Subject: Fundamentals of Pattern Making

Unit I

PATTERN MAKING- INTRODUCTION TO PATTERN MAKING AND ITS ORIGIN

The development of a garment comprises different processes. Fit is the most important factor leading to the final acceptance or rejection of a garment. Fit must be designed into the original pattern through details in the pattern that provide fullness at appropriate locations to accommodate body bulges in a flattering manner. Good customized fit is dependent on the **pattern drafting** incorporating various shapes and proportions of the individual customer. With the advancements in the industrial technologies, standardized patterns become essential to the success of **ready-to-wear garments.**

Pattern making is an art. It is the art of manipulating and shaping a flat piece of fabric to conform to one or more curves of the human figure. Pattern making is a bridge function between design and production. A sketch can be turned into a garment via a pattern which interprets the design in the form of the garment components.
A pattern is flat while the body is not. The body has height, width and depth. Within this roughly cylindrical framework there are a series of secondary curves and bulges, which are of concern to the pattern maker. Darts are the basis of all pattern making. With the help of darts, pattern makers can convert the flat piece of cloth into a three-dimensional form, which fits the bulges of the body.

A patternmaker typically makes a pattern from a flat sketch with measurements or a two dimensional fashion illustration. The basic pattern is the very foundation upon which pattern making, fit and design are based. The basic pattern is the starting point for flat pattern designing. It is a simple pattern that fits the body with just enough ease for movement and comfort.

Historical Background of Pattern Development in Fashion

Fittings were considered a luxury for hundreds of years in history, despite the fact that they are a vital component. The primary functions of clothing were to cover the body and provide weather protection. Women were in-charge of making clothes. In the old days, only high-status people could afford to hire personal or family dressmakers or professional tailors to make their own, customised garments. But the majority of the people made their own clothing.

Spain is where clothing patterns were first developed in 1589. For people from middle and lower castes who made their clothes at home, a "How-To" book was published in the 18th century. This time, diagrams, patterns, and shapes are shown in books, periodicals and magazines. For example, full-sized patterns were printed in "Instructions

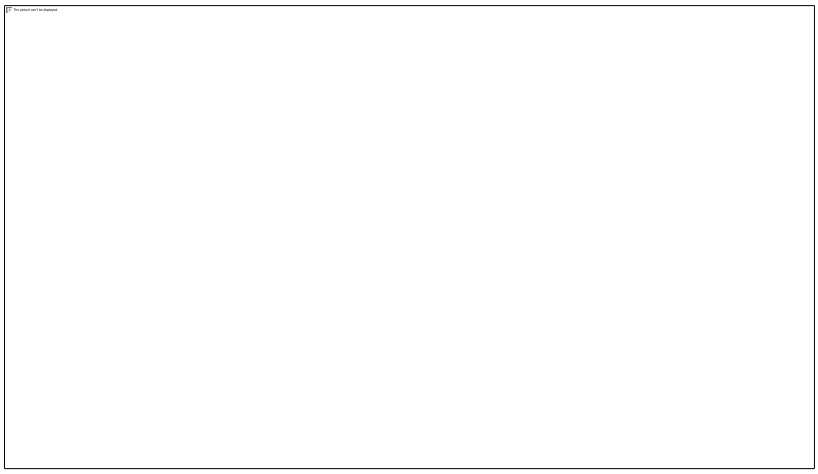
for Cutting Out Apparel for the Poor" (1789) and "The Lady's Economical Assistant" (1808). Along with patterns, "the Workman's Guide" (1838) included drafting guidelines and in-depth illustrations of finished garments.

The craft of pattern development was highly regarded before the Industrial Revolution. Patterns were precisely altered by tailors using their clients' unique dimensions. Only the very wealthy could afford costly tailor-made clothing. Standardized patterns became crucial to the success of ready-to-wear clothing. Ebenezer Butterick began to develop patterns for men and children in 1863. He and his family cut and folded each pattern. They started mass production and developed it fairly well; they sold roughly 6 million clothing patterns by 1871.

But in 1873, James McCall began to make patterns too, and for every size and variety of types. McCall proceeded to build his line of women's clothing patterns. But still, Butterick and McCall have a big name in the pattern industry. In the pattern-making market, the Germans and the French were still competing.

Importance of Pattern Making

Nowadays, women prefer sari, salwar kameez, tops, pyjamas, pants, and leggings, while men prefer shirts, Punjabi, T-shirts, polo t-shirts, pyjamas, and pants. Each piece of clothing displays a unique pattern. Without a pattern, fashion designers cannot demonstrate their mind set. Any design is first showcased through it. Therefore, its importance in the fashion sector is high.



Patterns are formed to cut a large amount of fabric in less time. Vast numbers of items of clothing can be cut with a particular pattern of any design. Because there are numerous difficulties that must be overcome when cutting thousands of pieces of fabric with a direct sizing method. That's why fashion designers are emphasising the importance of developing a pattern before any design. If there is any mistake, it will be captured here, and thus, the wastage of cloth will be lowered a lot. Fashion houses are developing their own distinct customer section through the ever-new art of pattern making.

Nowadays, fashion industries are always busy inventing new fashions. As a result, there is a need for different pattern-making techniques for each of these designs. It is not possible to give the look of design directly to the fabric without pattern making. The subject of pattern making is also creating new employment in the fashion industry. In this regard, students have a huge employment market in the world. For all these reasons, if anyone takes up the subject of design and pattern making as a profession, there is a huge opportunity for work.

PATTERN DEVELOPMENT METHODS

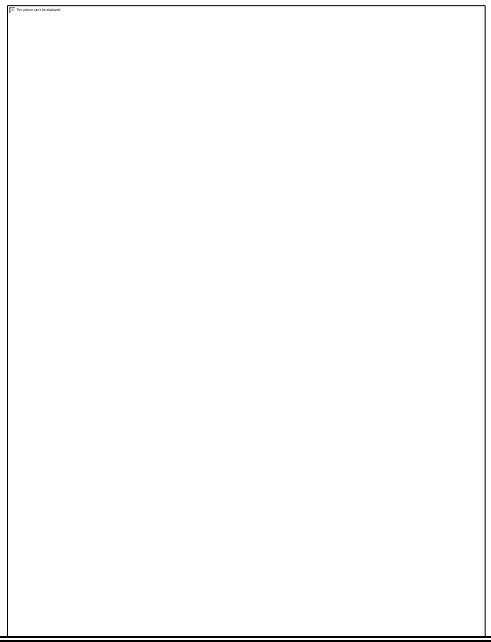
Pattern making involves two methods-

- Flat pattern making
- Draping

Flat Pattern Making:

The flat pattern making involves measurements derived from sizing systems or accurate measurements taken on a person, dress or body form. Measurements along with ease allowances are marked on paper and construction lines are drawn to complete the pattern. This is called Drafting that is used to create patterns.

It involves the development of a basic pattern with comfort and ease to fit a person or body form. A **sloper or block** is the starting point for flat pattern designing. It is a simple pattern that fits the body with just enough ease for movement and comfort. Five basic pattern pieces are used for women's clothing. They include a bodice front and bodice back (with darts and a basic neckline), a sleeve and a fitted skirt front and back (with darts). However, as fashion changes frequently women's styles fluctuate frequently. These basic slopers are then manipulated to create fashions.



A basic sloper has no seam allowances, which allows its manipulations to various styles. It has no design interest, only construction lines are marked on it. It is necessary that the basic structure of a sloper should be such that adjustments can be introduced easily. For good pattern making, accurate measurements are of utmost importance.

The flat pattern making method is widely used in the **ready-to-wear** industry because it is fast and

accurate.

Draping:

Draping involves creating a pattern by shaping a two-dimensional piece of fabric directly on a dress form, rather than by drawing a flat pattern on paper. Draping involves conforming fabric to body shape, creating a three-dimensional fabric pattern. The draping process is often used to create highly fitted or draped garments. The muslin fabric is used for draping. This muslin is transferred to paper to be used as a final pattern and ease allowances for movement are added to make the garment for comfortable wear. Advantage of draping is that the designer can see the overall drape and look of the finished garment on the body form before the fabric is cut and sewn. However, it is more expensive and time consuming than flat pattern making.

Pattern making in Today's World

Pattern making today has become an easy job with the use of computers. Now-a-days different softwares like Gerber, Lectra, Tukatech, OptiTex etc. are available in the market to meet the needs of the manufacturers. These softwares has made the job of the Pattern master easier, more economical and less time consuming. These softwares draft patterns to fit your measurements specifically, eliminating much fitting trial and error in the sewing room.

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

SYMBOLS AND ABBREVIATIONS

CF- Center Front

CB- Center Back

BP- Bust Point

SS- Side Seam

SW- Side Waist

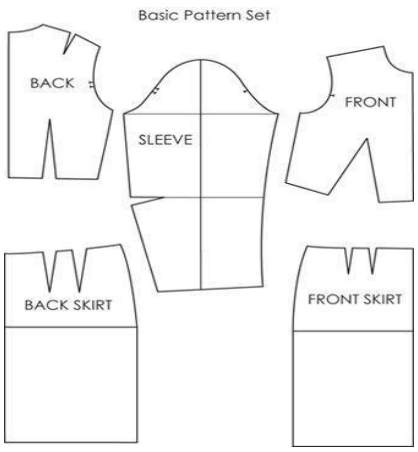
SH- Shoulder

HBL- Horizontal Balance Line

SH-TIP- Shoulder Tip

PATTERN MAKING TERMINOLOGY (Unit 1 continued)

Basic Pattern Set:



A five-piece pattern set, consisting of front and back bodice and skirt and a long sleeve, which represents the dimensions of a specific form or figure. It is developed without design features. It is always traced for further design changes. The traced copy is referred to as a working pattern.

Sloper/ Block:

Block, also called a Sloper is the Master or Foundation Pattern that is used to make other patterns and other blocks. A full set of Basic Blocks usually consists of: Bodice Front & Back, Sleeve and Skirt Front & Back. On these blocks, the pattern master applying the principles of patternmaking to make sewing patterns. Blocks are made of Patternmaking Cardboard, which is also called Patternmaking Paper.

Templates:

Clothing design templates are pre-drawn designs or sketches of clothing items, such as dresses, tops, pants, skirts, and jackets. They serve as a starting point for fashion designers to create their own unique designs by adding their own style and details to the templates.

Working Pattern:

To create new designs, the patterns of basic pattern set (Blocks) are traced and working upon. The traced copy is called a working pattern. For each part of a garment, separate working pattern is made. Sample garment is made with working pattern.

First pattern:

A first pattern is the original pattern developed for designs. The first pattern is generally made on marking paper and requires fitting and pattern corrections. Half a pattern is developed in the workroom (unless instructed otherwise). An asymmetrical design always requires a full pattern. Before going to production line, it will be tested for fit until perfect.

