an equivalent quantity of quota in another category or sub-category).

All transfers must be registered with the Trade Department, and traders applying for quota transfer should complete the following forms:

Transport terms

Bill Of Lading (BIL), Combined Transport Bill of Lading, Group age Bill of Lading / House Bill of Lading, Negotiable Bill of Lading, Non –Negotiable Bill of Lading, On Board Bill of Lading, Stale Bill of Lading, Third Party Bill of Lading, Through Bill of Lading, Unclean Bill of Lading, House Airway bill, Master Airway bill

Shipping terms

Consignee, FCL (full container load), LCL (less container load), Shipper, Shipping Marks, Garment on Hangers (GOH), Flat Packed Container (FPC)

Terms of trade

C&F (cost and freight), CIF (cost, insurance, freight), CM, CMQ, CMT, CMTQ, Ex-Ship, EXW (ex- works) / Ex-Factory, FOB, FOB Airport (FOA), Landed Duty Paid (LDP)/ Delivered Duty Paid (DDP), Certificate of Origin, Export License, Packing List

Terms of payment

Document against Acceptance (D/A), Documents Against Payment (D/P), Open Account, Letter of Credit (L/C), Commercial Invoice

9.1 Transport terms

Bill Of Lading (B/L)

It is a major document if the goods are dispatched by sea.

The document represents:

- A formal receipt for the goods

- The evidence of the contract of carriage of the goods between the shipper of the goods and the shipping company
- The document of title to the goods

A bill of lading may include the following details:

- A description of the goods in general terms not inconsistent with that in the letter of credit
- Identifying marks and numbers, if any
- The name of the carrying vessel
- Evidence that the goods have been loaded on board
- The ports of shipment and discharge
- The names of shipper, consignee (if not made out "to order"), and name and address of the "notifies" party if any
- Whether freight has been paid in advance or is payable at destination
- The number of original bills of lading issued
- The date of issue
- The departure date of carrying vessel or aircraft

Combined Transport Bill of Lading

A bill of lading covering carriage by a combination of transport movements where the carrier issuing the bill undertakes responsibility for the goods from a point or place of receipt to a point or place named in the bill of lading. This document is also commonly called a "container bill of lading" as it is issued by container companies and their agents.

Group age Bill of Lading / House Bill of Lading

When the order amount is insufficient to fill a container, the supplier might request that the forwarder combine several orders that are going to the same port of destination into one container to save freight charges for all the parties concerned. The forwarder does this and delivers the container to the shipping lines, which treats the container as one shipment and issues one set of bill of lading to the order of the forwarder, who in turn issues "groupage bill of lading" or "house bill of lading" to each of the suppliers. These documents merely serve as a delivery order notice or shipping certificate to direct forwarding agents at the port of destination to deliver the goods to the holders of the house bills of lading.

Negotiable Bill of Lading

The bill of lading is consigned to "the order" of the shipper, and blank endorsed on the back to the order of the bank which issues the letter of credit for the buyer.

Non -Negotiable Bill of Lading

The document is consigned to a specific party and delivery by the carrier is to the consignee only. The consignee must produce an original bill of lading in order to take delivery of the goods.

On Board Bill of Lading

The document confirms that the goods have been loaded on board for shipment, validated by the shipper confirming the name of the vessel and the date of boarding. This document is always requested by the bank unless otherwise stipulated in the letter of credit.

Stale Bill of Lading

The bill of lading is tendered to the negotiating bank at so late a date after sailing that the negotiating bank could not negotiate the documentary letter of credit before arrival of the goods at the port of destination.

Third Party Bill of Lading

This is a bill of lading that does not show the shipper as the beneficiary of the shipment but rather that the goods are consigned to a third party. Unless expressly prohibited in the terms of the letter of credit, this type of bill of lading is commonly accepted for negotiation by the banks.

Through Bill of Lading

This is an ordinary bill of lading with the exception that it indicates that the cargo will be unload at a port of discharge and then carried to a final destination by another sea carrier. The through bill of lading can also be used for transfers, transshipments, relays, or more than one mode of transport, similar to a combined transport bill of lading.

Unclean Bill of Lading

A bill of lading that bears a superimposed clause or statement expressing reservations about the condition of the goods or packing. If such remarks are shown on a bill of lading, the document will be treated as "unclean" or "caused" and considered a discrepancy by the banks.

House Airway bill

A master airway bill covers the whole shipment; a house airway bill is a receipt issued by a forwarder to each separate customer for his shipment in a single airway bill.

Master Airway bill

A receipt or air consignment note issued by an airline or their authorized agents evidencing the dispatch of merchandise by air freight. Usually three originals are made: one for the consignee, one for the shipper/supplier, and one retained by the issuing carrier.

9.2 Shipping terms

Consignee

The person whose name appears on the bill of lading or airway bill as the party to whom the goods are to be delivered by the carrier.

FCL (full container load)

A fully loaded container which may be in weight or cubic measurement terms, contracted by one shipper, and conveyed to one consignee and to one destination.

LCL (less container load)

A consignment of cargo which does not fill a full container, grouped with other consignments for the same destination.

Shipper

This is the person whose name appears on the bill of lading or airway bill as the party who has contracted the carrier to dispatch the goods.

Shipping Marks

These are marks essential to identifying cargo and linking that cargo with specific documents. Because these marks are important as identifiers, the marks and numbers should be as simple as possible. Shipping marks include the abbreviated name of buyer, reference number, destination, package number, and container number (if applicable).

Garment on Hangers (GOH)

The garments are packed into the container on hangers.

Flat Packed

The goods are packed into cartons.

9.3 Terms of trade

C&F (cost and freight)

The seller/supplier agrees to contract the freight and pay "cost and freight" for loading the goods, cleared for export, on board a vessel and the charges to ship the goods to destination. The buyer bears the risk of the goods from the time they pass the ship's rail at the port of shipment and pay for the insurance coverage, and for the unloading costs at the port of destination.

