



Department of Textile Engineering

REPORT ON
PROJECT WORK
“STUDY ON FLEECE KNIT FABRIC”

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14th January 2012

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Ref.: Letter of Transmittal.

Dear Sir,

We are very glad to let you know that we have already completed the project on “**STUDY ON FLEECE KNIT FABRIC**”. That you assigned us as a partial fulfillment of the course during preparing the paper have tried my best to make it rich covering the allconcerning matters. We believe the report will at least give you a brief picture about fabric properties. Now we humbly request you to accept the report for your favorable consideration.

It will be a privilege for me if you kindly accept this Project Paper.

Sincerely yours

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Heartfelt thanks goes to Senior Textile Engineers of various industries (Micro fiber Ltd.)From whom we collect the sample.

Above all, we would like to acknowledge our deep debt to all teachers of our University and especially of FMT department for their kind inspiration and help, which remain us the backdrop of all our efforts.

Finally, we would like to convey our acknowledgement that we remain responsible for the inadequacies and errors, which doubtless remain.

ABSTRACT

At first we collect some of Order Sheet along with required data which are needed to commence our project work with effective analysis. We also analysis the fabrics according to their class so that we can establish an acceptable result which will be perfect for effective use and will help to carry out further activities depending on the established form of work.

During our industrial attachment we manage to watch carefully and effectively the knitted fabric specification along with machine specification and the major factors which are necessary to calculate different types of variation and variable on which the whole fabric construction depends. Our efforts were to develop a dependable way so that we can easily visualize or can forecast the resulting fabric specification with required configuration. S

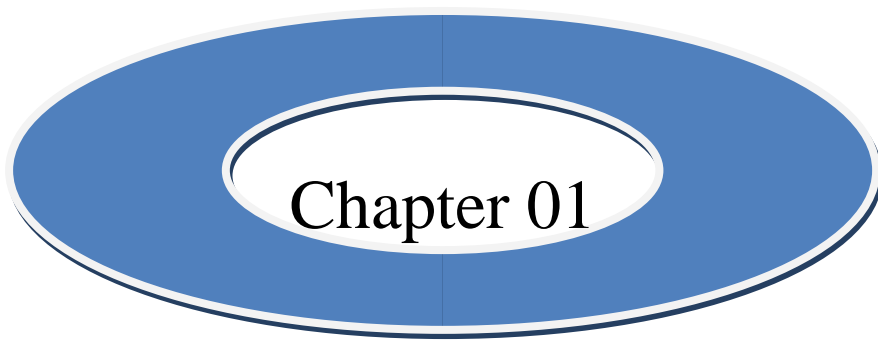
We have tried our best to emphasize on the adjustable points on which fabric G.S.M., stitch length, fabric width, & compactness directly or indirectly depend. The theoretical as well as the practical knowledge that we gathered from our classes and in the industry, help us to perform our project with credit and for this we specially convey thanks to our honorable teachers.

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*** INTRODUCTION**

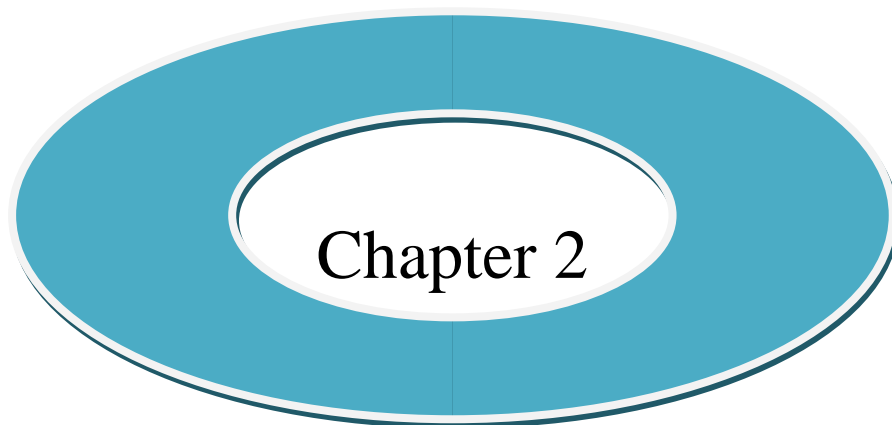
1.0 INTRODUCTION

Now a day's knit fabric is very popular in the whole world. Its manufacturing process is very easy. And its comfortable to wear. It is Incorporated has now developed a system (a program) that will allow a manufacturer or user to knit fabrics to fully understand and control the selection of yarn and knitting machine through Machine die, M/C Gauge, Yarn Count, Stitch Length, GSM processing.

A manufacturer or user of cotton knit fabrics accumulates large amount of data as related to dimensions of the fabrics (such as weight, width and shrinkage). This project will show that knit fabric performance and it's production procedure. Fabric is a manufactured assembly of fibers and yarns that has substantial surface area in relation to its thickness and sufficient cohesion to give the assembly useful mechanical strength. Fabrics are most commonly woven or knitted but the term includes assemblies produced by felting, lace making, net making, non woven processes and tufting. Our project basically is on knitted fabric specification and machines which are related to knitted fabric production.

Our project work is special type of Knit fabric other related machine specification. There are problem in our industries to produce knitted fabrics of required G.S.M. Other specification like fabric width, fabric thickness is generally maintained in industries by previous data sheet. For this reason there are problem if any order comes which didn't produced in previous.

Our intention is to find out the easy process to get decision about yarn count selection, loop length selection, machine Diameter selection & machine gauge selection.



*** LITERATURE REVIEW**

2.1 Fabric:

Textile fabrics can be produced directly from webs of fibres by bonding, fusing or interlocking to make non-woven fabrics and felts, but their physical properties tend to restrict their potential end-usage. The mechanical manipulation of yarn into fabric is the most versatile method of manufacturing textile fabrics for a wide range of end-uses

There are three principal methods of mechanically manipulating yarn into textile fabrics: interweaving, intertwining and interlooping. All three methods have evolved from handmanipulated techniques through their application on primitive frames into sophisticated manufacturing operations on automated machinery.

1. **Interweaving or Weaving** is the intersection of two sets of straight threads, warp and weft, which cross and interweave at right angles to each other. Weaving is by far the oldest and most common method of producing continuous lengths of straight-edged fabric.
2. **Intertwining and twisting** includes a number of techniques, such as braiding and knotting, where threads are caused to intertwine with each other at right angles or some other angle. These techniques tend to produce special constructions whose uses are limited to very specific purposes.
3. **Inter-looping or Knitting** consists of forming yarn(s) into loops, each of which is typically only released after a succeeding loop has been formed and inter-meshed with it so that a secure ground loop structure is achieved. The loops are also held together by the yarn passing from one to the next. (In the implied illustration this effect is not illustrated.)

Fabrics are produced mostly from yarns. Few fabrics are directly produced from fibers. Fabrics are made from yarns and are constructed mostly either by weaving or knitting. Weaving Major portion of the fabrics are produced by weaving. Among the other fabric constructions, lace making is worth mentioning. Felts are fabrics made directly from fibers without making yarns.