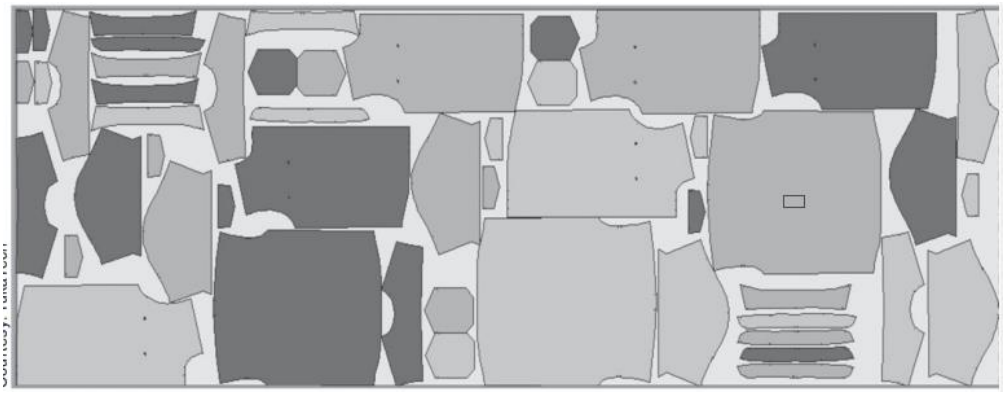
Production Pattern:

A production pattern is the final corrected and error-free copy of pattern. This contains every pattern information required to cut the garment pieces from the fabric bulk. The pattern is used by the grader for sizing and by the marker maker for fabric layout.

Marker:

A marker is the arrangement of pattern pieces of all the pieces of a garment and in all sizes on the paper. This can be done either manually traced on marking paper or patterns are digitized for computer application in laying out the marker. All pattern symbols are marked on the patterns.

Patterns are interlocked; sizes are mixed to eliminate fabric waste. The printout paper marker is laid on top of many layers of fabric. Patterns are cut either manually or by computer.



Pattern Chart:

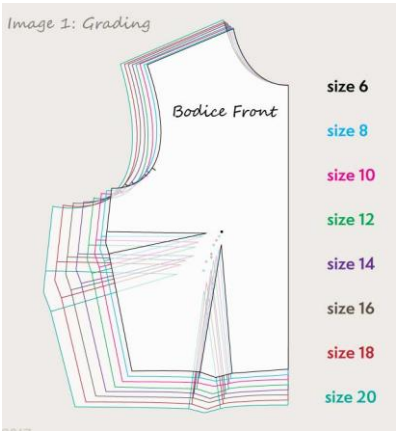
The pattern chart is a complete record of all pattern pieces within the pattern set of a particular garment or style. It also includes swatches and special pattern information. Each pattern shape is identified by name and number of pieces to be cut. When completed, the chart is placed in front of the production pattern and given to the production manager.

Pattern manipulation or adaptation:

The process of changing and reshaping pattern Blocks to adjust the fit or incorporate a new design is called pattern manipulation.

Pattern grading:

Pattern Grading is a technique for creating different sizes of a finished or production pattern. The initial pattern is created in a base size (not the smallest size), usually a size 10 or size 12. Once the pattern is perfected, the pattern is then made in the other sizes by increasing or decreasing the pattern by following the grading rules. Grading allows the sized up and one pattern to be made, then each size from down, rather than having to remake the pattern in a size the relevant size Block. Pattern grading is done using specification sheet.



Selvage:

Selvedge is the narrow, firmly woven, and finished strip on the edges of both sides along the length of the fabric. Selvedge is very useful in holding the fabric during processing in the garment and textile industry.

A selvage (US English) or selvedge (British English) is a self-finished edge of the fabric

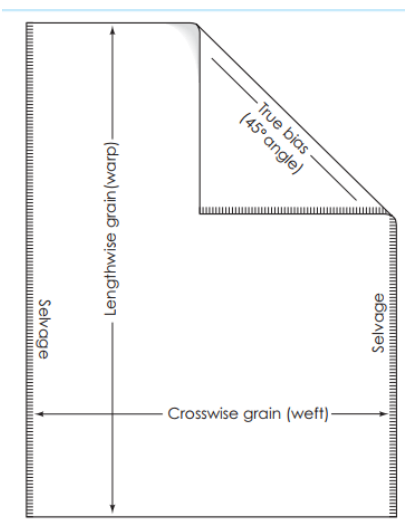
Grain line:

The fabric grainline is the direction in which the yarn is woven or knitted and threads are running (lengthwise grain, or warp; crosswise grain, or weft). There are three grains: straight grain, cross grain, and true bias.

Straight or lengthwise grain (warp) is parallel with selvage and at right angles to the crosswise grain. It is the most stable grain.

Crosswise grain (weft) is along the weft yarns woven across the fabric from selvage to selvage. It is the filling yarn of woven fabrics.

The pattern grainline is a double headed arrow line drawn on each pattern piece to indicate how the pattern should align with the lengthwise grain of the fabric. Regardless of where the grainline is drawn on the pattern, it will always be placed on the fabric so that the grainline of pattern is parallel to the lengthwise grain or selvage of the fabric. Grain line helps in cutting patterns from the fabric. It's important to understand because how you cut out a garment will change how the finished garment behaves.



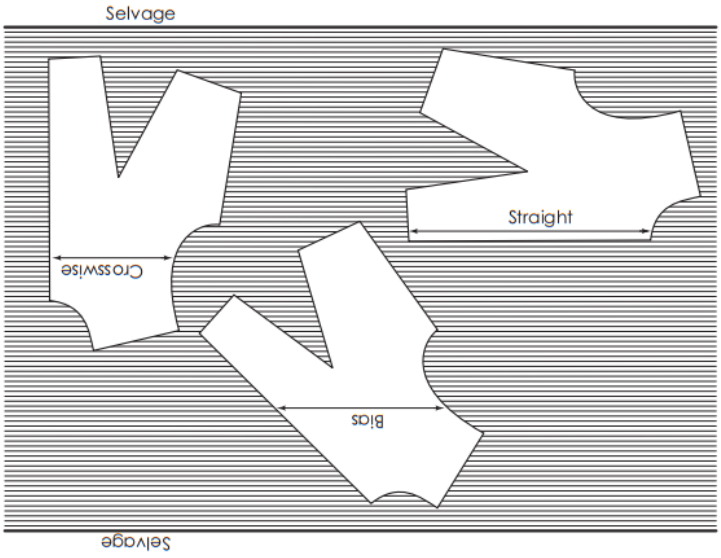
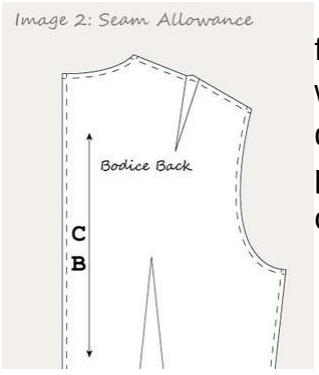


Figure 1

Plumb line:

It is a vertical line which is running through the centre of body from head to floor and at right angles with the floor. Plumb line is used to determine the balance of figure.

Seam Allowance:



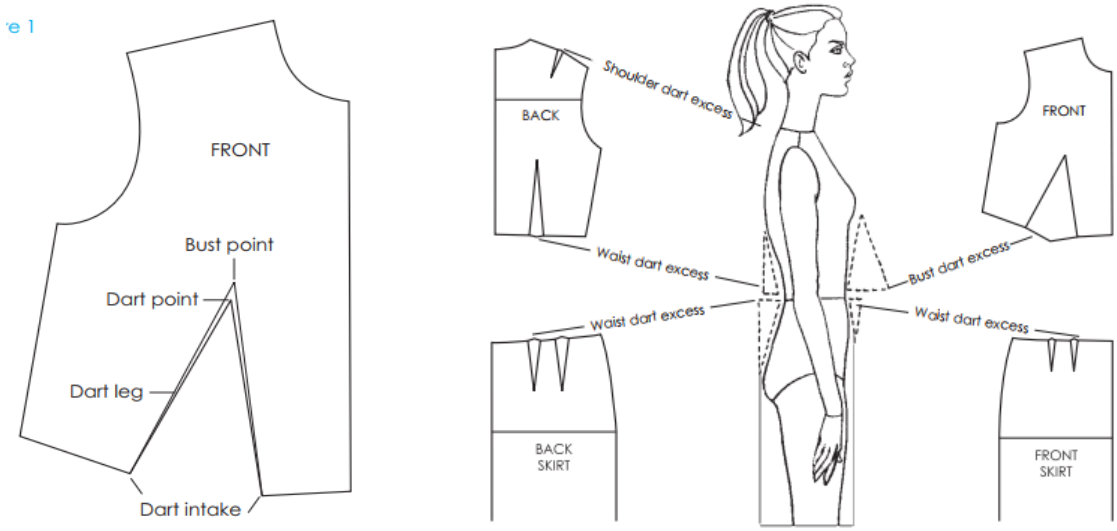
The area between the stitching line and the raw edge of the fabric. This seam allowance allows two pieces of material sewn together without reducing the wearing size of the garment. Basic blocks usually do not have seam allowance. The seam allowance is added after the pattern is made. It is not necessary for all seams to have the same amount of allowance. Seam allowance can range from ¼ inch to 1/2inch.

Ease Allowance:

Ease allowance is the difference between the body measurements and the finished garment measurements. There are two different types of ease: wearing ease, which allows movement and comfort during wearing, and design ease, which is added fullness for the purpose of design. Design ease is added over and above wearing ease. The amount of Ease that is required/added depends on the type of fabric used and the style or design.

Darts:

A wedge-shaped cut-out in a pattern to control the fit of the garment when stitched. The main function of dart is to control fit of a garment. It is the dart that converts a two-dimensional pattern into a three-dimensional garment. The two lines that converge at a predetermined point on the pattern are called dart legs.



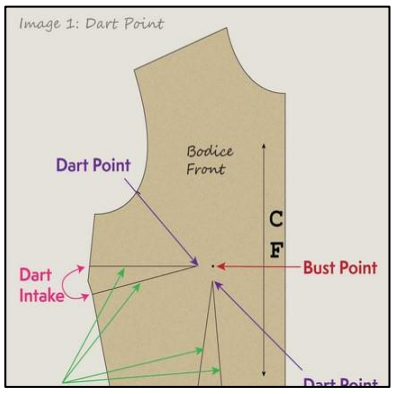
Dart Intake:

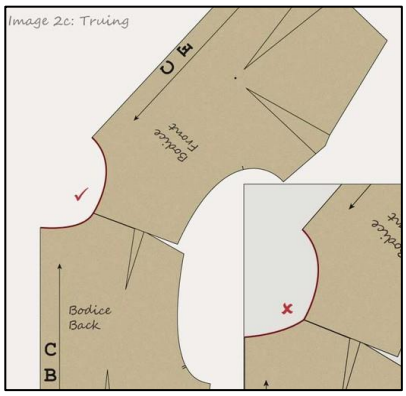
The amount of excess (or space) confined between dart legs. Its purpose is to take up excess where it is not needed and gradually release fabric. where it is needed the fit of the garment.