CIF (cost, insurance, freight)

The seller's price includes all charges, freight and insurance up to the point where the ship carrying the goods arrives at the port of destination; the goods must be cleared for export by the seller. From that point the buyer has to bear all charges and risks, including unloading costs.

CM

This refers to the manufacturing cost and this term means "cut and make". The buyer supplies all the materials to the manufacturer.

CMQ

This term means "cut, make and quota" and is similar to 'CM' except that the manufacturer has to supply the quota as well.

CMT

The term means "cut, make and trim". The buyer provides the fabric, and the supplier makes the garments.

CMTQ

The term means "cut, make, trim and quota". The buyer has to provide the fabric and the manufacturer makes the garments as well as provides the quota.

Ex-Ship

The supplier is responsible for all costs incurred until the ship reaches the port of destination where the supplier delivers the documents and the buyer can clear the goods on board the ship. The buyer bears all risks and costs from that point including unloading charges.

EXW (ex- works) / Ex-Factory

The supplier delivers the goods to the buyer at his premises, i.e., factory, warehouse, etc. He has the minimum responsibility and does not have to provide minimum documentation unless upon specific request. The buyer bears all costs and risks involved upon delivery of the goods until the desired destination.

FOB

This term means "Free On Board". The supplier is responsible for all charges (including export licenses, export taxes, etc.) and risks until the goods have passed over the ship's rail at the port of shipment; the merchandise must be cleared for export. The buyer contracts and pays for the freight and bears all risks for loss or damage to the goods as soon as the merchandise passes the ship's rail. The buyer also pays for all import duties and clears the goods through customs at the point of destination.

FOB Airport (FOA)

This is similar to the term FOB except that the mode of transportation is an air carrier. The supplier fulfills his obligations after he has delivered the goods to the air carrier. The goods must be cleared for export by the supplier.

Landed Duty Paid (LDP)/ Delivered Duty Paid (DDP)

The seller fulfills his obligation to deliver when the goods have been made available at the named place in the country of importation. The seller bears the risks and costs, including duties, taxes and other charges of delivering the goods thereto, cleared for importation. Under these terms, the seller bears the maximum responsibility, and in this case, the seller has to clear the goods both for export and import.

Certificate of Origin

A certificate of origin (CO) is issued when it has been established that the goods are the natural produce or the product of a manufacturing process in which has changed permanently and substantially the shape, nature, form or utility of the basic materials used in manufacture. There are specific origin criteria applicable to individual types of products. There are six organizations in Hong Kong authorized to issue the certificate, namely the Trade Department, the Hong Kong General Chamber of Commerce, the Indian Chamber of Commerce of Hong Kong, the Federation of Hong Kong Industries, the Chinese Manufacturers' Association of Hong Kong, the Chinese General Chamber of Commerce.

Export License

Export licenses are needed for all garments and textile products. The licenses are issued by the Trade Department.

Packing List

This is a document that indicates the contents of each individual carton/ package in the container. The packing list includes the cubic measurement of the cartons/package, the weight, the number of cartons/packages, the breakdown of the goods by size/color/quantity. This document is prepared by the seller or the

ship-owner, and the buyer can specify which information should be included.

9.4 Terms of payment

Document against Acceptance (D/A)

The buyer is allowed to make payment for the goods on credit, as agreed between him and the seller. Payment for the merchandise is commonly 60 or 90 days after acceptance of documents. The buyer gains the advantage of not having to pay for the goods for a period of time after accepting the documents. The supplier bears some risk because he will not receive payment until a specified period after the documents and titles to the merchandise have been accepted.

Documents against Payment (D/P)

The supplier agrees to release any documents referring to the transfer of title for the merchandise upon payment. Since the goods are produced and shipped before the supplier tenders the required documents for payment, there is some risk to the supplier for demurrage charges if the buyer does not accept the documents and title to the goods.

Open Account

This method of payment does not involve the services of a bank, but is based upon an agreement between the supplier and the buyer. The buyer has no legal obligation to pay the supplier and payment is normally made directly to the supplier. The supplier bears some risks as the goods and documents are usually delivered to the buyer before payment is made.

Letter of Credit (L/C)

A letter of credit (also known as documentary credit) is a document issued by a bank on behalf of an applicant (the buyer) undertaking to make payment to a beneficiary (the seller) up to a stated amount of money, within a prescribed time limit and against stipulated documents.

There are usually two banks involved in a letter of credit operation. The issuing bank is the bank of the buyer and issues the credit; the advising bank, usually located in the seller's country, is the bank through which the advising bank sends the credit to the beneficiary.

Types of credit:

There are three common types of credit: revocable, irrevocable, and irrevocable and confirmed

Revocable credit: this type of credit can be amended or cancelled by the applicant without any prior warning or notice to the beneficiary. More risks are involved for the seller (the beneficiary) as he will then have to deal directly with the buyer to obtain payment. However the buyer has more flexibility.

Irrevocable credit: this type of credit can be amended or cancelled only with the agreement of all parties concerned. It also represents a definite undertaking by the issuing bank to pay provided that the stipulated documents are presented and that the terms and conditions of the credit are complied with.

Irrevocable and confirmed credit: this type of credit involves the undertaking of the advising bank in addition to that of the issuing bank; it means that the issuing bank requests a second bank to add its own confirmation to the credit so that the confirming bank is responsible to make payment if the issuing bank fails to pay the beneficiary.

A letter of credit should usually stipulate a requirement for the following documents:

- Bill of lading
- Copy of the certificate of origin
- Commercial invoice
- Export license
- Packing list
- Commercial Invoice

A commercial invoice is a business document which records the sale of goods or services between two parties, and by which the seller informs the buyer of the amount to be paid for the goods. Usually, the original and four copies are stipulated in the L/C.