A wide variety of woven fabrics are available in today's market. An average consumer is unaware of many fabrics and their suitability for a specific end use.

Clothing refers to the various articles used to cover the body. Apparel may be divided into two classes. First one the desire for warmth and for protection against elements, Secondly the desire for satisfaction we receive from wearing clothing that makes us appear to advantage.

Baby's cloths need not be full of frills or elaborate, since the baby's comfort should be the main criterion. Their clothes are meant to protect them from colds and chills, while allowing enough freedom of movement for the limbs. Clothes should not be tight as they will hamper the circulation and breathing.

The appearance of a garment is greatly influenced by the fabric used for construction, not all fabrics are suitable for all garments. To choose a suitable fabric for a specific end use calls for basic knowledge in fabric construction and types of fabrics available in the market.

2.2 Knitting:

Knitting is the second most frequently used method of fabric construction. The term “Knitting” describes the technique of constructing textile structures by forming a continuous length of yarn into columns of vertically intermeshed loops. Knitted fabrics have been gaining popularity during the past two decades, thanks to the increased versatility of techniques and adaptability of the many new manmade fibres. Knitted fabrics are now widely used in the applications where woven fabrics formerly predominated. Today, the usage of knitted fabrics ranges from hosiery, underwear, sweaters, slacks, to rugs and other home furnishings.



Fig: Knitting Machine

From the beginning the art of knitting was an occupation for women. Traditional hand knitting, using knitting needles or pins, has been practiced for thousands of years. The earliest example of true knitting is a pair of knitting socks found in Egypt, dating back to 1100 A.D

just over 9 centuries ago! Socks and stockings were knitted because they had to be shaped to the foot or leg. By the 16th century knitting had advanced into a craft, the first real evidence of a production knitting machine was the stocking frame, invented by the Reverend William Lee in 1589. The invention laid the foundation for the development of knitting technology. Lee's invention enabled the knitting of loops at 10 times the speed of traditional hand pin knitting.

2.3 Why knits are popular?

Knitted fabrics are popular today because:

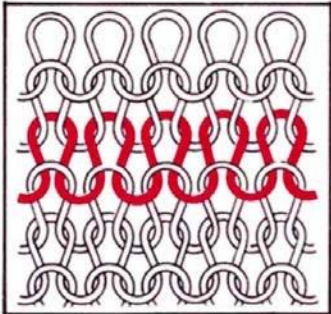
- It is usually soft and drapes well
- It molds and moves easily with body movement
- It has good stretch ability
- It resists wrinkles
- Most importantly, knits relate well to contemporary life-styles

2.4 Classification of knitted fabrics:

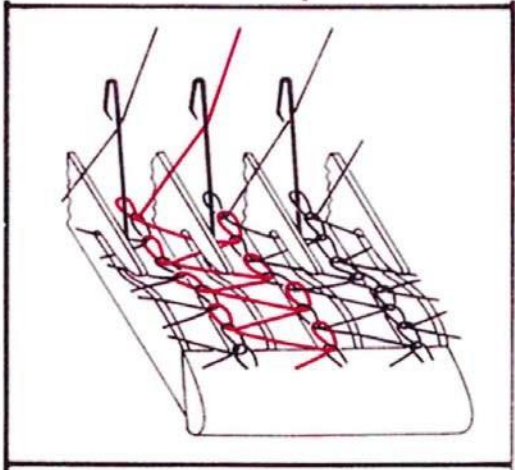
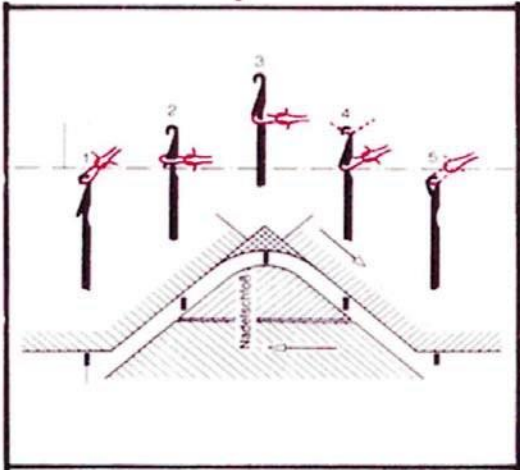
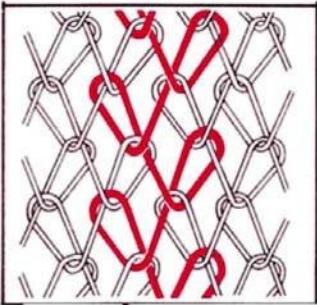
The knitting industry is divided into two distinct sectors,