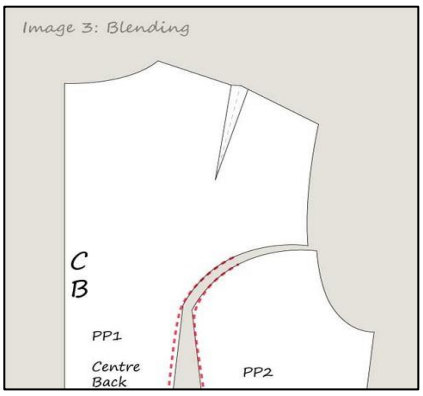
Truing and Blending:

Truing a pattern is the process of checking that adjoining pattern pieces match and any curve that continues from one piece to the next needs to be a smooth curve. When making Blocks or Patterns, the adjoining pieces need to be checked against each other; lines that are sewn together need to be the same length, such as side seams and the shoulder line. Adjusting the seam line and cutting line to retain smooth lines or curve is called truing and blending. When making changes to commercial patterns, it is essential to consider how any change will affect any adjoining pattern piece.

Blending is the process of smoothing and shaping angular and curved line on a seam to create a nice appearance. This will also include transferring any markings and sewing information to your pattern.







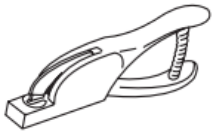
Muslin:

Muslin is a plain-woven cotton fabric made from bleached or unbleached corded yarns in a variety of weights. It is generally used for sheets and for a variety of other purposes.

Notch:

The notch tool or notcher cuts a 1/4 × 1/16-inch opening at the pattern's edge to indicate seam allowance, centre lines, and ease notches, dart intake and to identify front and back of patterns. The tool has a cutting blade that slips into the pattern's edge, leaving an 1/8- to 1/4-inch cut-out. As the patterns are traced, the notch cut-outs are marked on the fabric. The cutter slashes the fabric at these locations. The machine operator assembles and stitches the garment parts following the notches (Figure 1).

Figure 1



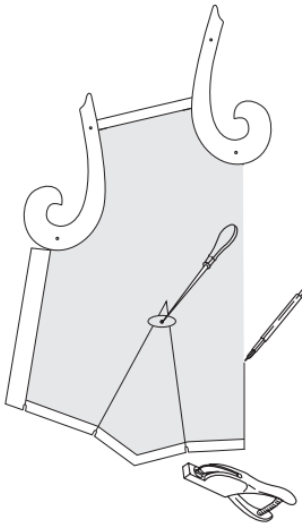
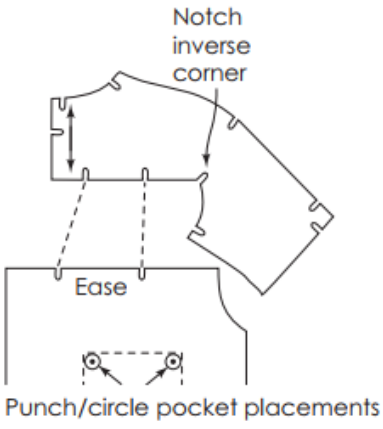


Figure 2



Empire Line:

It is a high waist seam and can be used in a dress, tunic or night dress. The upper garment is usually fitted over the bust and often the lower section of the garment is pleated or gathered into the waist.

Princess Line:

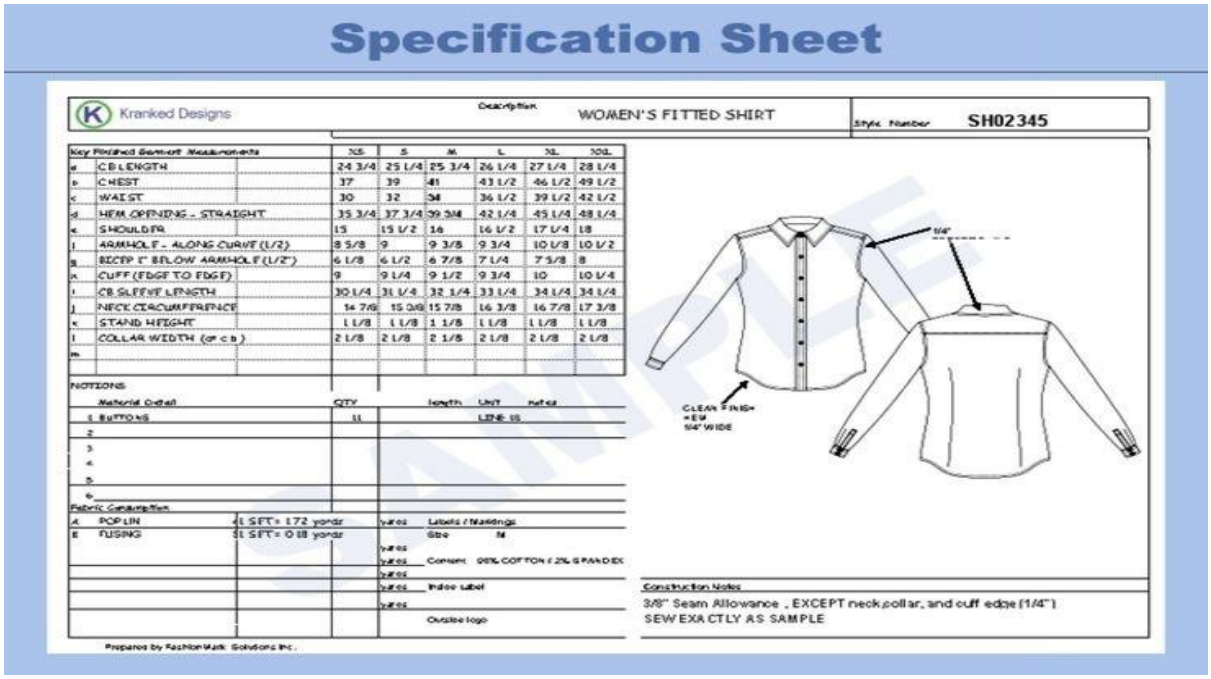
A dress or top with a seam-line that runs from the armhole to the hem, or from the shoulder to the hem, where the bust and waist darts are incorporated into this seam. In a garment containing princess line, the fit is achieved with long seams (princess seams) and shaped pattern pieces.

Prototype:

A prototype is a fitting version of a garment that's made up in an inexpensive fabric so that the design can be tested and perfected. It is made in a translucent linen or cotton muslin fabric.

Design Specification Sheet:

It is a record of all the specifications and information of the finishing required for each design. It contains every detail like fabric, cut pieces, stitching, trimming, finishing and technical stetch of the garment to be made.



Specification Sheet

Kranked Designs

Description: WOMEN'S FITTED SHIRT

Style Number: SH02345

Key Finished Garment Measurements		XS	S	M	L	XL	XXL
a	CB LENGTH	24 3/4	25 1/4	25 3/4	26 1/4	27 1/4	28 1/4
b	CHEST	37	39	41	43 1/2	46 1/2	49 1/2
c	WAIST	30	32	34	36 1/2	39 1/2	42 1/2
d	HEM OPENING - STRAIGHT	35 3/4	37 3/4	39 3/4	42 1/4	45 1/4	48 1/4
e	SHOULDER	15	15 1/2	16	16 1/2	17 1/4	18
f	ARMHOLE - ALONG CURVE (1/2)	8 5/8	9	9 3/8	9 3/4	10 1/8	10 1/2
g	BICEP 1" BELOW ARMHOLE (1/2")	6 1/8	6 1/2	6 7/8	7 1/4	7 5/8	8
h	CUFF (EDGE TO EDGE)	9	9 1/4	9 1/2	9 3/4	10	10 1/4
i	CB SLEEVE LENGTH	30 1/4	31 1/4	32 1/4	33 1/4	34 1/4	34 1/4
j	NECK CIRCUMFERENCE	14 7/8	15 3/8	15 7/8	16 3/8	16 7/8	17 3/8
k	STAND HEIGHT	1 1/8	1 1/8	1 1/8	1 1/8	1 1/8	1 1/8
l	COLLAR WIDTH (at c.b.)	2 1/8	2 1/8	2 1/8	2 1/8	2 1/8	2 1/8
m							

NOTIONS

	Material Detail	QTY	Length	Unit	Notes
1	BUTTONS	11		LINE 55	
2					
3					
4					
5					
6					

Fabric Consumption

A	POPLIN	1 SET= 1.72 yards	yards	Labels / Markings
B	FUSING	1 SET= 0.18 yards		Size M
			yards	
			yards	Content 98% COTTON / 2% SPANDEX
			yards	
			yards	Inside label
			yards	
				Outside logo

Construction Notes

3/8" Seam Allowance , EXCEPT neck,collar, and cuff edge (1/4")
SEW EXACTLY AS SAMPLE

Prepared by Fashion Mark Solutions Inc.

Unit 2 Measurements

INTRODUCTION TO STANDARD MEASUREMENTS-

Standardization of measurements is a difficult task because human anatomy varies region wise. Some attempts have been done to standardize the measurements in fashion industry. These attempts result into different standards as following: -

1. In industry, the measurement standard committee has developed set of figure types and sizes which are revised from time to time.
2. The various department stores and merchants develop their own standards to satisfy need of customers by survey.
3. The National Bureau of Standards (NBS), is a non-regulatory agency for the purpose of standardizing measurements for industry.
4. The American Society for Testing and Materials (ASTM) conducts survey for the purpose of standardizing body measurements.
5. Still industry use latest measurements available on computers database to satisfy customers need.

Standard measurement chart:

This chart is based on the work of measurement standard committee. But this chart has to be revised periodically.

Standard Measurement Chart

Use when form or model is unavailable.