A commercial invoice normally includes the following information:

- Date and authorized signature
- The correct name and address of both buyer and seller (or the name of the consignee if the goods are not consigned to buyer)
- A detailed description of the merchandise purchased strictly corresponding with the description given in the letter of credit, along with quantity, unit price, and total price, all deductions and additional charges included in the price
- Weight of the goods, number of packages, any identifying shipping marks, any import license number, contract number or any other details requested and stipulated in the L/C
- Terms of delivery and payment (FOB, CIF, C&F)
- The name of the issuing bank and the letter of credit number

- The port of entry for which the merchandise is destined
- The type of currency and rate of exchange

10. COSTING & CALCULATION

10.1 Garment Costing

Calculating the total cost of the garment is important, to determine its selling price as well as to determine whether the garment is worth manufacturing.... Freight

Both air transport and sea transport are commonly used in delivering goods from one country to another. However, the calculation for the charges of air freight and sea freight are different, as follows:

Conversion Table

Yard to meter, Inch to Centimeter, Yard square to meter square.....

Garments

Calculating the total cost of the garment is important, to determine its selling price as well as to determine whether the garment is worth manufacturing.

The costing will be determined by a few relevant criteria, as the cost breakdown will vary according to:

- The business nature of the company. (e.g., trading office, manufacturer)
- The payment conditions applied (e.g., F.O.B, C.I.F)
- The manufacturing conditions applied (e.g., CMT, CM) &
- The types of garments the company produces (e.g., woven , cut & sewn knits, sweater)

Since in the industry there are no two organizations or factories that function in exactly the same way, methods of garment costing vary from company to company, tailored to the individual's requirement. However, the same data is necessary no matter dissimilarities exist or not.

The equation to calculate the cost of a garment is:

(Note: The unit of garment is piece or dozen)

10.1.1 Basic Shirt / Jacket

[A – Length, B – 1/2Chest, C - Sleeve Length, D – Arm hole, E - Hood]

Fabric consumption for shirt – Z
Z = X + Y
X = (A+3") x (B+3") x 2
Y = (C+2") x (2D+2") x (E+2") x 2

Exam:
Highest Length of the shirt = 30"
Chest length (1/2 of Total length) = 20"
Sleeve length = 25"
Arm hole (1/2) = 9.5"

X = (31"+3") x (20+3") x 2 = 1564"
Y = (25+2") x (2x9.5+2") x 2 = 1134"
Z = X+Y
= 1564 + 1134
= 2698"
Now divided by fabric width
Say fabric width – 45"
So, Z = 2698 / 45" = 59.955"

Now we convert it inch to yds
So, 59.955/36" = 1.66 yds / Pc.

10.1.2 Basic Pant / Trouser

[H – Length or height of the pant, J – Width through cross line]
Pant = P
P = (H+4") x (J+2") x 4

Say,
H – 42" , J – 13.5"
(42+4") x (13.5 + 2") x 4
P = 2852"
= 2852"/56 (Fabric width)
= 50.93"/36 (yds)

= 1.41 yds / Pc

10.1.3 Basic T-Shirt

[A – Length, B – 1/2Chest, C - Sleeve Length, D – Arm hole, E - Hood]

T-Shirt = K
K = X+Y
X = (A+2") x (B+2") x 2
Y = (C+1") x (2D+1") x (E+1") x 2

Sum of K / 39.37 (meters) x GSM / 1000 (KG) = Kg / per pc.

Or.

(Length+S.Length) x 2 x chest x GSM / 10,000 = gm / unit

Rib: Length x width x Gsm / 10,000 = gm

Or.
Total length x Total width x GSM / 10000000 = KG + 18% (10% allowance waste + 8% Rib)

KG to yds converts

Say, we need 220 gsm s/jersey fabrics. Now yds per KG??
1 Kg / gsm+5
1000 / 225
4.44 – 5%
4.22 yds per kg.

GSM to Kg convert:
185 Gsm
so 185/84.25(formula) = 1.90 kg / per dz.

10.1.4 Basic Pricing for Knit

Length – 77 Cm, ½ Chest – 64 Cm, S. Length – 26 Cm
Length + S.Length+Wastage X ½ Cheast X 2 (for double) / 10000 (Formula) X Gsm / 1000 (Formula) = Kg/ Pc
77 (L)+26(s.L)+12 (wastage) X 64 (1/2 cheast) X 2 (Double) / 10000 X 180 (GSM) / 1000 (Formula) = Kg / Pc
=(77+26+12) X 64 X 2 / 10000 X 180/1000
= 115X128 / 10000 x 180/1000, or 14720/10000x180/1000

= .26 kg / Pc
= 3.12 kg/ Dz + 15% (for Rib)
= 3.67 Kg / Dz.

10.1.5 Sweater

Yarn weight + wastage % = consumption

10.1.6 Fleece Fabric

Length + sleeve + 3.5" + ½ chest x 2 x 12 (dz) x 15% (wastage) / 10,000 x Gsm / 1000 = Fabric Kg.

Gsm x 1.4 = X
1000 / X = Yds / Kg.

10.2 Fabric Cost

For woven garment

Purchase of finished fabric

Fabric cost per unit garment

= Finished fabric cost per yard x (1 + finance charge %) x fabric consumption per unit garment in yard

Or

= Finished fabric cost per meter x (1 + finance charge %) x fabric consumption per unit garment in meter

For example,
The production of a piece of blouse needs 2 yd of 100% cotton sheeting fabric @ $ 10.0 per yd. The finance charge is at 5% per yd. Then,
Fabric cost per blouse = $ 10.0/yd x (1 + 5%) x 2 yd = $ 21.0

Purchase of greige fabric which needs to be further processed

The calculation is similar to that for finished fabric but processing charges (such as printing, dyeing and finishing) need to be added.

