

15

FABRIC CONSTRUCTION

15.1 Introduction

When you see the clothes you wear or fabric you use for curtains or bedsheet, have you noticed something different in them? Some fabrics are thick, others are thin, some are plain, others are with design and some are stiff and others limp. If you examine your clothes, you will find that your inner clothes or underwear are very different from outerclothes. These differences in fabrics are because of their construction. You have already learnt in the previous lessons that the fibers and yarns affect the properties and appearance, strength, wearline of the fabric, etc. Similarly, fabric construction method also influences the appearance, properties and performance of the fabric. In this lesson you will learn about this aspect of fabrics.

15.2 Objective—

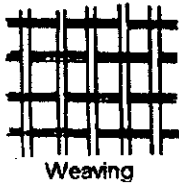
After reading this lesson you will be able to:

- describe briefly the various methods of fabric construction;
- explain the process of weaving;
- correlate various designs in weaving with type of fabrics produced;
- explain the process of knitting;
- distinguish between woven and knitted fabrics.

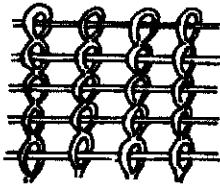
15.3 What is a Fabric?

In the earlier lesson you have learnt about fibers and yarns but still when you are asked about the meaning of textiles you think of fabrics, clothes or garments. Actually, in order to use the fibers and yarns for apparel, household textiles and other end uses, there is a need to make them into a fabric.

FABRIC IS ANY PIECE OF CLOTH



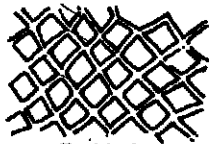
Weaving



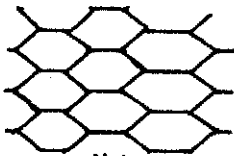
Knitting



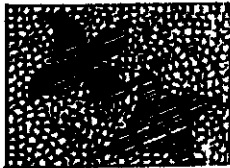
Non - woven



Braided



Nets



Lace

Fabrics can be made by using a number of techniques. Let us enumerate them and try to see their important features:

- i) **Weaving:** You must have seen a chatai being made. Weaving is similar to it, where two sets of yarns are interlaced with one another at right angles. Weaving gives a firm fabric. Have you heard of fabrics like poplins, denim, cambric?
- ii) **Knitting:** When you knit a sweater, there is normally one ball of yarn which is interlooped to get a fabric. This technique is called knitting and it gives a lot of stretch and easy-care properties to fabric. Knits are mainly used for hosiery.
- iii) **Non-Woven:** These fabrics are made directly from fibers without weaving or knitting. Fibers are held together by mechanical forces, gum or heat. Namada is a traditional Kashmiri piece of a non-woven type of fabric.
- iv) **Braided Fabrics:** Braided fabrics are created in a fashion similar to braiding of hair. These fabrics are mainly used to make trimmings and shoe laces.
- v) **Nets:** They are open-mesh fabrics with geometrical shapes. These yarns may be knotted at the point of intersection. You notice it being used very commonly for mosquito nets.
- vi) **Laces:** Yarns are criss-crossed to create intricate designs. Yarns may be interlooped, interlaced or knotted to give open-mesh structure.

15.4 What is Weaving?

In weaving two sets of yarns are interlaced at right angle to one another in an established sequence.

Have you ever seen a 'charpai' being made? On the frame, first one rope is taken and interlooped on two parallel edges and after that a second rope is interlaced perpendicular to it going once over the rope and once under it. This kind of an interlacement gives an even check effect and the weave is quite firm.

The weaving of a fabric is also done in a similar way, except for the fact that yarns are used for interlacing and a loom is used to hold the thread instead of a frame. There are some terms which are frequently used while using a fabric and you see them on the table also.

Selvedge : When you examine a fabric, you see two long finished edges, one on each side the fabric. These edges are called selvedge and give strength to the edges which is important in further processing of the fabric.

Warp/ end : They are the yarns parallel to the length of the fabric or selvedge. They can be of any length.

Weft/pick/filling : When you see a woven fabric, besides warps, another set of yarns move perpendicular to warps. They are called wefts. They are interlaced with warps in a crosswise direction to make a fabric.

Thread Count : You must have noticed that some woven fabrics look dense and compact whereas others open. This difference is due to the thread count which refers to the total number of warps and wefts per square inch of a woven fabric. Thread count tells us about the fabric quality, durability and wear-life. Fabric with a higher thread count is better than fabric with lower thread count. Also, for good quality fabric, warps and wefts should be equal in number or more or less equal.

Process of weaving

The weaving operation can be explained by three basic movements, i.e.