- ∞ Weft Knitting
- ∞ Warp knitting

WEFT KNIT

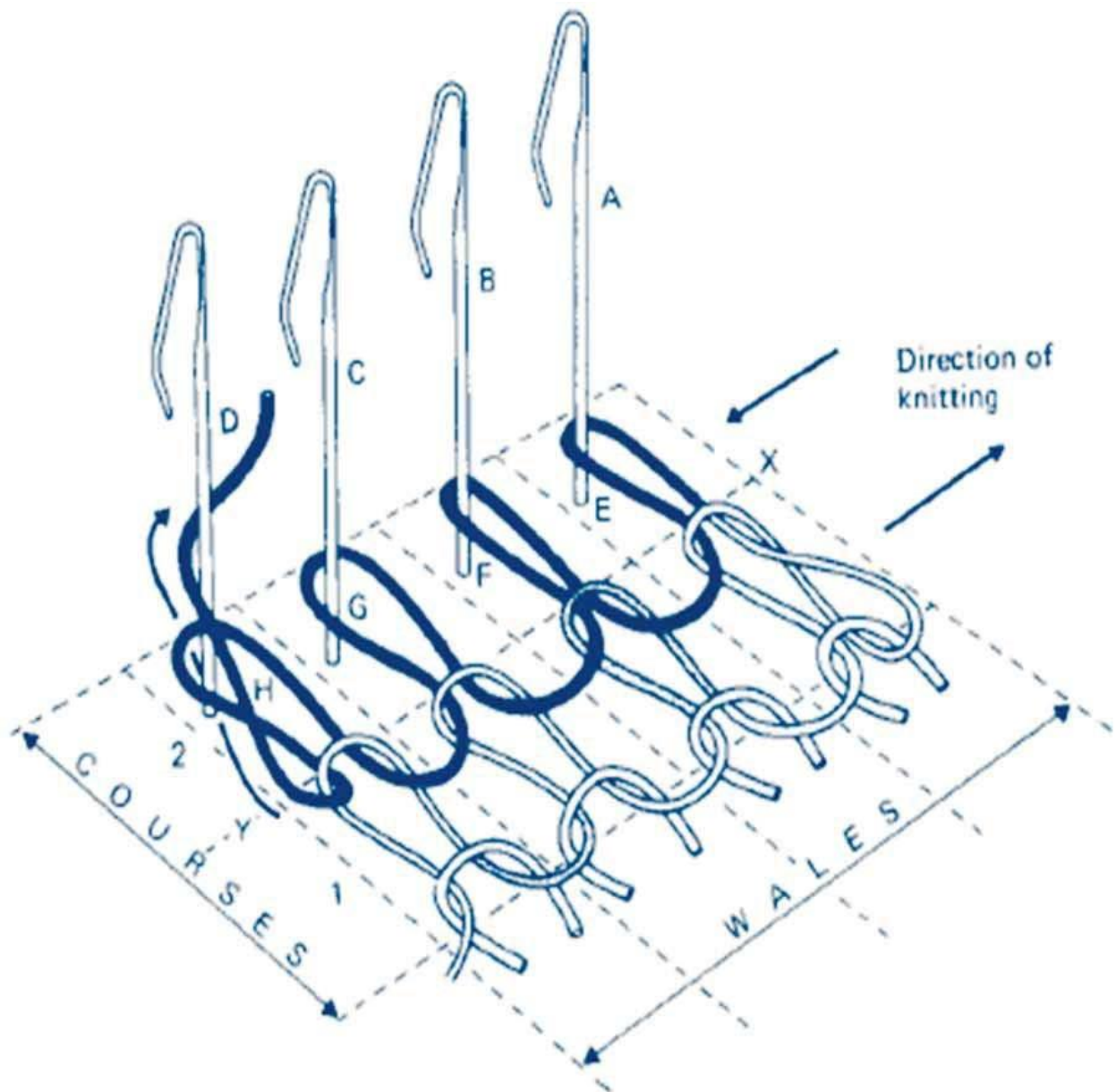


WARP KNIT



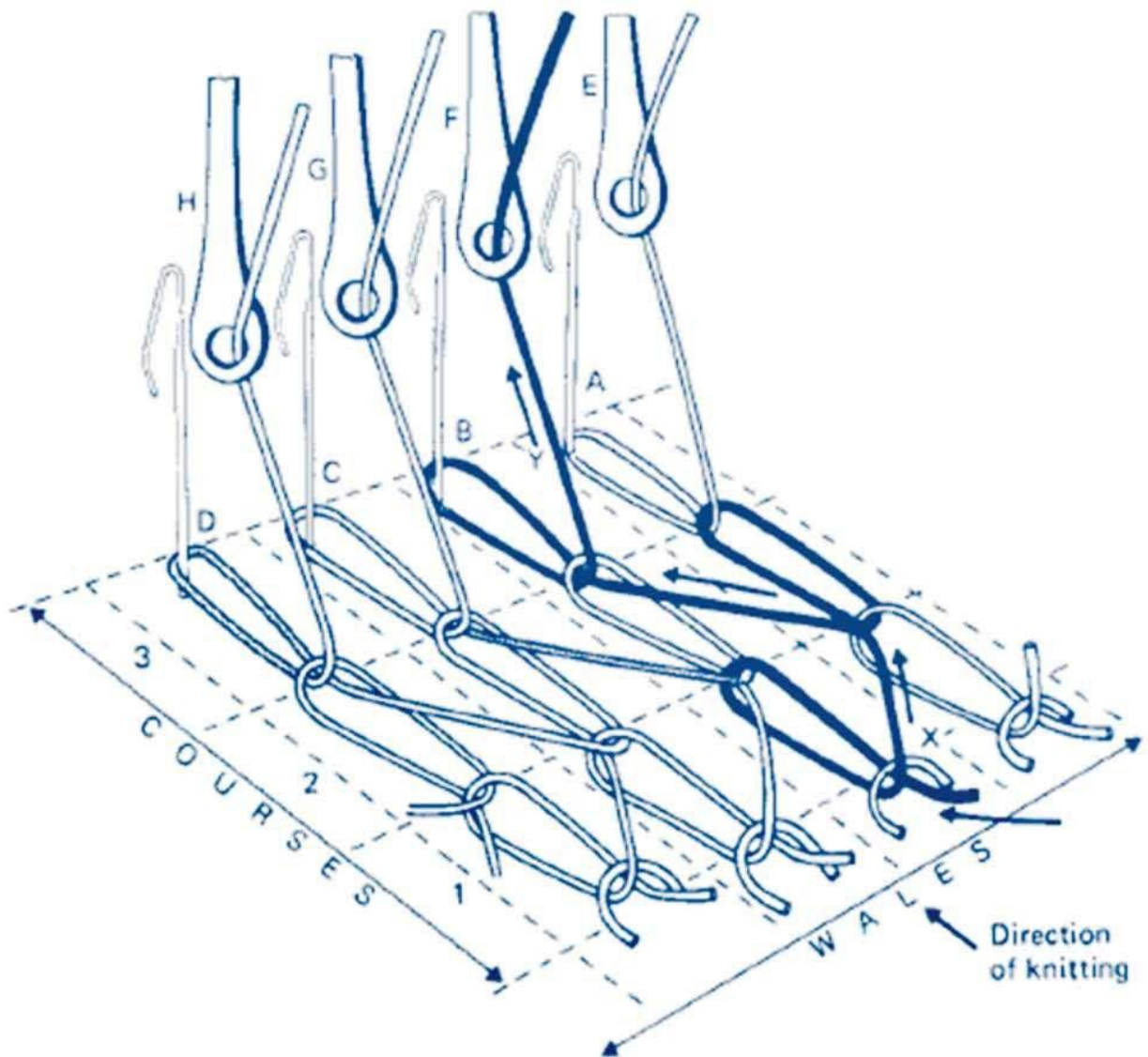
2.5 Weft knitting

In weft knitting, the loops are formed across the width of the fabric, and each weft thread is fed more or less at a right angle to the direction in which the fabric is produced. It is possible to knit with only one thread or cone of yarn, though production demands have resulted in circular weft knitting machines being manufactured with up to 192 threads



2.6 Warp knitting:

Warp Knitting is a method of producing a fabric by using needles similar to those used in weft knitting, but with the knitted loops made from each warp thread being formed down the length of the fabric; the loops are formed vertically down the length of the fabric from one thread as opposed to across the width of the fabric, as in case of weft knitting.



2.7 Type of knit Fabric:

- single jersey
- Single lacoste
- Double lacoste

- Polo pique
- Plain interlock
- 1×1 Rib • 2×1 Rib
- 2×2 Rib
- Flat back rib
- Two Thread Fleece
- Three Thread fleece
- Polar Fleece

2.8 About Fleece Fabric:

Fleece is one of the oldest knitted fabric designs which still command huge popularity in today's modern fashion world. It has the unique characteristics of being warm, cozy, easy to care, easy to sew, washable and hang to dry. Moreover many types of fleece fabric can be easily produced at very low cost with the circular knitting machine. The wide applications include outer garments, vests, warm garments, lining/insulation, mittens, socks, hats, scarfs, blankets, quilts and pyjamas etc. Due to its popularity the fabric developments have been extensive worldwide. Main variations involved the combinations of machine gauge (measured in needle-per-inch or N.P.I) yarn materials e.g. cotton, polyester, and cotton/polyester blend of various composition) and types (ring spun yarn, rotor yarn, texturised polyester, spun polyester, polyester microfibers etc. While the various structure enable garment designs to enjoy the wonderful characteristics without being too restricted by the fabric weight density



Fig: Fleece Fabric

The surface effects of fleecy, plush or pile are developed during the finishing process. In fleecy fabrics, the fleece yarn fibers become entangled and indistinguishable from the base yarn on the effect side despite having been separately supplied during knitting. In pile and plush structures, the pile and plush is clearly distinguishable to the base. Pile is considered to understand out at right-angles to the base, whereas plush lies at less of an angle from the base surface. High quality three-thread invisible fleecy and sinker loop terry (plush plating) is still produced by the loop wheel frame and sinker wheel machine respectively, despite intense competition from more productive machines. Both machines can also produce other structures.