Fabric cost per unit garment

= (Greige fabric cost per yard + processing charges per yard) x (1 + finance charge %) x fabric consumption per unit garment in yard

Or

= (Greige fabric cost per meter + processing charges per meter) x (1 + finance charge %) x fabric consumption per unit garment in meter

Note: extra allowance should be included in the calculation of fabric consumption because of the shrinkage and wastage that may be incurred in the processing.

For example,
Using the above example, the fabric purchased is greige @ $6.0 /yd. It costs $2.0 /yd for dyeing and finishing treatment in a dye mill. To allow the extra shrinkage and wastage in the processing, the fabric consumption becomes 2.2 yd per blouse. Then, Fabric cost per blouse = ($6.0 /yd + $2.0 /yd) x (1 + 5%) x 2.2 yd = $18.48

For cut & sewn knit garment

In the industry, fabric consumption for knit items is generally expressed in weight, i.e., lb. The same formula applies to the calculation of fabric cost for cut & sewn knits.

Fabric cost per unit garment

= Finished fabric cost per pound x (1+ finance charge %) x fabric consumption per unit garment in pound*

or

= Finished fabric cost per pound x (1 + finance charge %) x fabric consumption per unit garment in pound*

*If the given fabric consumption is expressed in yards, the following formula converts this into pounds.

Fabric consumption (yd) --> Fabric consumption (lb)

Fabric consumption per unit garment (lb)

= (Fabric width (in) x Fabric consumption per unit garment (yd) x Fabric weight in standardized form ($9/M^2$) x 0.00082)/16

10.3 Yarn Cost

For sweater items, instead of using fabric cost, yarn cost is used for the calculation. Normally, yam cost per unit garment is calculated by multiplying the yam consumption per unit garment (in pounds) by the cost of yam per pound.

In general, the more complicated the knitted structure, the more yarn will be consumed, so the yarn cost will become higher. Hence, in order to calculate the fabric cost precisely, in most cases it is necessary to knit a sample for determining the actual garment weight, enabling an accurate evaluation of the yarn consumption.

10.4 Production Cost

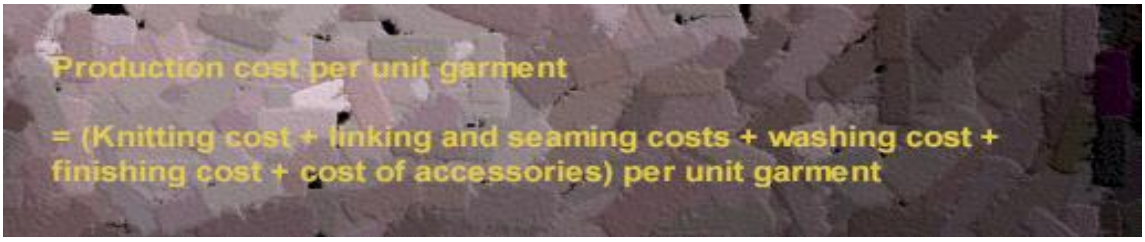
As for different types of garment, the production cost will be charged differently according to the different manufacturing procedures and the level of technology employed (such as computerized system vs. manual system) in the operation. However, in most cases, the manufacturer only quotes the total CMT cost to the buyer without disclosing the breakdown of costs involved in each operation.

For woven and cut & sewn knit garment

Both woven and cut & sewn knit garments are manufactured in a similar way. Although the fabric structure and the equipment/machinery used might be different, this does not affect the production cost significantly. The production cost is the sum of the manufacturing costs of each process: cutting, sewing and assembling, washing (if necessary) and finishing, plus the cost of accessories (such as labels, linings, interlinings, buttons, shoulder pads or zippers). The finishing operations include pressing, trimming, buttoning, inspecting, labeling, ticketing and bagging. The following equation shows the calculation of the production cost:

For Sweater:

For sweater items, the production cost is also the sum of the manufacturing cost of each process: knitting, linking and seaming, washing and finishing, plus the cost of accessories (such as labels, linings, interlinings, buttons, shoulder pads or zippers). The finishing operations include pressing, hand stitching (or hand sewing), trimming, buttoning, labeling, ticketing and bagging. The following equation shows the calculation of the production cost:



10.5 Other Costs

Besides fabric cost and production cost, to determine the actual garment cost in FOB prices,

several costs have to be included as follows:

Local transportation	A premium added for inland transport charges
Document	An additional cost for document charges
Quota	The cost of quota (if applicable)
Duty	The charge for some imported material, components/accessories e.g., fabric, buttons (if applicable)
Miscellaneous	A cost charged for unclassified expenses such as packing expenses
Profit margin	The profit expressed as a percentage of total cost

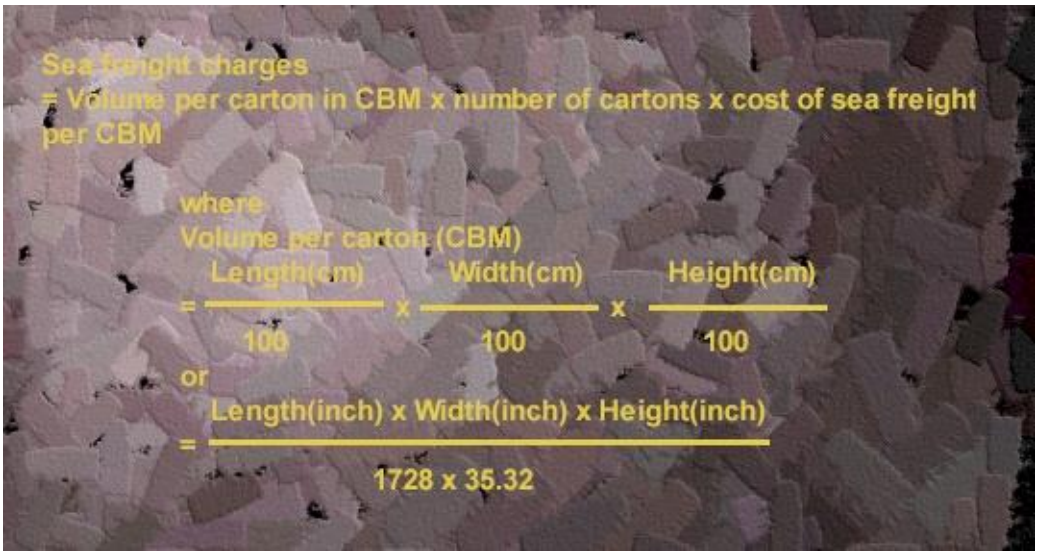
In practice, the costing could be slightly more complex dependent on the individual company's costing system.