CIRCUMFERENCE MEASUREMENTS: (Lase not included)	Grade:	1″	1″		1 1/2″	1 1/2″	1 1/2″	2″
	Sizes:	6	8	10	12	14	16	18
1. Bust:		34	35	36	37 1/2	39	40 1/2	42 1/2
2. Waist:		24	25	26	27 1/2	29	30 1/2	32 1/2
3. Abdomen:		32 1/2	33 1/2	34 1/2	36	37 1/2	39	41
4. Hip:		35 1/2	36 1/2	37 1/2	39	40 1/2	42	44
UPPER TORSO (bodice):								
5. Center length:								
Front		14 1/2	14 3/4	15	15 1/4	15 1/2	15 3/4	16
Back		16 3/4	17	17 1/4	17 1/2	17 3/4	18	18 1/4
6. Full length:								
Front		17	17 3/8	17 3/4	18 1/8	18 1/2	18 7/8	19 1/4
Back		17 1/4	17 5/8	18	18 3/8	18 3/4	19 1/8	19 1/2
7. Shoulder slope:								
Front		16 1/2	16 15/16	17 1/4	17 13/16	18 1/4	18 11/16	19 1/8
Back		16 1/4	16 11/16	17 1/8	17 9/16	18	18 7/16	18 7/8
8. Strap:								
Front		9 1/2	9 3/4	10	10 3/8	10 3/4	11 1/8	11 5/8
9. Bust depth:		9	9 1/8	9 1/4	9 3/8	9 1/2	9 5/8	10
Bust radius		2 3/4	2 7/8	3	3 1/8	3 1/4	3 3/8	3 3/4
10. Bust span:		3 1/2	3 5/8	3 3/4	3 7/8	4	4 1/8	4 1/4
11. Side length:		8 1/4	8 3/8	8 1/2	8 5/8	8 3/4	8 7/8	9
12. Back neck:		2 3/4	2 7/8	3	3 1/8	3 1/4	3 3/8	3 1/2
13. Shoulder length:		5 1/8	5 3/16	5 1/4	5 3/8	5 1/2	5 5/8	5 13/16
14. Across shoulder:								
Front		7 1/4	7 3/8	7 1/2	7 11/16	7 7/8	8 1/16	8 5/16
Back		7 3/8	7 1/2	7 5/8	7 13/16	8	8 3/16	8 7/16
15. Across chest:		6	6 1/4	6 3/8	6 9/16	6 3/4	6 15/16	7 3/16
16. Across back:		6 1/4	6 3/8	7	7 1/16	7 3/8	7 9/16	7 11/16
17. Bust arc:		9 1/4	9 1/2	9 3/4	10 1/8	10 1/2	10 7/8	11 1/8
18. Back arc:		8 1/2	8 3/4	9	9 3/8	9 3/4	10 1/8	10 5/8
19. Waist arc:								
Front		6 1/4	6 1/2	6 3/4	7 1/8	7 1/2	7 7/8	8 3/8
Back		5 3/4	6	6 1/4	6 5/8	7	7 3/8	7 7/8
20. Dart placement:		3	3 1/8	3 1/4	3 3/8	3 1/2	3 5/8	3 3/4
LOWER TORSO (Skirt/Pant):								
22. Abdominal arc:								
Front		8 1/4	8 1/2	8 3/4	9 1/8	9 1/2	9 7/8	10 3/8
Back		7 1/2	7 3/4	8	8 3/8	8 3/4	9 1/8	9 5/8
23. Hip arc:								
Front		8 1/2	8 3/4	9	9 1/4	9 1/2	10 1/8	10 5/8
Back		9	9 1/4	9 1/2	9 7/8	10 1/4	10 5/8	11 1/8
24. Crotch depth:		9 1/2	9 3/4	10	10 1/4	10 1/2	10 3/4	11
25. Hip depth:								
Center front		8 1/2	8 3/4	9	9 1/4	9 1/2	9 3/4	10
Center back		8 1/4	8 1/2	8 3/4	9	9 1/4	9 1/2	9 3/4
26. Side hip depth:		8 1/4	9	9 1/4	9 1/2	9 3/4	10	10 1/4
27. Waist to ankle:		37	37 1/2	38	38 1/2	39	39 1/2	40

27. Waist to ankle:	37	37½	38	38½	39	39½	40
Waist to Floor:	39	39½	40	40½	41	41½	42
Waist to Knee:	22¼	22⅝	23	23⅜	23¾	24⅛	24½
28. Crotch length:	24½	25¼	26	26¾	27½	28¼	29
Vertical trunk:	60	61	62	63½	65	66½	68½
29. Upper thigh:	19½	20¼	21	22	23	24	25¼
Mid-thigh:	17	17½	18	18¾	19½	20¼	21¼
30. Knee:	13	13½	14	14½	15	15½	16
31. Calf:	11	11½	12	12½	13	13½	14
32. Ankle:	9½	9¾	10	10¼	10½	10¾	11

Method of talking measurements –

Measurements are taken with the help of a measurement tape. Depending on how the measurement is taken, the methods are as follows:

1. **Direct Methods**

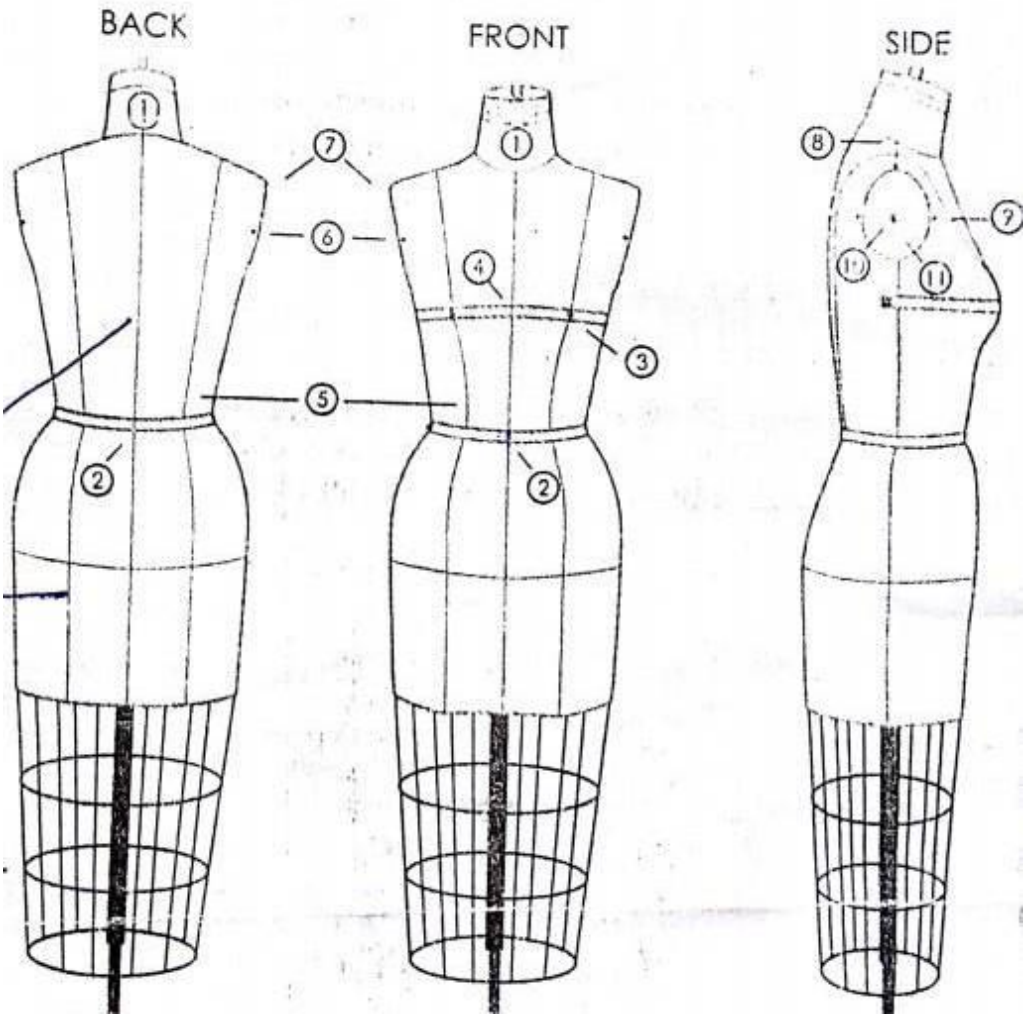
   In this method, measurements are directly taken from body. But a minimum practice inrequired to take measurements through this method otherwise wrong measurements can be taken.

2. **Indirect methods**

   In this method, measurements are taken from already stitched garment and not directly from the body. This method is not much reliable if the stitched garment is not of proper fit. But it is helpful if the person is not able to go for giving measurement he can send his already stitched garment.

3. Landmarks

In this method, measurements are taken from body form or dummies using guidelines which are known as landmarks. These landmarks are available on forms or dummies as shown below.



The landmarks are shown by numbers which mean:

1. Center front neck

Center back neck

2.Center front waist

Center back waist

3. Bust points

4. Center front burst level

5. side front (princess)

Side back (princess)

6. mid-armhole front

mid-armhole back

7. shoulder tip

8. Shoulder at neck

9. Armhole ridge or roll line

10. plate screw

11. armhole plate

The landmarks are used in short forms:

CF- CENTER FRONT

CB- CENTER BACK

BP- BUST POINT

SS-SIDE SEAM

SW- SIDE WAIST

SH- SHOULDER

HBL- HORIZONTAL BALANCE LINE

SH-TIP= SHOULDER TIP

Classification of measurements-

On the basis of the direction or manner in which a measurement is taken from a body or form, the measurements can be classified as follows: -

1. ***Circumference measurements:***

The measurement in which the measurement tape is hold around the part of which measurement is taken is known as circumference measurements e.g.-

- Bust (1)- Across bust points and back
- Waist (2)- Around waist
- Abdomen (3)- Three inches below waist
- Hip (4)- Measure widest area with tape parallel with floor. Pin to mark hip level at center front (referred to as X-point).

2. ***Horizontal measurements:***

The measurement in which the measurement tape is held parallel to the ground are known as horizontal measurement e.g.

Across shoulder (14)- Shoulder tip to center front neck.

- Across chest (15)- Center front to 1 inch above mid-armhole (pinhead mark).
- Bust arc (17)- Center front, over bust point, ending 2 inches below armplate at side seam.
- Bust span (10)- Place tape across bust points; divide in half for measurement.
- Waist arc (19)- Center front waist to side waist seam.
- Dart placement (20)- Center front to side front (princess line).
- Abdomen arc (22)- Center front to side seam, starting 3 inches down from waist.
- Hip arc (23)- Center front to side seam on HBL line.
- Hip depth (25)- Center front to HBL line.

Back neck (12)- Center back neck to shoulder at neck.

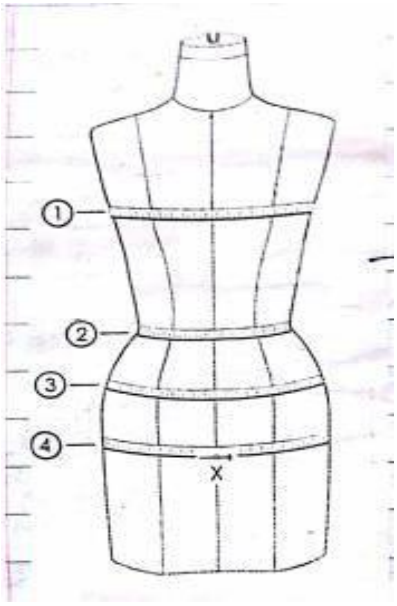
- Across shoulder (14)- Shoulder tip to center back neck.
- Across back (16)- Center back to 1 inch above the mid-armhole
- Back arc (18)- Center back to bottom of arm plate.

3. Vertical measurements:

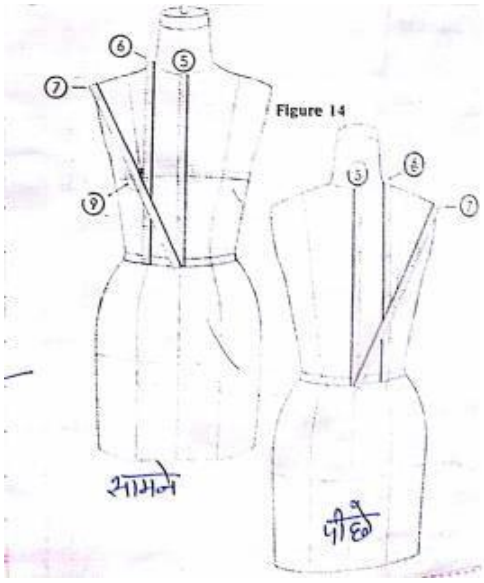
In vertical measurements, the measurement tape is held vertical to the ground while taking measurement e.g.