2.9 History of Fleece Fabric:

Throughout the ages mankind tried all manner of clothing to keep warm, we went from animal skins such as bears, raccoon, squirrel etc to refined natural fibers but each thread their own problems. Skins come from animal Animals are no that hard to catch. All natural fibers had one thing in common; they did not really keep you warm when they got wet. There also were heavy and several layers were required to provide significant.

In old days, say before 1980 anyone out of doors during extremely cold weather had no choice but to just bundle up and go for it. Layers upon layers of heavy course fabric which restricted movement and performed miserably when damp from internal and external sources.

Then in 1981 a company called Malden Mills invented Polartec fleece and favored changed the way the world dresses for cold weather.

2.10 Characteristics of fleece Fabric:

- ⌚ It is warm, cozy and comfortable ⌚ Easy to care, easy to warm, washable.
- ⌚ It has the amazing ability to insulate the weather, while wicking moisture away from the body.
- ⌚ Many types of fleece fabric can be easily produced at very low cost with the circular knitting machine.
- ⌚ It can be used both practical and high fashion purpose.
- ⌚ It has environmentally friendly.

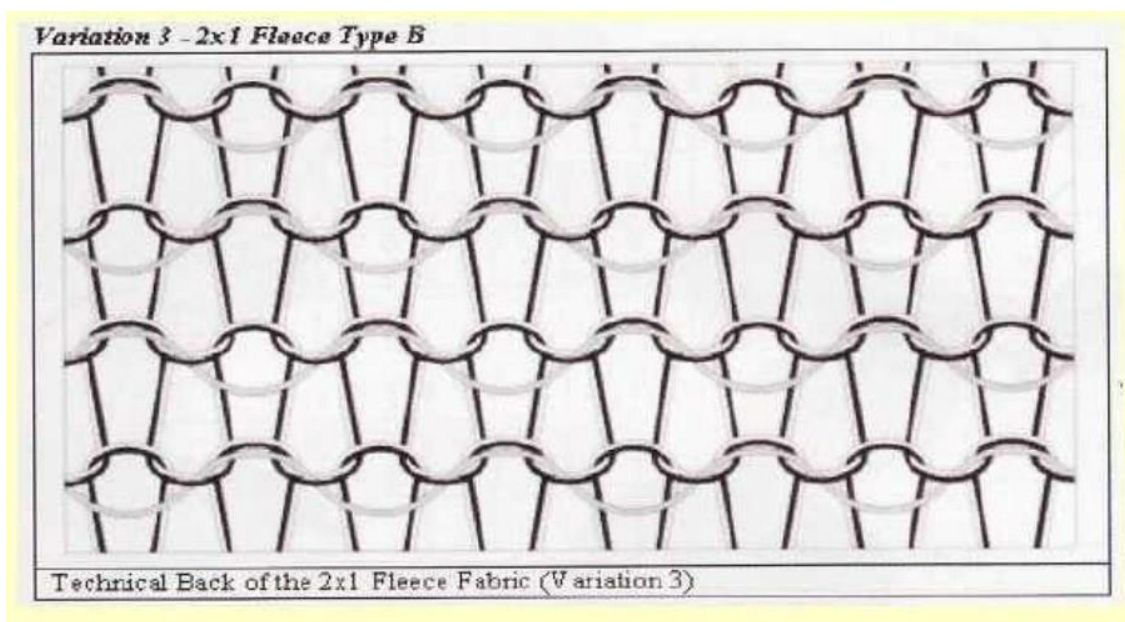
☉ Machine dryable on low heat, no ironing.

2.11 Types of Fleece Fabric:

1. One thread Fleece
2. Two thread Fleece
3. Three Thread Fleece
4. Polar Fleece
5. Micro Fleece

2.12 One Thread Fleece:

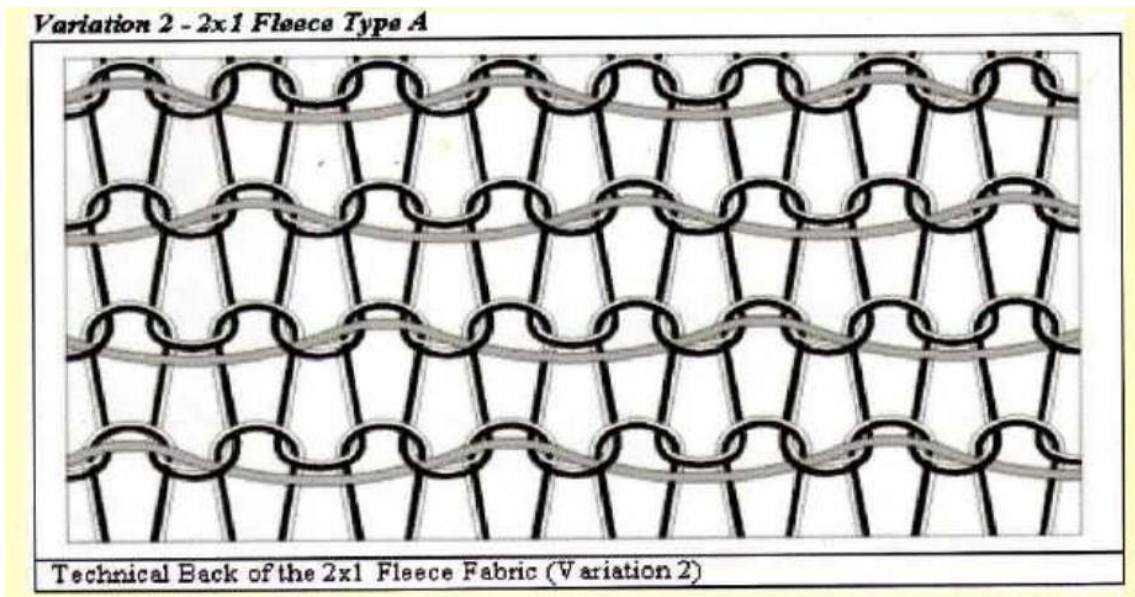
This type of fleece construction is the yarn system, single or pilled yarns are knitting according to a predetermined. Since the yarn as well as the resulting additional napping and the finishing costs make this type of fleece more expensive.



2.13 Two Thread Fleece:

Another type of fleece fabric is the two yarn system. One yarn which provides the ground or body is knitted either in single or double jersey construction. The second yarn which may be coarser or heavier to accommodate subsequent napping. Another type of yarn which is the fine yarn from the ground fabric. This is the most productive method of making fleece knit. Two Thread fleece called as simple fleece.