- shedding
- picking
- beating

The weaving operation can be compared to 'chatai' making. When a chatai is made some ropes are held parallel to one another on a frame. The chatai maker lifts some strands with his fingers and passes another rope perpendicular to it and pushes it down with a blunt knife to make a compact chatai.

In weaving also similar process is carried out on a loom. Warp yarns are laid parallel to one another to make a sheet like structure. Then, with hands or some other device the warp sheet is divided into two parts i.e. some warps are lifted and others remain as such and the weft is then passed through them to complete the interlacement. For example alternate warps could be lifted to get a checkered fabric. To make the weave compact, the wefts are beaten with a comb like device.

In a handloom, shedding (separating warp sheet), picking (laying of a weft) and beating (pushing weft yarns to compact weave) are done manually. But now-a-days automatic looms are being used to do weaving at a fast rate.

15.5 Designs in Weaving

You must have observed that woven fabrics are not always plain and checked. Many of them have designs on them. If these designs are created on the loom they are called 'woven designs'. The designs can mainly be due to:

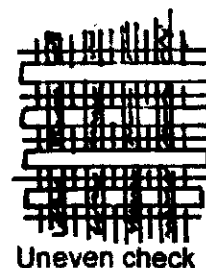
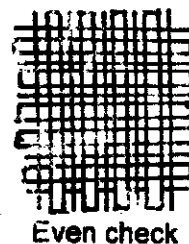
- Selection of yarn
- Selection of weave

You have learnt in the previous lesson that yarns are simple, ply, cord, and complex. So while making a fabric, if the warp is simple and the weft is complex you will get an interesting effect, different from a plain fabric. Also you can take a thick warp or a thick weft.

You must have seen a lot of woven stripes or checks also, in the market. Do you know how they are made? Yes, vertical stripes can be created by putting coloured warps at a distance and horizontal stripes by using coloured weft at a distance and to make a check both warp and weft selected are coloured.

Sometimes warps of one colour are taken and weft of another and they are used to give very interesting effects. Have you heard of *Dhup-Chann* fabric or what we call the *shot effect*, which is very common in silk sarees from South India?

You have learnt till now that when designs are being created by selection of special yarns or colour, the main effect is due to texture or colour. But in order to get intricate woven designs, the way in which yarns are interlaced can also be changed. Rather than alternate interlacement as in plain fabric, intricate patterns are created by changing the frequency of interlacement. Have you noticed something different in denim, corduroy or towel? Yes, in denim you see a dominant diagonal line, in corduroy, there are raised parallel vertical lines. In a towel, there are loops placed in such a way that even if one loop is pulled, the fabric remains intact. All these fabrics are made by using special looms and special weaving techniques and, as you may have guessed, these fabric are comparatively expensive.



INTEXT QUESTIONS 15.1

1. Fill in the blanks -

- i) Weaving is an _____ of two sets of yarns at right angle.
- ii) In _____ one set of yarns is interlooped to get a fabric.
- iii) _____ is a traditional non-woven piece.
- iv) One common use of braided fabrics is in _____.
- v) Weaving is similar to _____ making.
- vi) _____ is related to the quality of a woven fabric.

2. Match the statement of column A with the terms in Column B:

(A)

(B)

- | | |
|---|-----------------|
| a) Yarn parallel to selvedge | 1) Balance |
| b) Yarns at right angle to selvedge | 2) Weft |
| c) Finished edge to fabric | 3) Warp |
| d) Number of weft and warp yarns in two inch square piece | 4) Thread count |
| | 5) Selvedge |

3. Tick the right choice—

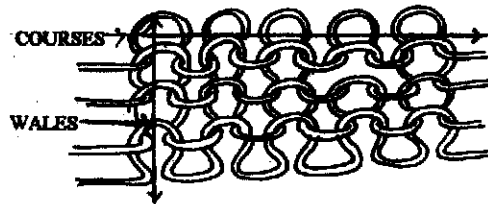
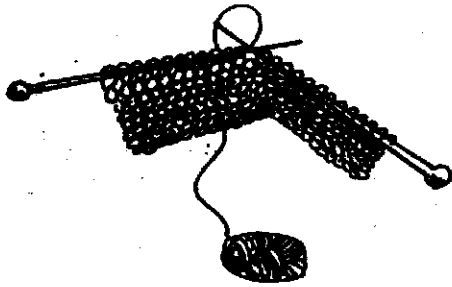
- a) Open mesh fabrics with large geometrical shapes are called
 - i) laces
 - ii) nets
 - iii) braids
 - iv) knits
- b) Weaving needs the following number of sets of yarns
 - i) One
 - ii) Two
 - iii) Three
 - iv) Four
- c) Designs in woven fabrics can be made by using
 - i) Variety yarns
 - ii) Weaves
 - iii) Both (i) and (ii)
 - iv) any one of (i) and (ii)
- d) Woven stripes which are vertical are made by using coloured yarns along
 - i) Warp
 - ii) Weft
 - iii) both (i) and (ii)
 - iv) either (i) or (ii)
- e) Which fabric shows a dominant diagonal line?
 - i) corduroy
 - ii) denim
 - iii) towel
 - iv) cambric

15.6 Knitting

Knitting is making of cloth with the help of needles to create a series of interlocking loops with a single yarn.