Freight

Both air transport and sea transport are commonly used in delivering goods from one country to another. However, the calculation for the charges of air freight and sea freight is different, as follows:

Sea Freight

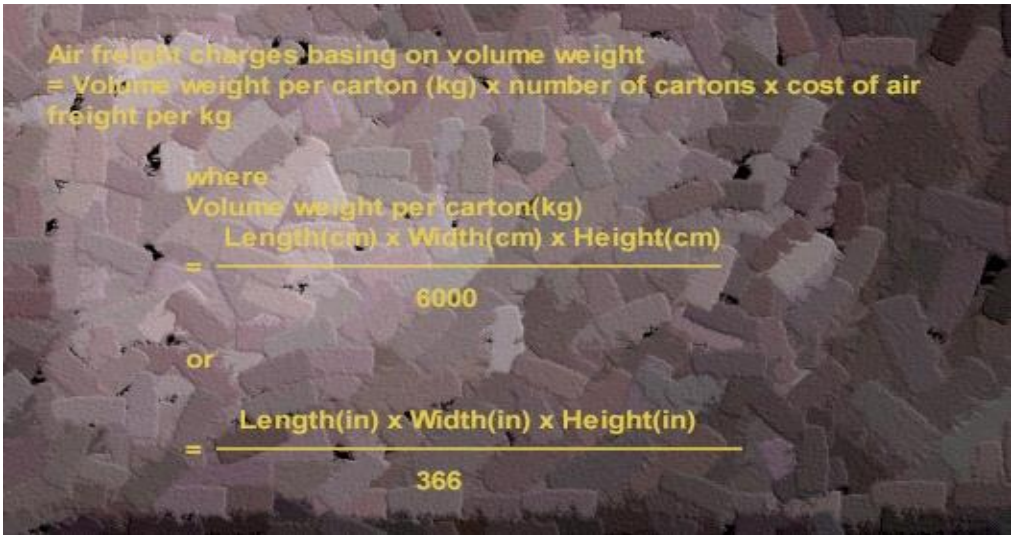
Sea freight is charged on a volume (cubic meter or CBM) basis. Firstly, the volume of a carton is calculated by multiplying the length by the width by the height of the carton. Secondly, the freight charges for the delivered merchandise can be calculated by multiplying the volume of a carton by the total number of needed cartons by the price charged per cubic meter (CBM).



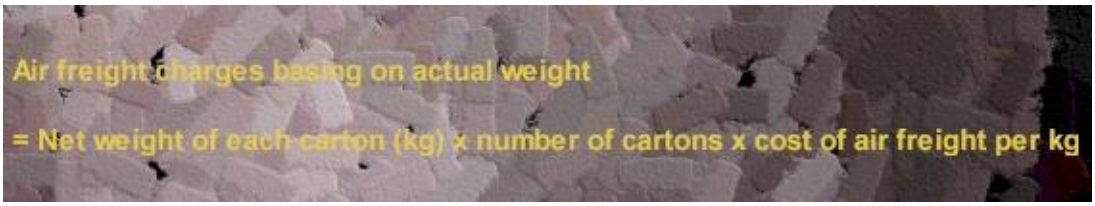
Air Freight

Air freight is charged on a weight basis (kg), either by volume weight or actual weight of the freight. In Hong Kong, in most cases, both volume and actual weight are evaluated and the air freight will be charged based on the weight, whichever is greater.

Volume weight



Actual weight



10.6 Conversion table

QUANTITY	TO CONVERT FROM (Non-SI UNIT)	TO (SI UNIT)	MULTIPLY BY (Approximate)

Linear density	Denier English cotton count(NG) Linen(NG) Woolen count Worsted count Metric count (Nm)	Tex Tex Tex Tex Tex Tex	0.1111 Tex = 590.5/Ne Tex = 1654/NG Tex = 1938/woolen ct. Tex = 885.8/worsted ct. Tex = 1000/Nm
Cloth Length	Yard (yd)	Meter (m)	0.9144
Cloth width	Inch (in)	Centimeter (cm)	2.54
Area	Square yard (yd2) Square inches (in2)	Square meter (m2) Square centimeters(CM2)	0.8361 6.452
Weight/Mass	Pounds (1b) Ounces (oz)	Kilograms (kg) Grams (g)	0.4536 28.35
Threads in fabric	Threads per inch	Threads per cm	0.3937
Courses per unit cloth length	Courses per inch	Courses per cm	0.3937
Mass per unit area	Ounces per sq. yard	Grams per sq. meter	33.91
Stitch length (knitted)	Inch	Millimeter	25.4
Cover factor: Woven cotton fabrics			0.0957
Weft knitted worsted fabrics			1.172

Garments Costing

The costing will be determined by a few relevant criteria, as the cost breakdown will vary according to –

- The business nature of the company (Trading office, manufacture)
- The payment condition (FOB,CIF)
- The manufacturing conditions applied (CM,CMT,CMQ,CMQT)
- The types of garments the company produces (woven, cut & sewn knit, sweater)

The equation to calculate the cost of a garment is :

Fabric cost + Trims & Acc cost + Production cost + Local transportation cost + Document + Quota premium + Duty + Miscellaneous + per unit garments x 1 + Profit = Per unit garment FOB Price.