Side length (11). Pin mark below arm plate at side seam to side waist.

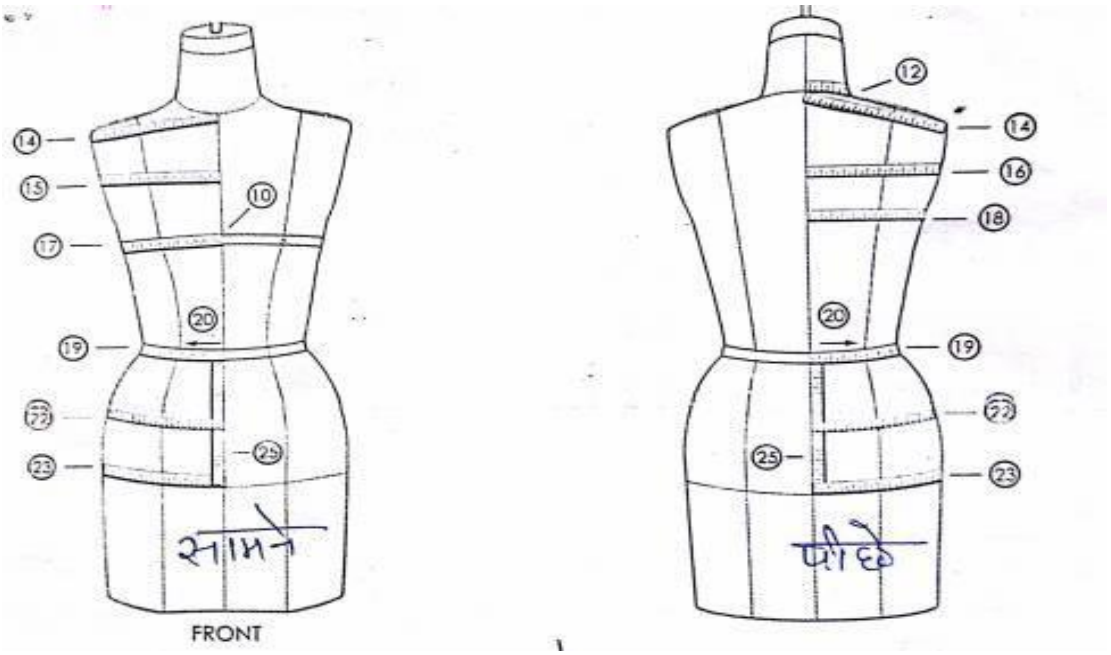
- Shoulder length (13). Shoulder tip to neck.
- Side hip depth (26). Side waist to HBL, on side of form being measured.
- Bust radius (9). Measure from bust point ending under bust mound to rib above. Center length (5). Mark neck to waist (over bridge).
- Full length (6). Waist to shoulder at neck, parallel with center lines.
- Shoulder slope (7). Center line at waist to the shoulder tip (mark).
- Bust depth (9). Shoulder tip to bust point.



CIRCUMFERENCE MEASUREMENT



VERTICAL MEASUREMENT



HORIZONTAL MEASUREMENT

PATTERN MAKING TOOLS

Measuring Tools:

1. **Rulers:**

A ruler is useful for measuring all types of measurements, tucks, hems, facing, etc. on patterns, for drawings lines and marking dots. Pattern maker uses a number of different rulers.

-Tailors square (24 × 14) inch is metal ruler with two arms forming a 90-degree angle that measures, rules and squares simultaneously.
-A flex general rule (12 x ½) inch
-A 36-inch ruler
- 18 × 2-inch plastic rule (flexible for measuring curves)
-Triangle with the measurements to square lines.

2. **Curve rules:**

These are curved rules used for measuring and marking in curves. Some curve rules are as follows:

- French curve is one of the several curves used for shaping arm hole and neck line.
- Sleigh curve, shapes necklines, armholes and other curves, pockets, collars, and cuffs.
- Hip curve rule to shape hipline, hem, lapels.
- Vary form curve to blend and shape armhole, necklines.

3. **Measuring tape:**

Measuring Tape is one of the important tools for pattern maker. It is metal-tipped plastic tape with a scale printed on it and is usually about ½" wide and **60" (152 cm)** long. With the use of this one can take measurements from body, form or measure from already stitched garment for stitching a new garment. It can also be used to check the measurement of the garment during sewing. Note that the tape must not get twisted while measuring. Measuring tape must be of good quality which will not stretch after use. Some of the measuring tapes have centimeter markings along one edge.

Marking tools:

1. **Pencils and pens:**

Mechanical pencils are used to mark lines on pattern. Red and blue colored pencils are used to identify pattern changes. The stitching line is marked using blue pencil and cutting line is marked using Red Pencil. Black, green, red and blue felt tip pens are required for writing pattern information on patterns.

2. **Tailor's chalk:**

This is also called as Marking Chalk. This is used for marking seam lines and other pattern details on fabric. These are available in different colors in rectangular and triangular shapes. This can be selected according to the fabric color. The edges can be sharpened for drawing straight and curved lines easily.

3. **Black twill tape:**

Black twill tape is used for the marking and placement of style lines on forms and to hold ease in place.

4. **Tracing wheels:**

This is a sharp toothed wheel used with carbon paper to transfer pattern markings from pattern to cloth. The points of wheel should be sharp. When two or more garments are cut with same pattern, tracing wheel is used to mark all the patterns at a time.

5. **Simflex Folding Measure:**

The Simflex Expanding Sewing Gauge is a expending mechanical tool used to measure and mark multiple equal distances, for example for fast accurate placement of buttons, buttonholes, hooks, eyes, snaps, shirring, smocking, skirt and dress pleats, drapes, tucks, gathers, bias or straight cut strips. It is a huge time saver aid.

Cutting tools

1. **Scissors:**

These have round handles and the length of blades is 6" or less than 6 inches. They are designed mainly for cutting paper, threads and trimming seams. However, scissors with 5-inch blade can be used by beginners for cutting fabric.

2. **Shears:**

For cutting fabric, shears are more suitable than scissors. Shears have one small ring handle for the thumb and a large ring handle for the fingers. They also have longer blades. The length of blades is 8” to 12”. It is better to select bent handled shears made of high quality steel and having blades joined with a bolt or screw.

3. **Pinking Shears:**

These shears are useful for finishing the edges of seams and other raw edges of fabric. They produce a zigzag cutting line which prevents raveling of woven fabrics. Pinking gives a neat appearance to the inside of garments.

4. **Notcher:**

The notch tool or notcher cuts a 1/4 × 1/16-inch opening at the pattern’s edge to indicate seam allowance, center lines, and ease notches, dart intake and to identify front and back of patterns.

5. **Awl:**

It is pointed tool that can pierce 1/8-inch hole in the pattern to indicate the ending of darts, pocket, trim and button hole placements.

Pressing tools

1. **Straight pins:**

Use of pins for fixing of pattern pieces to the fabric and the muslin fabric to the form makes work easier, quicker and more accurate. Select sharp, thin, medium lengthy pins that will not leave pin marks, on all types of fabrics. For silk, satin and other flimsy, slippery fabrics patterns must be pinned to the fabric before cutting.

2. **Straight pin holder:**

Pin Cushions are needed to hold the pins while work. These are available in many different styles; some have an elastic or plastic band so they can be worn around one’s wrist.

3. **Push pins:**

Push pins are used for pattern manipulation. It also prevents pattern slippage when cutting several plies of paper together.

4. **Metal weight:**

These are heavy metal weights that are used to hold the patterns in place while tracing and marking.

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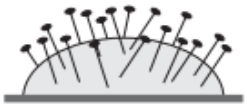
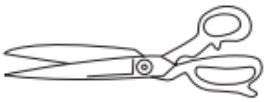
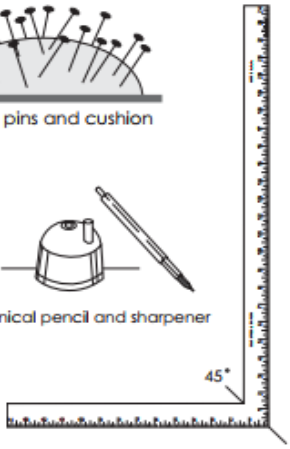
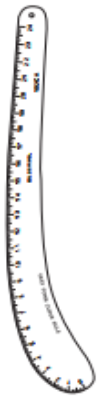

Straight pins and cushion



Mechanical pencil and sharpener



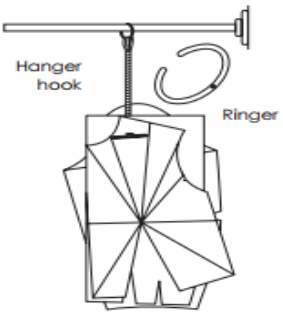

French curve


Vary form curve

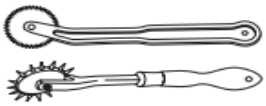

Hip curve rule


Square/triangle

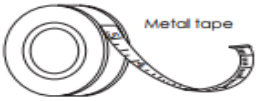

Sleigh curve



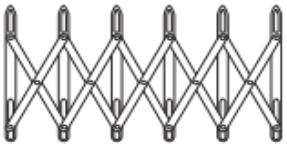

Notche

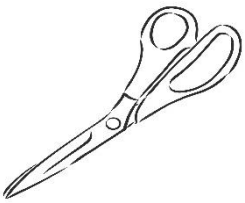

Tracing wheel

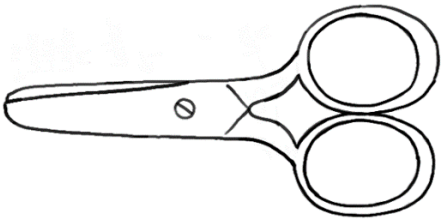

Awl



Metal weight


Simflex folding measure

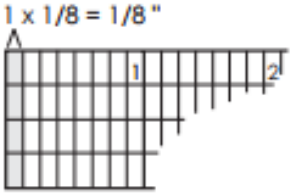




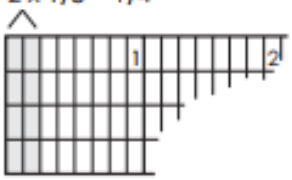
(Diagrams)

Guide to Reading Ruler Increments (based on 1/8 inch*)

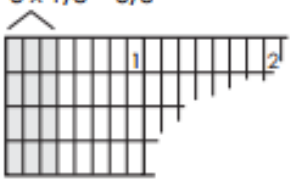
1 x 1/8 = 1/8 "



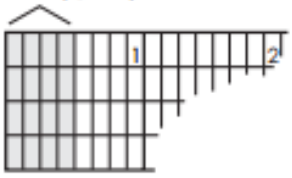
2 x 1/8 = 1/4 "