Sample



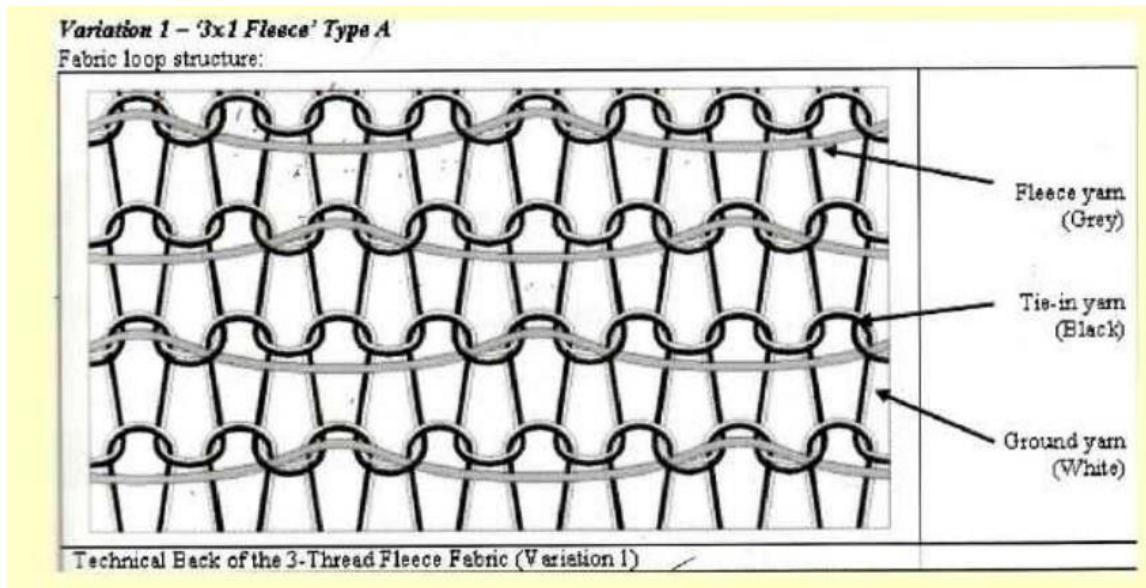
2.14 Three Thread Fleece:

By far, the most common type of three thread fleece is knitted on a gauge 18 with two cotton yarns NeB 30 s/1 as ground (knit-in) and tie-in loops and another of NeB s/1 as fleecy (or lay-in) loops to achieve fabric weight range of 220-260 g/m². Heavier fabrics are knitted with gauge 20.

2.15 Fleece Fabric Structures:

In circular knitting, the fleece is also known technically three thread fleece. It uses three types of knitted loops to form strong ability and very low skewers. The fabric variations are achieved on the same circular knitting machine through the changes in the arrangement of the knitting cams and the arrangement of the needles.

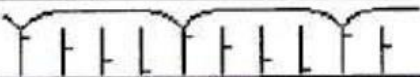

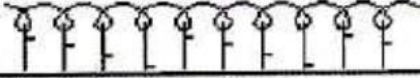

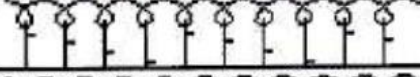

Sample



2.16 Fabric Structure of Three Thread Fleece:

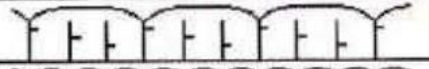


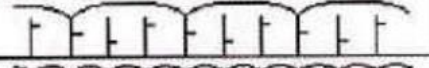
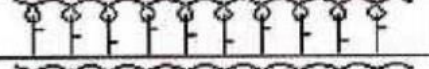
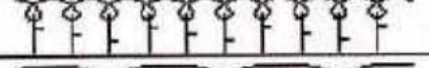


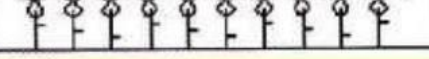
The double yarns, i.e. tie-in yarn and ground yarn, formed a plain jersey structure, while the fleece yarn is held by the tie-in yarn. Floating stitches of the fleece yarn over a span of three Wales from the fleecy loop. This illustration shows the most common three thread fleece structure. Other variations are created by varying the width of the fleecy loop, or varying the location where the tie-in yarn holds the fleecy yarn between two adjacent courses.

Technical yarn path diagram:

Feeder Number	Yarn Path Notation	Yarn Type
1		Fleecy Yarn
2		Tie-in Yarn
3		Ground Yarn
4		Fleecy Yarn
5		Tie-in Yarn
6		Ground Yarn

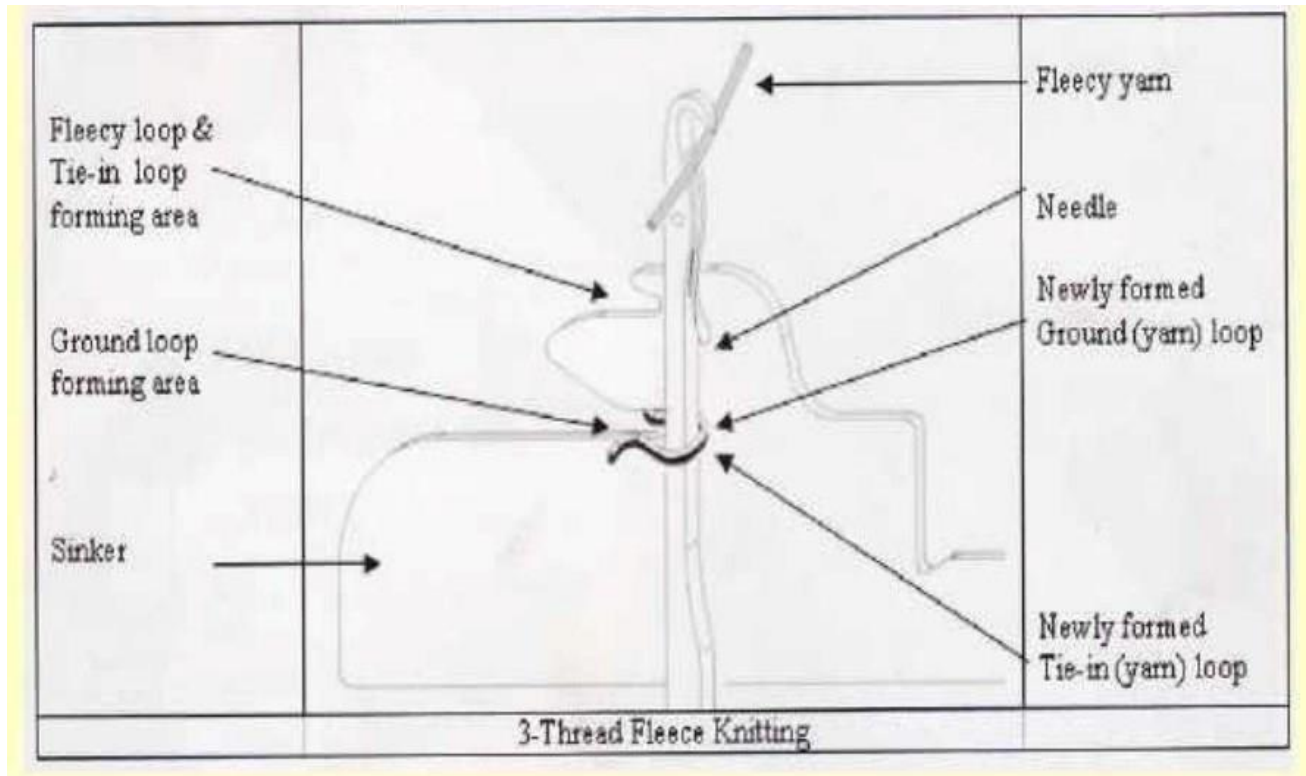
2.17.1 Type-1 Forming Fleecy Loops with Needle:

This method has the advantage of machine design simplicity and easy machines set up. It has been widely preferred by the techniques in key fabrics producing centre's such as Tripura of Tamilnadu. The base length of fleecy loops is determined by the positions of the sinker cams fixed onto the holder during the initial machine setting. However, this length can further increased or reduced by adjusting the amount of fleecy yarn being taken it by the needle.