10.7 GSM calculation [Woven]

(No. of warp yarn / warp yarn count + No. of weft yarn / weft yarn count) X 25.605

Exam.

176 X 58 / 40 X 20
(176 / 20) + (58/16) x 25.605
(4.4 + 2.9) x 25.605
7.3 x 25.605
= 187 Gms**.**

GSM TO Oz

(GSM / 100 X 45.72) / 15.5 = Oz.

Oz TO Gsm

(Oz X 100 X 15.5) / 45.72 = Gsm

10.8 Embroidery Costing

Qty X Stitches / Unit (12000) X Price

For pricing : Stitch / 1000 X Price

10.9 Global Logistic

CBM – Cubic Meter
NOVCC – Non Vessel Operated Cargo Carrier
FCL – Full Container Load
LCL – Less Container Load
ETA – Expected Time of Arrival
ETD – Expected Time of Departure

10.9.1 Sea

CBM = Length X Width X Height (CM) / 1000000 X total No. of ctn
= Length X Width X Height (Inch) / (1728*35.32)

10.9.2 Air

a. 7000 Cubic CM = 1 Kilo
b. 6000 Cubic CM = 10 Kilo (for Bangladesh)

1. Length X Width X Height (CM) / 6000 = Kilo
2. Length X Width X Height (Inch) / 366 = Kilo

** Volume weight per carton (Kg) X Number of carton X Cost of Air freight per Kg = Carring cost / Air

11. DOCUMENTATION IN MERCHANDISING

11.1 Importance of Purchase Order

The Purchase Order Sheet is abbreviated to PO Sheet. This is one of the very important documents for both buyer and manufacturer. It can be explained from the both buyer's and seller's point of view.

11.2 From the buyer's point of view

A Purchase Order Sheet is used to request product e.g. garments like shirt, trouser, shorts, kid's item etc. from manufacturer. Rather than calling the manufacturer to request their purchase, they send them a Purchase Order Form.
On the Purchase Order Sheet the buyer describes three most important things:-

- What it is that he requires i.e. garment details?
- When he wants it i.e. the date of delivery?
- How much he expects to pay for it i.e. unit price and total price?

By using this Purchase Order Sheet, the buyer can ensure his receive exactly what have been ordered at the right time and at the right price.

11.3 From the seller's point of view

The manufacturer can use the purchase order to clearly specify the delivery details, billing information and order details for supplier or manufacturer.
a) The manufacturer can identify the followings from a Purchase Order Sheet:

- Purchase details and requested delivery date
- Delivery details for the items purchased
- Billing and supplier information
- Quantity and unit price of each item
- Total price of the purchase

b) By using this Purchase Order Form, the manufacturer can:

- Monitor the delivery of goods from suppliers
- Put in place an approval process to control project expenditure
- Ensure that suppliers deliver exactly what was requested
- Report the status of procurement to management

11.4 Application of the P.O. Sheet in the Factory

From the previous discussion, this is much clarified that the Purchase Order Sheet is how much essential for beginning the production of a particular order to be purchased.
Way of Application

- When an exporter or a buyer confirms a merchandise to purchase, he sends a Purchase Order Sheet to the assigned merchandiser.
- After receiving the P.O. sheet, it has to be sent in each department of the factory related to the purchasing from getting order to the shipment of the merchandise.
- Therefore, the P.O. sheets are copied a few copies –

- for cutting section,
- for commercial section,
- for each production floor,
- for the merchandiser himself,
- For others if needed.

11.5 Possible Problems during Application

The application is not so much easier as described before. There may create lots of problems regarding the copies of P.O. The most two of them are as below –

- As the activities start from the cutting section, the P.O. sheets should be reviewed as very good and notified the number of pieces to be cut as per size and color. Then the cutting master proceeds on his function. But the problem arises when he is to find out the necessary points (color –wise and size –wise quantity) from each of the large number of P.O. sheets. It becomes very difficult for him to spend such a huge time beyond this. Besides, sometimes in our country the cutting in charges is not literate enough to study the P.O. sheets as well.
- Another problem arises when a large number of P.O. sheets have to be copied. We know that the Purchase Order for a particular product may contain a lot of sheets having different P.O. number. The merchandiser does not do this work himself rather it is generally done by the peon or the photocopier. So, often it occurs that there have to face problems during copying them and arranging them in order according to the P.O. number.

11.6 Solution of the Problem

The problems mentioned above must have to be eradicated in order to minimize the obstacles during further functions. And a merchandiser is the only one who can find out the solution. Just he has to perform one more function after obtaining the P.O. sheets.
The merchandiser studies the P.O. sheets from point to point and prepares a Microsoft Excel Sheet notifying each important point separately. The necessary points to be mentioned are as follows –

- Factory Name,
- P.O. Number,
- Style ,
- Color Ratio,
- Size Ratio,
- Quantity as per size,
- Total Quantity,
- Poly – no. of pieces per poly,
- Carton – no. of pieces per carton,
- Delivery Date,
- Order replete or not.

Therefore, a lot of P.O. sheets will be summarized in one sheet that makes easier to study for others as well as also increase the productivity.
A sheet is given next where there a number of P.O. sheets are summarized. If it is compared with the P.O. sheets stated before, we shall find out that how much it is easy to study than that of a number of sheets.

11.7 Documentation for shipment

When we refer to documentation in the process of export, we usually refer to the preparation of documents which the shipper uses to collect money for the goods shipped. Therefore, this is the final of the transaction and an important step.

Depending on how the payment term is set up between you and your buyer, we should prepare the documents accordingly. However, no matter it is L /C payment or DP, DA or open account, you must prepare your documents to satisfy the following parties.

1) The buyer's bank who has open the L /C to you if it is L /C payment, otherwise you will have delay in receiving the proceeds of the goods you have shipped.