Have you ever observed somebody knitting a sweater? Normally, there is only one ball of knitting yarn and with the help of two needles, loops are made and when one row of loops are made, the next row is formed by interlooping with the previous loops.

This fabric making method gives us a very comfortable and stretchable fabric which does not wrinkle. Due to its elasticity, it can fit various sizes. Knitted fabrics are used not only for sweaters but also for hosiery articles like vests, socks, underwears, etc.



In knitting also, some terms are used which are as follows:-

- i) *Courses*: Series of successive loops lying in crosswise direction.
- ii) *Wales*: Lengthwise or vertical columns of loops.
- iii) *Gauge*: It is fineness of stitch and it depends upon the size of needles.

You must have seen that for a thicker wool, thick needles are used which give a very big loop.

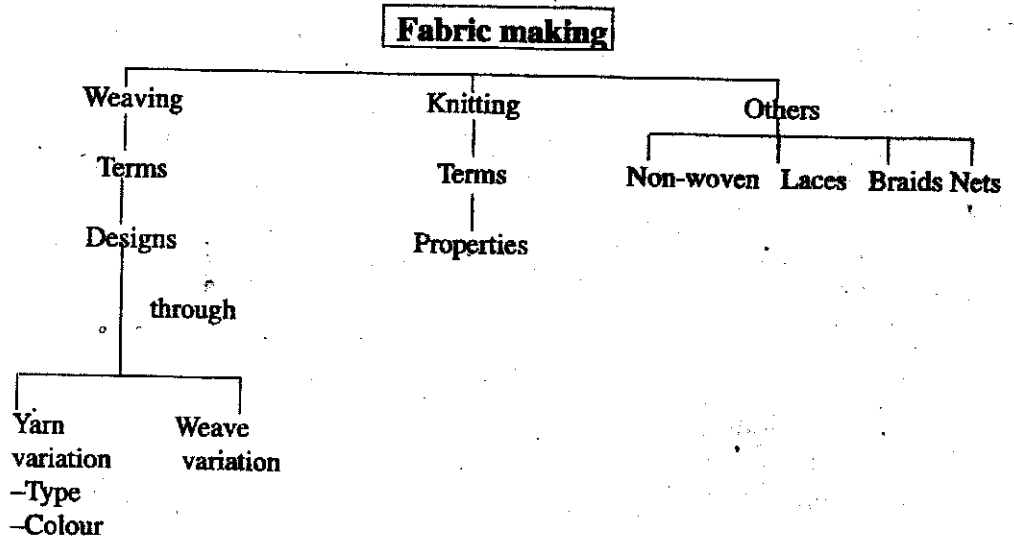
15.7 Weaving Vs Knitting

As you have seen both weaving and knitting are the popular methods of fabric making and depending upon the end use and properties needed any one can be chosen. The following table gives a comparative picture of the two.

Weaving Vs Knitting

Property	Weaving	Knitting
1. Number of yarns	Two sets of yarns interlaced at right angles.	One set of yarn interlooped with itself.
2. Made on	A Loom-could be a handloom or automatic loom.	Needles - could be hand knitting or machine knitting.
3. Fabrics are	Firm, smooth, stable and maintain their stiffness.	Wrinkle resistant, stretchable, limp and fit to the body.
4. Care and maintenance	Need proper washing and ironing before reuse.	No ironing required but while drying have to be dried flat on ground.
5. Designs	Can be created by using different yarns (types and colours) and also weaves.	Are created by using various knitting yarns and by changing stitches or colour.
6. Used for	Apparels, upholstery, curtains, draperies, table linen, bed linen, etc.	For undergarments, hosiery, sweaters, T-shirts etc.

15.8 What Have You Learnt?



15.9 Terminal Exercise

1. Enumerate the various methods of fabric making.
2. Discuss how designs can be created by weaving.
3. Compare and contrast between weaving and knitting.
4. How are fabrics woven?

15.10 Answers to Intext Questions

- 15.1
1. i) interlacement
ii) knitting
iii) namada
vi) shoe laces
v) chatai/charpai
vi) thread count
 2. a) Warp
b) Weft
c) Selvedge
d) Thread count
 3. a) (ii)
b) (ii)
c) (iii)
d) (ii)