Feeder Number	Yarn Path Notation	Yarn Type
1		Fleecy Yarn
2		Tie-in Yarn
3		Ground Yarn
4		Fleecy Yarn
5		Tie-in Yarn
6		Ground Yarn
7		Fleecy Yarn
8		Tie-in Yarn
9		Ground Yarn

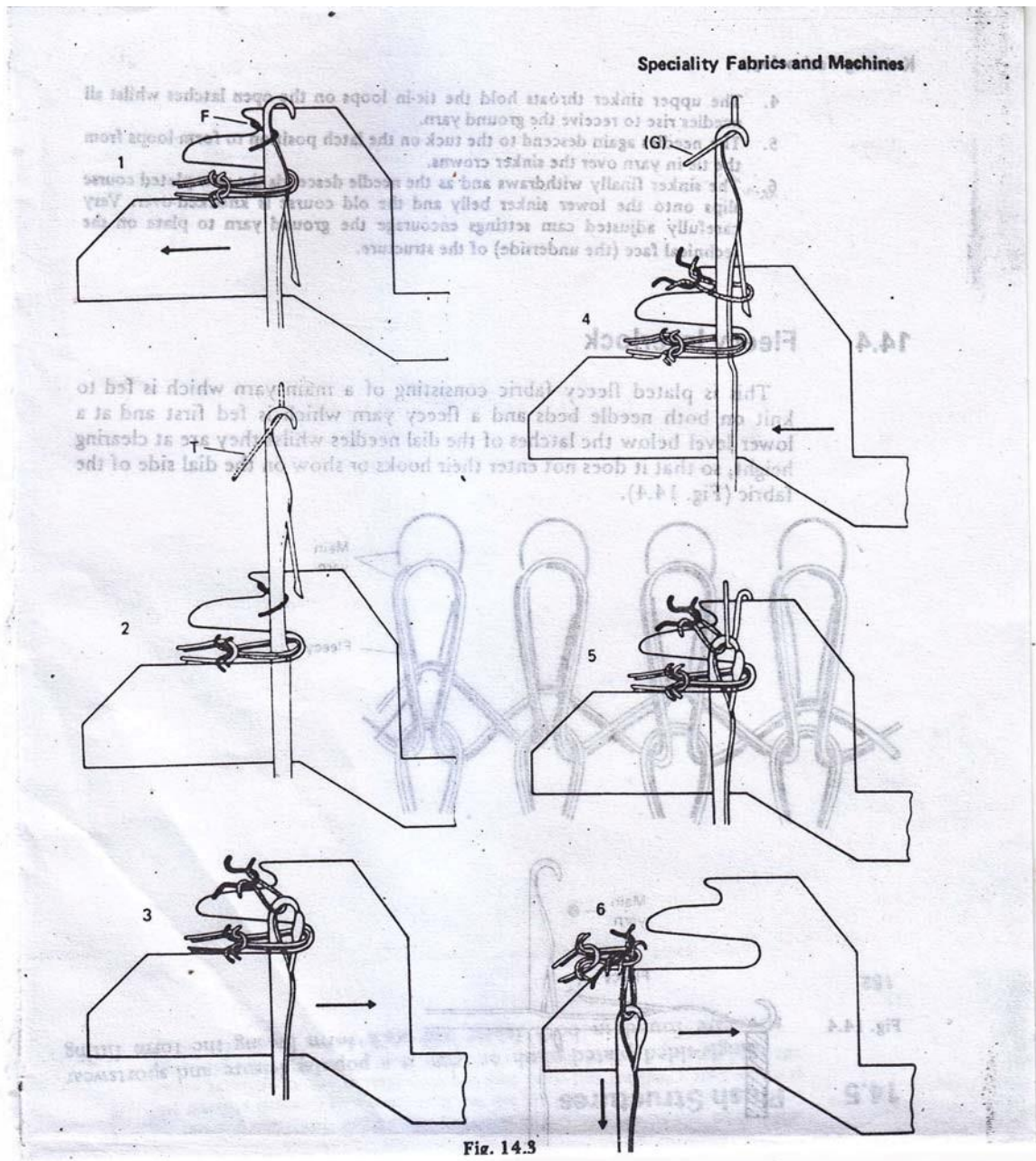
2.17.2 Forming Fleecy Loops with Sinker:

This is the more traditional method used in circular knitting. On the sinker control there are two independent sinker cams which control the positions of sinker. Therefore the length of fleecy loops is determined by distance between the sinker 'throat' and needle shank, after the fleecy yarn is taken in by the needle. The needles play a secondary role in determining the length of the fleecy loops by varying the amount of fleecy yarn taken in. Thus method produces fabric with very uniform fleecy loops and allows user more freedom in controlling the fleecy loop length while changing the fabric weight density. The fabric are therefore very suitable for fleecy fabrics which are finished without brushing process on the fleecy loops. While the other adjusting sinker cam is used to set the tightness of tie-in yarn the fleecy yarn.



2.19 The production of Fleecy on sinker Top Machines:

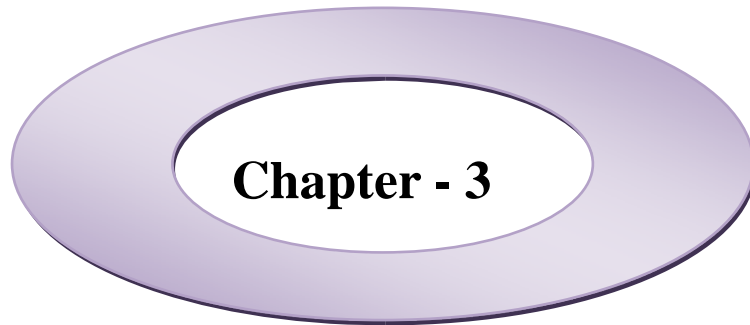
Three threads fleecy is increasingly being produced on top latch needle machines in the manner first patented by Lestor Mishcon in the U.S.A in 1937. Originally, pattern wheel selection was used for fleece yarn tucking. The preferred method today is to use a top needle butt and am-track for knitting the ground (face) and tie-in (binding) yarns and four tracks and corresponding butt positions (which can be rearranged) for the fleecy tucking sequence.