2) The customs, otherwise you will have delay in clearing the goods through customs.

3) Giving buyer the correct information in all respect, particularly all the packing details in order to enable him to distribute the merchandise correctly to the retail stores.

Now, let us go through each piece of paper needed in the set of documents we are preparing and note the essential information it should contain.

12. INTERNATIONAL CARE LEBELING

The International Association for Textile Care Labeling (GINETEX) has developed a language-independent care labeling system in 1975.

With an aim to promote voluntary care labeling on international basis, the GINETEX care labeling system (or international care labeling system) mainly uses symbols to provide care instructions. ISO 3758 1991 provides a code of reference for the use of these symbols.

The system consists of five basic symbols and their full descriptions are shown in the following.

Note: A cross on any of them means that the treatment shall not be used and a bar under the symbols indicates milder treatment is needed (broken bar indicates a very mild treatment).

12.1 Washing

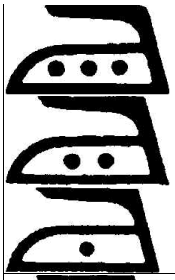
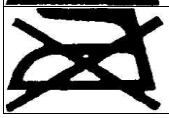
	Maximum temperature 95° C Mechanical action normal Rinsing normal Spinning normal
	Maximum temperature 95° C Mechanical action reduced Rinsing at gradually decreasing temperature (cool down) Spinning reduced
	Maximum temperature 70° C Mechanical action normal Rinsing normal Spinning normal
	Maximum temperature 60° C Mechanical action normal Rinsing normal Spinning normal
	Maximum temperature 60° C Mechanical action reduced Rinsing at gradually decreasing temperature (cool down) Spinning reduced
	Maximum temperature 50° C Mechanical action reduced Rinsing at gradually decreasing temperature (cool down) Spinning reduced
	Maximum temperature 40° C Mechanical action normal Rinsing normal Spinning normal
	Maximum temperature 40° C Mechanical action reduced Rinsing at gradually decreasing temperature (cool down) Spinning reduced
	Maximum temperature 40° C Mechanical action much reduced Rinsing normal Spinning normal Do not wring by hand
	Maximum temperature 30° C Mechanical action much reduced Rinsing normal Spinning reduced

	Hand wash Do not machine wash Maximum temperature of wash 40° C Handle with care
	Do not wash. Be cautious when treating in wet stage

12.2 Bleaching

	Chlorine-based bleaching allowed Only cold and dilute solution
	Do not use chlorine-based bleach

12.3 Ironing

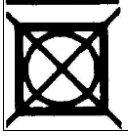
	Iron at a maximum sole-plate temperature of 200° C Iron at a maximum sole-plate temperature of 150° C Iron at a maximum sole-plate temperature of 110° C Steam-Ironing may be risky
	Do not iron Steaming and steam treatments are not allowed

12.4 Dry-cleaning

	Dry-cleaning in all solvents normally used for dry-cleaning - this includes all solvents listed for the symbol P, plus trichloroethylene and 1, 1, 1-trichloroethane

	Dry-cleaning in tetrachloroethylene, monofluorotrichloromethane and all solvents listed for the symbol F Normal cleansing procedures without restrictions
	Dry-cleaning in the solvents listed in the previous paragraph Strict limitations on the addition of water and/or mechanical action and /or temperature during cleaning and/or drying No self-service cleaning allowed
	Dry-cleaning in trifluorotrichloroethane, white spirit (distillation temperature between 150° C and 210° C, flash point 38° C to 6O° C) Normal cleansing procedures without restrictions
	Dry-cleaning in the solvents listed in the previous paragraph Strict limitations on the addition of water and/or mechanical action and/ or temperature during cleaning and/or drying No self-service cleaning allowed Do not dry clean No stain removal with solvents

12.5 Drying

	Tumble dry possible Normal drying cycle
	Tumble dry possible Drying at lower temperature setting
	Do not tumble dry

13. CARTON

13.1 Type of carton

• DEPEND ON PAPER	Khaki Carton Or Brown Carton Duplex Carton Box Carton
• DEPEND ON STITCHING	Stitching Carton Now stitching /Gum Pasting Carton Or Metal Free Carton
3. DEPEND ON PLY	3 Ply Carton 5 Ply Carton 7 Ply Carton
4. DEPEND ON LINER	Both Side Liner Carton Out Side Liner Carton
5. DEPEND ON SIZE	Master Carton Inner Carton

CARTON CONSUMPTION & COSTING CALCULATION	
Formula = (Length x Width) X (Width x High) x 2 + Wastage	
1.Length = 92cm = .92m	
2. Width = 80cm = .80m	(.92+.80) x (.80 x .40) x 2 + 5%
3. High = 40cm = .40m	(1.72 x 1.20 x 2 + 5%
4. Ply = 7	4.128 + 5%
5. Quantity = 200 pcs Carton	4.33 Sqm
6. Price for 7 ply = $ .60 / Sqm	4.33 X $.60
	$ 2.60/carton x 200 box = $520

13.2 Carton consumption & costing calculation

Formula = (Length + width) × (width + high) × 2 + wastage %
= {(.90+.80) × (.80+.40)} × 2+5%
= {1.72 × 1.20} × 2 + 5%
= 40128+ 5% =4.33Sqm
=4.33 Sqm × $.60
= $ 2.60/ carton Box × 200 = $ 520

13.3 Measurement

- Length =92cm =.92m
- Width =80cm =.80m
- High =40cm =.40m
- ply =7
- Quantity =200pc carton
- Price for 7 ply = $ .60 /Sqm

13.4 Cartoon measurement

FORMULA (1) = (L+W) (W+H)/100*100 (Without Wastage) in cm
FURMULA (2) = (L+W+6) X (W+H+4) X 2/10000 (Include Wastage)
PRICE = (L+W) (W+H)*2x Rate per Square Meter/100*100 Rate/Pc

14. ENVIRONMENTAL ISSUE

14.1 Introduction

The textile industry, in particular the wet processing sector, has been facing increasing environmental regulations in the past few years. These regulations have been very specific and at

fairly stringent levels covering a broad spectrum of raw materials, work-places areas and multimedia reject systems. Textile industry is considered to be one of the industries causing environmental damage. Changes in environmental policy and consumer behaviour have led to strategic changes in the textile industry in countries such as Germany, the UK and the US which, in turn, have influenced textile exports to these countries. In the near future "clean processing" could become an additional requirement for these export markets.