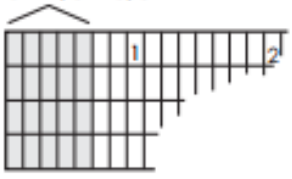
3 x 1/8 = 3/8 "



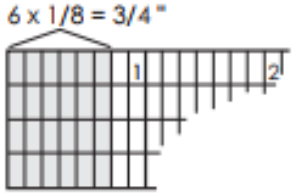
4 x 1/8 = 1/2 "



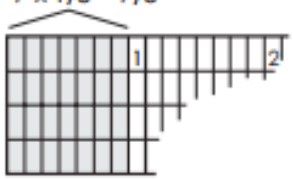
5 x 1/8 = 5/8 "



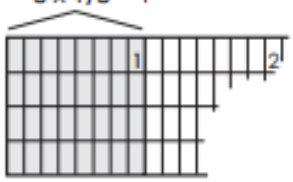
6 x 1/8 = 3/4 "



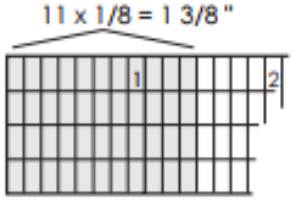
7 x 1/8 = 7/8 "



8 x 1/8 = 1 "



11 x 1/8 = 1 3/8 "



YARDAGE IN INCHES

9 " = a quarter yard (1/4)
12 " = a third yard (1/3)
18 " = a half a yard (1/2)
24 " = 2/3 of a yard
36 " = 1 yard

* 1/16 " = one-half of 1/8 "

UNIT 3

Drafting Basic Bodice -Front

Block normally represents the dimensions of a specific form or figure. It has darts to fit to the contours of the body but no other design features. It is a foundation that is used to make the pattern for a design and has no seam allowances.

The basic blocks can be drafted to fit individual figures by using personal measurements instead of the standard measurements listed in the size chart.

Procedure

To develop pattern for basic Bodice for women wear use measurements from the given chart or measure a dress form or a body.

Full length	=	19”
Bust circumference	=	36”
Waist circumference	=	32”
Centre front length	=	16”
Centre back length	=	18”
Across back (full)	=	14”
Bust span	=	7”
Shoulder width	=	15”
Shoulder length	=	5 1/4”

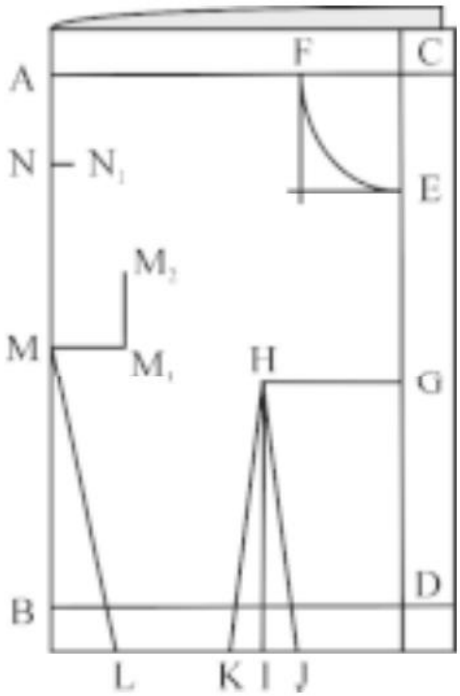
Cut a paper, whose length is full length front plus 3” and width is half of the bust width plus 4” on fold.

Fold the paper lengthwise and with fold on the left-hand side mark a guideline 1” down from the top edge, mark A as illustrated.

A to B = full length front

A to C = B to D = ¼ bust circumference (+1/2” ease)

Join C to D



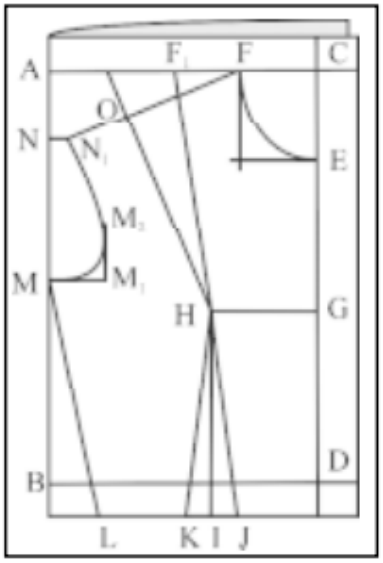
Mark D to E = centre front length (CE is front neck depth)

For neck width mark CF=CE

Square out lines from these points. Draw the neckline curve using French curve.

G = midpoint of DE

GH = half of bust span



Square a line from H to I

D to L = ¼ waist circumference (+1/2” ease)

A to M = ¼ bust circumference

Join L to M

M to M1 = M1 to M2 = 2 ½”.
Square out

A to N = 1/10 shoulder width

Join F to N.

Mark F to N1 = shoulder length

Draw the front armhole curve joining N1, M2 and M using French curve.

Drafting Basic Bodice -Back

Trace B D line, L M line and M M1 line on the other half of the paper.

Extend M M1 line on the second half of the paper.

Mark B to Z = BD

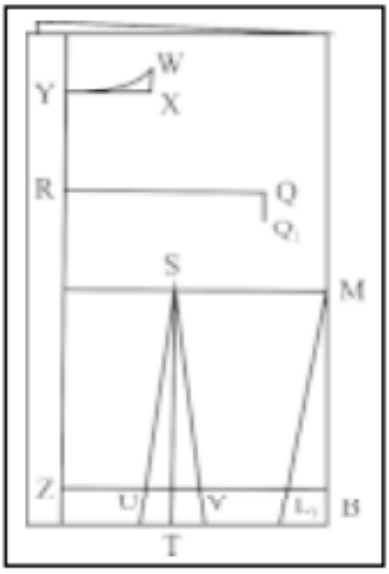
Z to Y = centre back length

Y to X = CF

X to W = 7/8”, draw the back neckline curve.

Mark Y R = ¼ centre back length

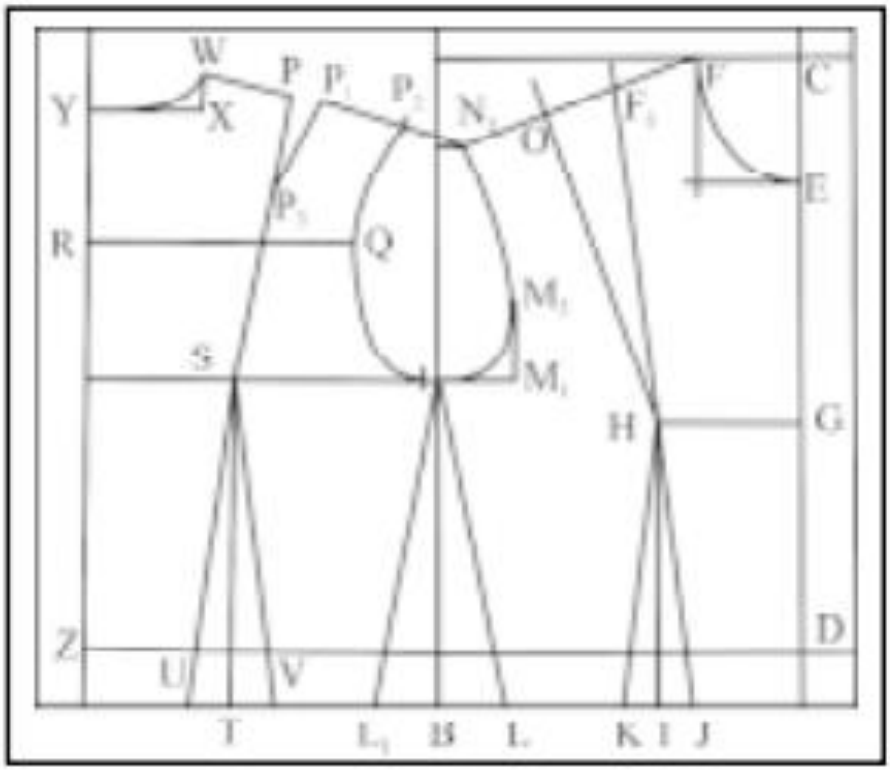
R to Q = half of across back (+1/4” ease)



Join W to N1 in front

Mark W to P2 = shoulder length

Draw the back armhole curve joining P1, Q and M using French curve.



Drafting Basic Sleeve

The arm is very mobile and the efficient part of the human body as it is capable of moving practically in every direction. The basic sleeve is a mounted sleeve stitched to the basic bodice armhole. The sleeve is one of the most difficult of the basic patterns to fit. The well-balanced sleeve will hang on the relaxed arm without any visible puckering or stress around the cap.

Measurements:

Sleeve length	=	22”
Cap height	=	51/2”
Biceps circumference	=	13”
Elbow circumference	=	10”
Wrist circumference	=	7”

Armhole measurement = 16”

Procedure:

To develop pattern for basic sleeve for women wear use measurements from the given chart. Take a paper, whose length is desired length of the sleeve plus 3” and width is bicep plus 2”, fold it lengthwise and place paper with fold towards you**.**

Mark a guide line 1” away from the right edge and label A.

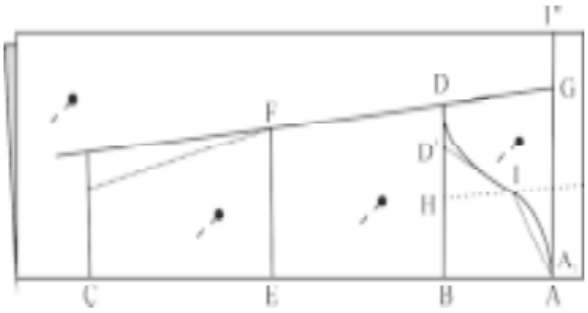
A to B = cap height

A to C = full length

B to D = ½ biceps circumference

B to E = ½ BC- 11/2”

E to F = ½ elbow circumference (+1/2” ease)



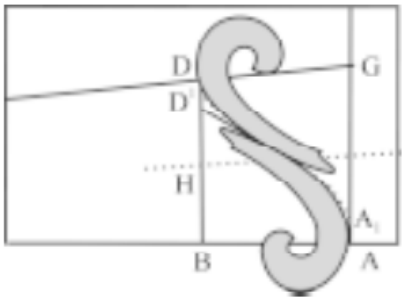
Join D to F and extend it to a line squared from c

Extend D to G

Find mid-point of B D line and A G line by folding the paper lengthwise.

On this line mark H to I = ½ cap height + ¾”

Mark A to A1= ¼” and D to D1=1”

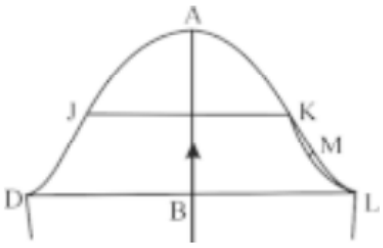


Join A1 to I and I to D1 with dotted lines.