2.20 The Process sequences are described below:

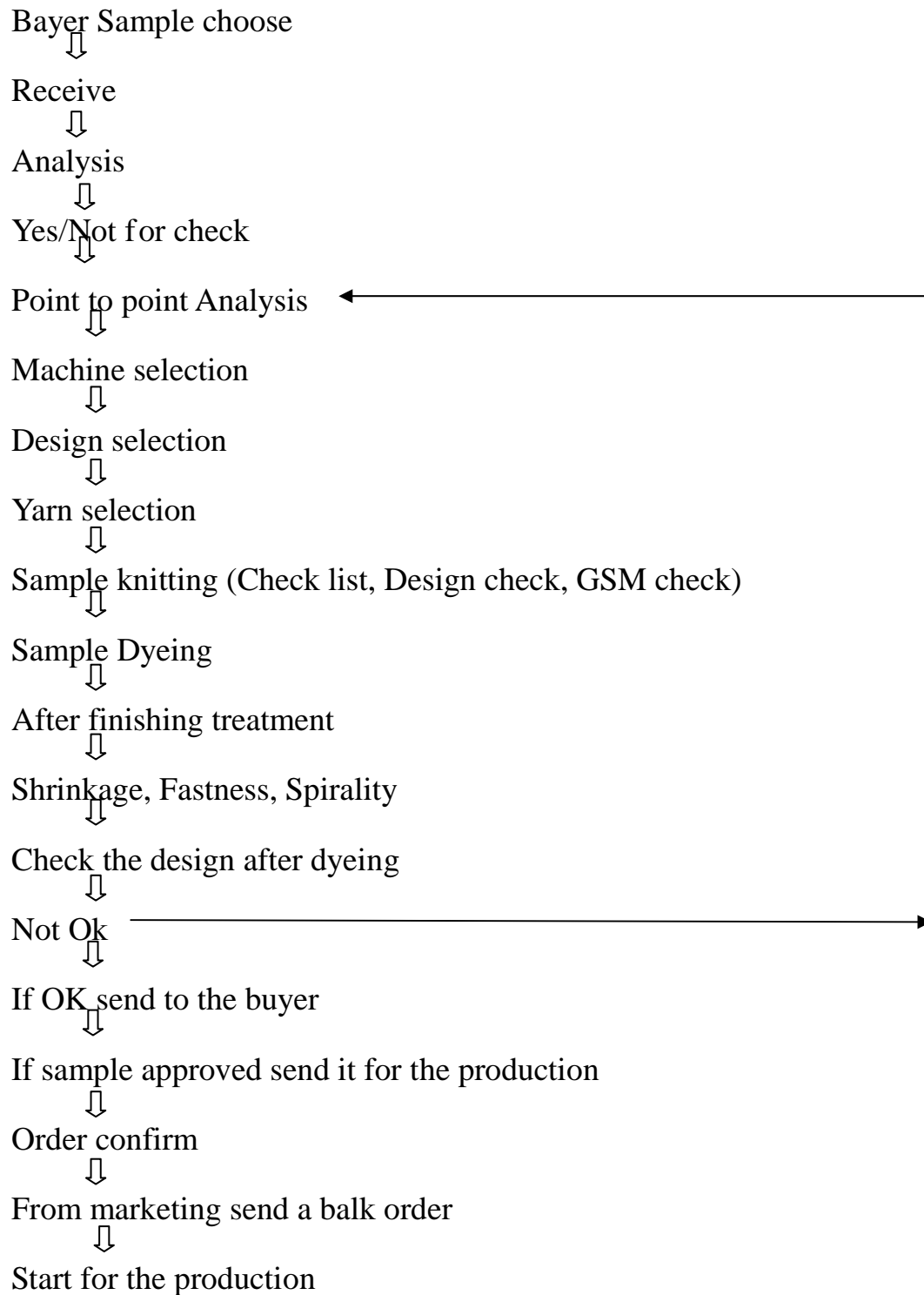
1. Selected needles are raised to tuck height to receive the fleecy (usually one out of four). The sinker then moves forward for its top throat to control the fleecy tuck whilst the lower throat controls the previous course.
2. All needles are raised to clear the previous course and receive the tie-in yarn.

3. The needles descend to normal tuck on the lath position so that the previous course remains on the outside of the closed latch but the fleecy tuck which is higher slips off the needle head and the tie-in yarn is drawn through it on the upper sinker belly as the withdraws.
4. The upper sinker throats hold the tie-in loops on the open latches whilst all needles rise to receive the ground yarn.
5. The needles again descend to the tuck on the latch position to form loops from the tiein yarn over the sinker crowns.
6. The sinker finally withdraws and as the needle descends the new plated course is knocked-over, very carefully adjusted cam settings encourage the ground yarn to plate on the technical face (the underside) of the structure.



*** EXPERIMENTAL PROCEDURE**

1.1 Study of Flow Chart of Knit fabric development:



1.2 Details of *Flow Chart*:

1. Buyer sample choice:-

This is the first step for development a knit product. Buyer gives a sample or knitting production to manager or merchandiser chooses the sample with his experience.

2. Receive sample:-

Knitting production manager receive the sample from merchandiser. Before receiving the sample the manager visualize the sample by his experience. For this process highly experienced person is need the manager should be highly experienced about 3 to 5 year.

3. Analysis: Manufacturer point out the knit design. And discus with knit manager the possibility to develop the design.

4. Yes/Not for check:-

After visualizing the sample the manager say yes or not for check. This is totally depends on knitting manager. if he thought this design can be made by this machine he say yes or he thought can not be produce he say not to merchandiser.

5. Point to point Analysis: In this analysis knit manager decide which machine is suitable for this design.

6. Machine Selection:

1. Machine gauge.
2. Machine Diameter.
3. Needle gauge.

They are described below:

1. MACHINE GAUGE:

No. of needles per inch present in a needle bed of a knitting machine is called machine gauge for that knitting machine.

A term giving a notational indication of the no. of needles per unit length along a needle bed or needle bar of a knitting machine in current practice, a common unit length of one English inch (25.4mm) is used for all types of warp and weft knitting machine.

Selection of machine gauge depends upon yarn diameter. Yarn diameter depends Upon the following:

- a. Yarn count
- b. Fibre type
- c. Yarn twist
- d. Yarn finished

General practice of yarn count and machine gauge in different industries in Bangladesh given below:

3.3 Fleece knitting Machine:



Fleece Knit: Technically, fleece fabrics are not truly a pile construction. Fleece fabrics are knitted so that, when finished, they will have a short to medium nap that has a soft, pleasant hand, will provide warmth and body, as well as moisture wicking and absorption, if desired. The kinds of fibers used are dependent upon the use objective. They are used for such purposes as liners, active sports, outerwear, and plush toys.

Fleece knits can be made on circular knit machines in any one of three different types of construction. The machines may be complex, utilizing either spring or latch needles employing sinker-top, dial, cylinder, or dial/cylinder mechanisms. With this equipment, various effects can be produced.