14.2 Environmental Pollution in the Textile Industry

The undesirable effects of chemicals on the environment do not show up immediately. Thus, long term studies have to be made to understand and solve problems. Most of the industrialized countries have enacted regulations necessitating manufacturers to pay special attention to the minimization of environmental pollution.

Waste water is produced in every textile wet processing stage, namely pre-treatment, coloration and finishing, and is characterized by:

- Color in the effluent
- Trace amount of heavy metals
- high concentrations of dissolved solids, and
- high BOD & COD levels

14.3 Eco-standards and Eco-labels

Apart from controlling the harmful chemical usage and discharge in the industry, the European Union has also identified imported textiles as a major source of "harmful chemicals" and has tried to control their entry through a list of eco-standards. This list essentially stipulates limits for the presence of chemicals such as formaldehyde, pesticides, p.c.p. heavy metals, aromatic amines like benzidine and nathylamines and halogenic carriers. The criteria to meet such standard requirements, applicable to 100% cotton beddings and polo T-shirts are set out in the Official Journal of the European Communities (No L 116/34), November 1996.

Some large apparel companies such as Clean Fashion and Steilmann have also set their own eco-standards for specifying product requirements.

Beside the EU-wide eco-standard, individual European countries have developed their own eco-labels. Having met the specified requirements, a label would be issued. The following table lists the eco-labels currently available in the textile industry:

Eco-label	Issuing Organization
Gut	Association for Environmental Friendly Carpets
Eco Tex	SCOTDIC Textile Farben and Textile Design Group
Oeko Tex	International Association for Research and Testing in the field of Textile Ecology and Mark for Textiles Tested for Harmful Substances
MST	Marken Zeichen Schadstoffgepinffe Textilikn

Furthermore, the phenomenon of "ecological consciousness" is gaining ground with the increasingly green minded consumers. Other than the private eco-standards adopted by some

European apparel companies, some renowned US manufacturers have started manufacturing and marketing eco-friendly garments. VF, whose brand names include Lee and Wrangler jeans, have started a separate "O" division of "O" wears ("O" stands for organic or eco-friendly or green). Another example is Levis Strauss which is launching its" Natural" line of jeans manufactured from colored cotton.

15. COMPLIANCE ISSUE

a. Child labor
b. Forced labor
c. Freedom of Association
d. Discrimination
e. Working hours
f. Health & safety
g. Collective bargaining
h. Disciplinary Practices
i. Compensation
j. Management System
k. Harassment or abuse
l. Wages & benefits

15.1 CHILD LABOR

Child labor refers to the employment of children at regular and sustained labor. This practice is considered exploitative by many international organizations and is illegal in many countries. Child labor was employed to varying extents through most of history, but entered public dispute with the advent of universal schooling, with changes in working conditions during the industrial revolution, and with the emergence of the concepts of workers' and children's rights.

Minimum age for child labor
Countries are free to specify a minimum age for labor, with a minimum of 15 years. A declaration of 14 years is also possible when for a specified period of time. Laws may also permit light work for children aged 13–15 (not harming their health or school work). The minimum age of 18 years is specified for work which "is likely to jeopardize the health, safety or morals of young person's". Definitions of the type of work and derogations are only possible after tripartite consultations (if such a system exists in the ratifying country).

16. CONCLUSION

The project has come to a termination finally after lots of thinking, discussion and our uninterrupted trying. We really have worked hard to complete this project well ahead. We wished to make it as a replica of merchandising so that it provides a complete knowledge about merchandising. Though there were some limitations like shortage of time that compelled us to complete the thesis as soon as possible, even then we have tried to give our best.

We have tried our level best to fill this gap and if the kind hearted readers feel that we have been able to flourish our merchandising skills knowledge in any way and we shall be highly obliged.

The study shows that a merchandiser should have some unavoidable qualities, what it demands, his entire functions and some guidelines and instructions to be a good merchandiser. It also makes aware of that a merchandiser should have enough knowledge about Inquiry Sheet, Purchase Order Sheet, Letter of Credit, Inventory Report, Bill of Lading, inspection and other test methods.

In addition, we wanted to discuss some more topics, such as – the problems and prospects of merchandising job in respect of Bangladesh, how a Textile Engineer can contribute more in merchandising job as many of the non – technical persons are doing this and why they are so efficient. Because of the limitation of time as well as due to deficiency of enough sources of information, we could not meet these. Further research can be conducted on those topics.

16.1 Limitations of the project

In this project data has been collected from different sources.
All the documents are from a source & it may differ according to company. These are the limitations we have face while doing the project work.

We are enough fortunate that we have got opportunity to do our project work in Standard Group, under the guidance of Mr. Aziz, B.C Manager, Merchandising section, Standard Group (Bangladesh) .During the project work we have received co-operation and association from the authority full. All stuffs & officers were very helpful.

16.2 Future Scope of the project

Taking the project as a guide line, following further research is possible:

- Problems facing in merchandising section,
- How a Textile Engineer can contribute more in merchandising job as many of the non – technical persons are doing,
- The problems and prospects of merchandising job in respect of Bangladesh.

16.3 Concluding comment

In this project we have studied the manual for merchandising job. A general outline has been

drawn for future scope of work related to merchandising (Woven or Knit). Therefore, we wish that the project is successful to achieve its objectives considering its limitations.

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