Draw the armhole curve with the help of French curve as shown in figure.

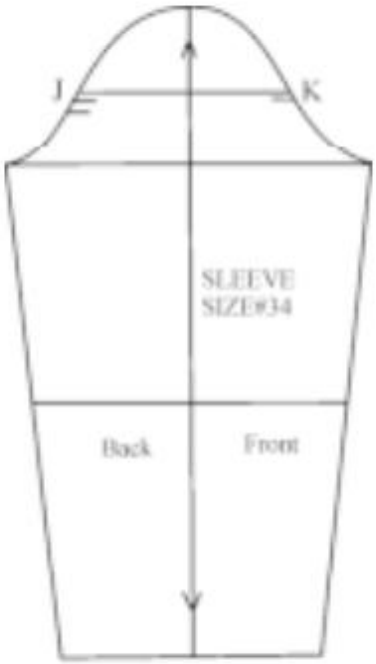
Trace all the lines for front sleeves on the other side of paper.
Open the paper.

Find the mid-point of A to B by folding the paper and draw the line JK.



Find the mid-point M of KL line and on M go in ¼”.
Redraw the front curve as shown.

Mark the notches
For front mark one notch = ½” below point K.
For back mark two notches, one at ½” below J and next ½” away from the first notch



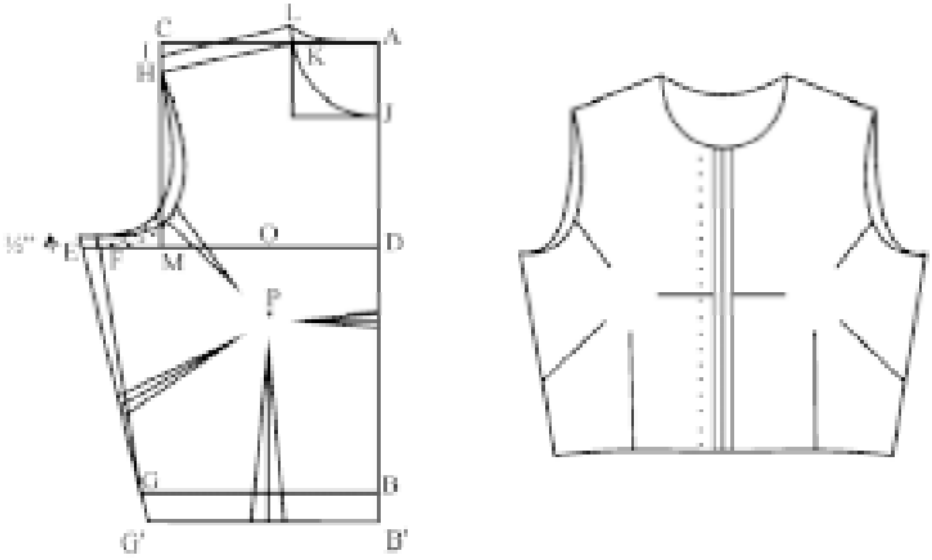
FINISHED PATTERN

Drafting Sleeveless Bodice

In the sleeveless bodice, the armhole should be fitted closer to the body; when the armhole is away from the body the under garments may be visible. Hence it should be finished
closer to armpit of the body.

Procedure
For a sleeveless bodice, trace the basic bodice block is used. Change the armhole as follows:
Go up ½" on the armhole level i.e. E and F and redraw the curves, as illustrated.

Ensure that the armhole is closer to the body but does not bite into the armpit.



Unit: 3 Garment fit

Garment fitting:

Fitting is most important and most difficult step in clothing constructions. The garment fitting refers to how well a garment confirms to the three-dimensional human body figure. There are various variables present in fitting like figure, fabric, design and the purpose for which a garment is prepared. Systematic garment fitting usually follows a definite plan and is based on understanding of causes of defects and remedial measures without spoiling the fit of other parts of the garment. A well fitted garment not only fits perfectly to the figure but is equally comfortable to wearer.

For example, you can put on an expensive dress or a designer suit but if it is too small or too big, people will notice the fit and never notice your fancy frock or classy decorations.

Need to fit:

- Garment construction is a practical work, so practical demonstration is necessary in terms of fitting.
- Both fitting and dressmaking depend on each other and each contributes equally to the success of the garment.
- The manner in which clothing fits one's body is an important factor in clothing selection and purchase.
- A good fit brings confidence in the wearer, allowing the body to move without restrictions so that your clothing is not slowing you down at the gym, on the job or while you're at home.
- Clothes that are too big make you look both bigger and older than what you actually are. Furthermore, they tend to hide your best features. Clothes that are too small tend to highlight every single body defect. Clothes that fit properly make you look thinner, and they make you feel confident.

Factors Affecting Good Fit and Causes for Poor Fitting:

The following are the main four factors that affect the fit of a garment. If all these factors are correct then the garment fit is considered good.

- **Appearance:** All darts and seams must fall in proper places, the garment should have smooth look, with no pulls or wrinkles, no sagging or baggy areas.
- **Comfort:** Comfort is extremely important. The garment is considered comfortable if movement of body is possible without straining its seams or feeling restricted. Most attractive garment in one's wardrobe will never be worn unless it feels good when you wear it.
- **Design:** The design of a garment may be based on either a close fit or a loose fit. It is important to keep in mind what the designer wants when one fits individual garment. He/she can take help from photographs, illustration etc to show the desired fit.
- **Fabric:** Fabric is crucial to good fit styles for "stretch knits" are relying on some stretch in the fabric. A thick fabric is usually designed a bit larger to accommodate the bulk: the same style in a thinner fabric would be probably too big. So, it is advisable to consider the pattern department recommendation.

Evaluating fit (Five Standards for Good Fit):

An evaluation of the garment fit is based on five classical elements or standards. These are as follows:

- **Ease:** Ease is the difference between the circumference measurement of the figure and of the garment or we can say looseness in a garment for comfort and appearance. The garment looks

perfect if it is neither to loose nor too tight. It should have enough ease for comfort but not so much that drooping and sagging occurs. Some of the evidences of improper amount of ease are too long shoulder, bagginess under the arms, waistline too tight, tightness over the bust, narrowness across the shoulder etc. So, the amount of ease should be sufficient for comfort and keeping with fashion, style, type of garment and fabric used.

- **Line:** Construction lines and edges of the garments are referred as line. The basic seam lines, shoulder and side seams should follow the general outlining of the body shape.

The side seam appears from the neck to the ankle, perpendicular to the floor and to the horizontal circumference lines and half way between the front and back of the figure when viewed from the side. In a well fitted basic dress, the CF and CB of the garment coincide with the corresponding position on the body.

- **Sets:** Sets refer to the way in which the fabric fits to the contours perfectly smooth and free of creases in all areas. A well fitted garment sets smoothly without wrinkles. Graceful folds created by gathers or other design features are not to be confused with wrinkles that are formed where the garment is strained over some curve.
- **Balance:** The symmetry of garment on the figure is called balance. Balance is the relationship between the garment and the figure and between the various parts of the garment. The garment should hang equally either side of the figure. A garment is out of balance when it is cut off grain, causing it to hang unevenly.
- **Grain:** Grain refers to the lengthwise and crosswise thread from which a woven fabric is constructed. Straight grain refers to warp threads. The straight grain line on a pattern is always plays parallel to the warp threads. The warp grains should be perpendicular to the ground on the central front and central back lines and the centre line of sleeve. The weft grains should be parallel to the ground on the front and back width lines.

Methods of Fit:

Garment fit and ease of body movement are traditionally assessed by following means:

- **Wearer trials**, in which wearer put on the garment and perform a series of activities which normally occur in practice and then asked to rate the ease of body movement on a scale; for example, from 1 for very stiff to 5 for very flexible, or from 1 for very tight to 5 for very loose. Different assessments are made for different parts of the body under different activities.
- **Fitting index**, based on the measurement of the space between the body and clothing,
- **Symmetrised dot pattern technique**, based on the measurement of the changes of the dot pattern
- **Imaging technology**, sometimes photographs are taken for visual assessment of garment's look. Their practical use is very limited due to the difficulty in accurately and efficiently capturing the space between the body and clothing or garment surface, which may be folded or wrinkled.

The following points are considered necessary for "Good Fit":

- Side seams should be perpendicular to the floor (straight up and down), not swinging to the front or back, or twisting.
- The neckline should not pull to the front or back of the garment.
- Sleeves should be proportional to the length of the garment, and the design intent.
- Sleeve openings should not be too wide or too narrow.
- Garments should not have "whiskers" or "drag lines."
- The crotch of the garment should not cut into the body, or hang too low below the body (unless this is the design intent).
- Sleeves should not bind when arms move.
- Pants should not gape at the back waist when sitting.
- Pants should be comfortable to sit in, move in.
- Jackets should not be tight across the back when arms are crossed in front of the chest.
- Hems should be appropriate for the garment: It should not be too narrow or too wide.
- Dress hems should hang parallel to the floor (unless it is an asymmetrical hem).
- Busts should fit comfortably in the garment: no drag lines between the apex of each breast, etc.
- Bust darts should point to the apex of the breasts and should end roughly 1-1 ½" away from the apex of the bust.
- Waist darts should be parallel to the CF/CB of the garment.
- Shirt collars should roll nicely, rather than fighting to stand up or flay out flat.
- Buttons and zippers should be easy to use, in logical locations
- Pockets should be proportional, functional, and easy to get into and out of.
- Hoods should not pull the garment up and away from the body.

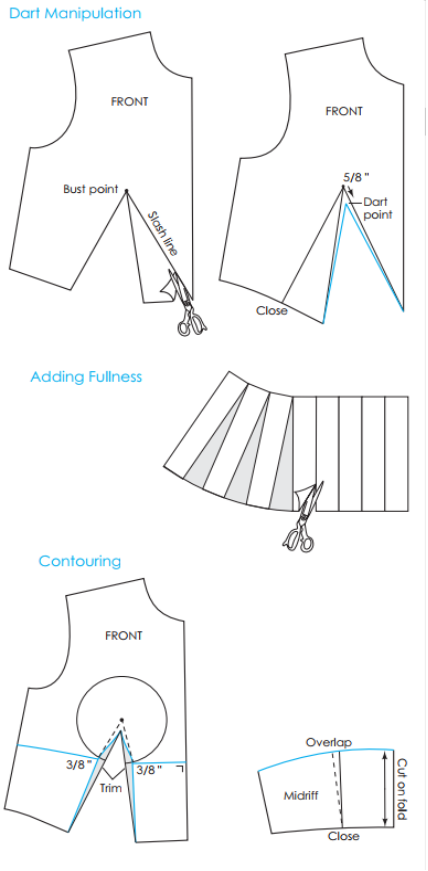
UNIT 4 Dart Manipulation

Flat patternmaking is the fastest and most efficient method utilized for developing design patterns of mass-produced or ready-made garments. Flat patternmaking is based on **three major patternmaking principles** and **techniques**:

dart manipulation (relocating darts),

added fullness (adding more fabric in the design), and

contouring (fitting to a model's figure).



Dart manipulation. Changing the location of a dart within the pattern frame. Remember that the dart is responsible for fit and will be part of the design in one form or another.

Adding fullness. Applies when design fullness is greater than the dart excess can provide. Added fullness is not directed to the pivotal point (bust). Adding to the pattern's outline also indicates that added material is needed for the design.

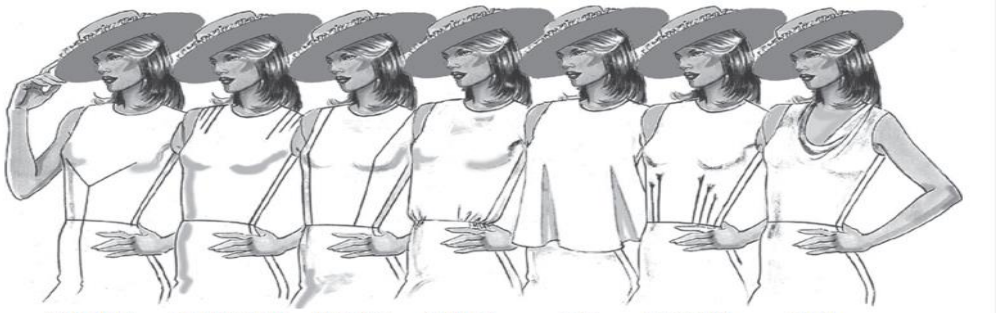
Contouring. Fitting to the contour above, below, and in between the bust, leaving the dart excess to be absorbed into stylelines, or gathers.

I. <u>Dart manipulation:</u>

Dart manipulation is a useful and interesting tool for pattern maker for creating interesting, innovative dart placements and style lines. The change in the position of the dart creates interest in the garments in different dart positions. The basic fit of the garment is not altered by these manipulations.

Principle. A dart can be transferred to any location around the pattern's outline without affecting the size or fit of the garment.

The dart excess (space between the dart legs) can be used as gathers, pleats, tuck-darts, stylelines, cowls, flare (unstitched dart legs). The creative use of the dart excess is called a *dart equivalent.*
Dart(s) or dart equivalents will direct themselves toward the pivotal point. A dart ends before reaching the pivotal point and should not go beyond it, especially the pivotal point of the bust.



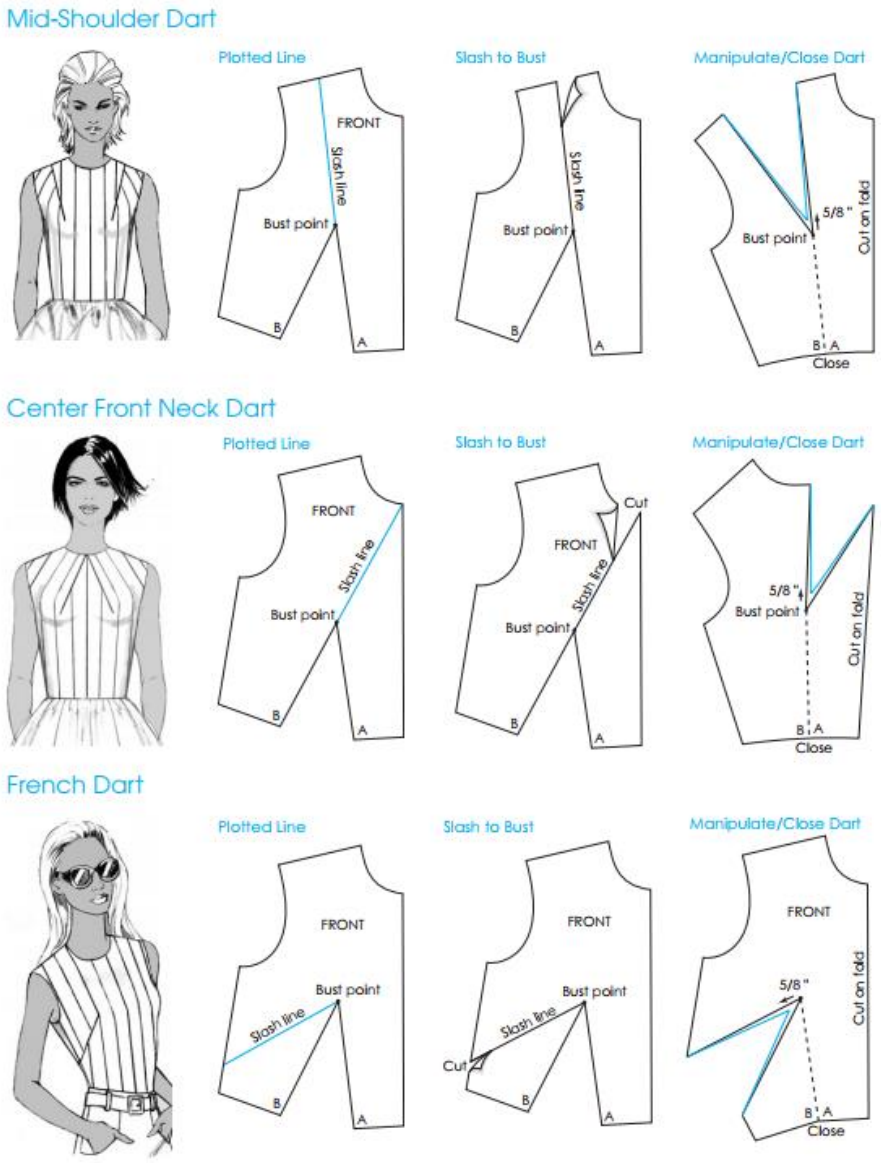
Techniques of Dart Manipulation

The dart manipulation technique is applied when the dart of basic patterns (bodice, skirt, sleeve, or any pattern) are relocated in the process of creating design patterns. To create a design pattern, the design is analyzed first to identify the location of the dart or equivalent before manipulating the pattern. Following are the techniques of Dart Manipulation.

1. Slash and spread: In the slash and spread method, as the name implies the pattern/sloper is slashed or cut on the desired line and as the old dart is closed, the pattern itself spreads on the new position, to create the new design. Through this method, the patternmaker is able to see how the original working pattern changed into a design pattern.

Steps in the Process

Design analysis. Identifying where the dart will be located.
Plotting. Drawing line(s) on the traced pattern to indicate where the design elements are located.
Manipulation. Applying the slash method to change the shape of a traced pattern into a design pattern.

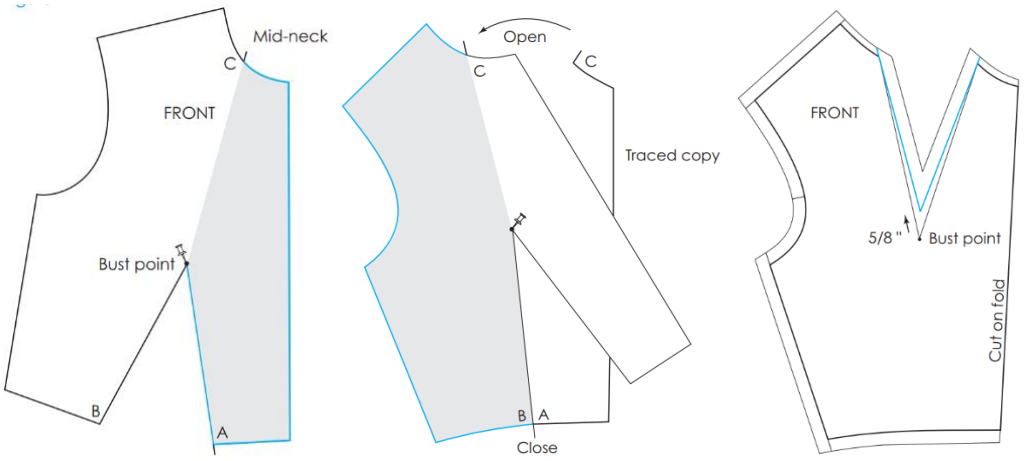


2. Pivotal-transfer*:* The pivotal-transfer technique involves manipulating the *original* working pattern into a new shape by pivoting, shifting and tracing, without cutting.

The working pattern is placed on top of pattern paper with a push pin placed through the pivotal point. To transfer a dart to a new location, the dart is marked on the paper underneath and then traced to an existing dart on the pattern. The pattern is then pivoted, closing original dart legs while opening space for the new dart. The remaining untraced pattern is traced to paper underneath. Once an area of the pattern has been traced, *it is not traced again.* Push pins are also used to transfer stylelines within the pattern's frame. When the pattern is removed from the paper, the lines are trued with straight or curved rulers, using the pin marks as a guide. This method does not require that the working pattern be slashed in order to change its original shape into a design pattern. It is a faster method and, with experience, it is preferred.

Steps in the Process (For dart relocation from waist to mid-neck)

- Place the working pattern on paper with a push pin through the bust point (pivotal point).
- Mark the mid-neck location (point C) and dart leg A on paper.
- Trace the section of pattern from dart leg A to C (blue line and shaded area).
- Pivot pattern until dart leg B touches A on paper (closes waist dart and opens space for the mid-neck dart).
- Trace the remaining section of the pattern from dart leg B to point C on the pattern (blue line and shaded area). Remember, once a section of the pattern is traced, *it is not traced again.*
- Remove the working pattern from paper.
- Draw dart legs to bust point.



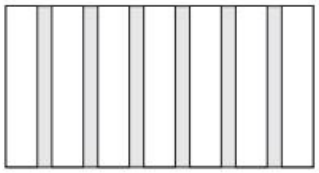
II. Adaptation of fullness

This principle of flat pattern making is applied when design fullness is greater than the dart excess. Added fullness is not directed to the pivotal point (bust). Adding to the pattern's outline also indicates that added material is needed for the design. To increase fullness the length and/or width within the pattern's frame must be increased by slashing and spreading where fullness is needed.
This principle of adding fullness can change the silhouette of the garment.

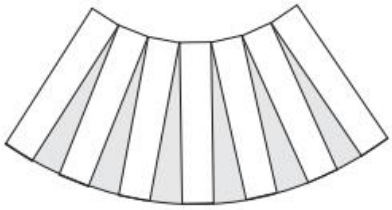
Three Types of Added Fullness

To add fullness, the working pattern is increased in one of three ways:

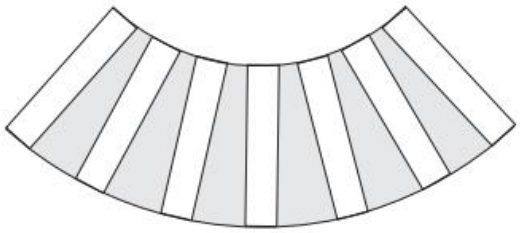
Equal fullness. Opposite sides of a pattern are spread equally, increasing fullness to top and bottom.



One-sided fullness. One side of a pattern is spread to increase fullness, forming an arc shape at the top and bottom.



Unequal fullness. One side of the pattern is spread *more* than the other, forming an arc shape at the top and bottom.



Compare the silhouette differences between the design and the basic garment when adding fullness.