One type of fleece knit construction is the three-yarn system, where three yarns are fed sequentially from separate yarn positions around the cylinder of the machine. The first yarn is the backing or fleece yarn. The second and third yarns are the tie-in and ground yarns which are fed successively in plating relationship and kind so that the fleece yarn is caught at predetermined intervals between them. The results in the fleece yarn being floated on the technical back of the fabric and held in place by the Wales of plaited tie-in ground yarns. The fleece yarn, which may be coarse spun and low twist, can thus subsequently be readily napped and given other surface finishes.

M/c Name: Juinn-Long 09

M/c Ø GG: 30" × 20 GG

Fabric : Fleece
: 210/215

S. length : S/3.50 + B/4.80 + Loop/1.4 G.G.S.M

F.G.S.M : 280

Yarn : 30^s/1 G mill + 24KH + 10 CVC

CAM SETTING

T	Δ	Δ	—	Δ	Δ	—	Δ	Δ	—	Δ	Δ
—	Δ	Δ	—	Δ	Δ	T	Δ	Δ	—	Δ	Δ
—	Δ	Δ	T	Δ	Δ	—	Δ	Δ	—	Δ	Δ
—	Δ	Δ	—	Δ	Δ	—	Δ	Δ	T	Δ	Δ

NEEDL ARRANGEMENT

1			
	2		
		3	
			4

N.B:

— = Miss cam

1= One butt needle

Δ = Knit cam

2= Two butt needle

3= Three butt needle

4= Four butt needle

Sample

3.4 Fleece Machine Speed List:

TYPE	GAUGE	MAX R.P.M	MAX R.P.M	Standard R.P.M
30'' 90F	18~22G	10s/C+20s/C+30s/C	28.0	24.0
7'' 21F	18~22G	10s/C+20s/C+30s/C	120.0	102.8
8'' 24F	18~22G	10s/C+20s/C+30s/C	105.0	90.0
9'' 27F	18~22G	10s/C+20s/C+30s/C	93.3	80.0
10'' 30F	18~22G	10s/C+20s/C+30s/C	84.4	72.0
11'' 33F	18~22G	10s/C+20s/C+30s/C	76.3	65.4
12'' 36F	18~22G	10s/C+20s/C+30s/C	70.0	60.0
13'' 39F	18~22G	10s/C+20s/C+30s/C	64.6	55.3
14'' 42F	18~22G	10s/C+20s/C+30s/C	60.0	51.4
15'' 45F	18~22G	10s/C+20s/C+30s/C	56.0	48.0
16'' 48F	18~22G	10s/C+20s/C+30s/C	52.5	45.0
17'' 51F	18~22G	10s/C+20s/C+30s/C	49.4	42.3
18'' 54F	18~22G	10s/C+20s/C+30s/C	46.6	40.0
20'' 60F	18~22G	10s/C+20s/C+30s/C	42.0	36.0
22'' 66F	18~22G	10s/C+20s/C+30s/C	38.1	32.7
24'' 72F	18~22G	10s/C+20s/C+30s/C	35.0	30.0
16'' 78F	18~22G	10s/C+20s/C+30s/C	32.3	27.6
28'' 84F	18~22G	10s/C+20s/C+30s/C	30.0	25.7
30'' 90F	18~22G	10s/C+20s/C+30s/C	28.0	24.0
32'' 96F	18~22G	10s/C+20s/C+30s/C	26.2	22.5
34'' 102F	18~22G	10s/C+20s/C+30s/C	24.7	21.1
36'' 108F	18~22G	10s/C+20s/C+30s/C	23.3	20.0
38'' 114F	18~22G	10s/C+20s/C+30s/C	22.1	18.9
40'' 120F	18~22G	10s/C+20s/C+30s/C	21.0	18.0

3.5 Some Fleece Machine Survey Report:

M/C no	MC DIA/ Gauge	F.GSM	F.DIA	Fabric type	Yarn type	Stitch length
01	32" * 20G	250	730	Fleece	30's SLUB 30's KH 20's KH	K= 4.60 T= 3.70 L= 1.55
02	34" * 20G	290-300	700	Fleece	30's CVC 20'D 10's CVC	K= 4.80 T= 3.50 L= 1.55
03	36" * 20G	290-300	740	Fleece	30's CVC 20 D 10's CVC	K= 4.80 T= 3.50 L= 1.55
04	36" * 20G	280	740	Fleece	30's G 100 D Poly 12's CVC	K= 4.70 T= 3.50 L= 1.55
05	38" * 20G	280	780	Fleece	30's G 100 D Poly 12's CVC	K= 4.70 T= 3.50 L= 1.55
06	38" * 20G	290-300	780	Fleece	30's CVC 100'D Poly red 10's CVC	K= 4.75 T= 3.45 L= 1.55
07	40" * 20G	290-300	820	Fleece	30's CVC 100' Poly blue 10' CVC	K= 4.80 T=3.50 L= 1.55
08	34" * 20G	300	52	Fleece	40/2 Dyed 40's KH 10 KH	K= 5.00 T= 5.00 L= 2.00
09	34" * 20G	290-300	70	Fleece	30's CVC 100'D Poly blue 10's CVC	K= 4.80 T= 3.50 L= 1.55
10	30" * 20G	250	70	Polar / 2thread	34's KH 34's Eco-mell	K= 3.14 L= 6.80

11	30" * 20G	240	650	Fleece	34's CVC 20's CVC	K= 4.40 T= 3.60 L= 1.50
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3.6 Cam Arrangement of Fleece fabric in Circular Knitting Machine:

3.6.1

TWO Thread fleece:

1	2	3	4	5	6	7	8
^	^	^	--	^	^	^	-- ^
--	^	^	^	--	^	^	
^	--	^	--	^	--	^	--

^ = B. Knit
^ = S. Knit
-- = Miss

Sample

3.6.2

THREE Thread fleece / Terry fleece:

1	2	3	4	5	6	7	8	9	10	11	12	
^	^	^	^	^	--	^	^	--	^	^	--	
^	^	--	^	^	^	^	^	--	^	^	--	^
^	--	^	^	--	^	^	^	^	^	--		
^	^	--	^	^	--	^	^	--	^	^	^	

^
= B. Knit

^ = S. Knit

-- = Miss

Sample

3.6 Advantages of using Fleece Fabric:

Fleece is the fabric of choice when it comes to producing quality products. Most of sports wear production will rely heavily on the fabric. The fabric is for all the yarn collection of the products. The fabric comes with a very many advantages. It combined with great technologies to produce items that are simply superior.

The following are some of the advantages that fleece come with.

- ⌚ It brings very good insulation it is able to maintain warmth ever under very harsh condition. You can enjoy warmth and great comfort even with temperature below 30 degree Celsius.
- ⌚ Fleece fabric is very durable; you can have it for a very long time serving you in the same great way.
- ⌚ The fabric is very versatile; you will be to wear it for a variety of activities and occasions.
- ⌚ The fabric will be use to make products that have a wind resistance property. The feature is incorporated in the design of the item.
- ⌚ Despite all the superior qualities, it will leave you skin comfortable, providing space for you to breath.
- ⌚ It eliminates sweat immediately.
- ⌚ Water repellent fabric can be produce by mixing this with other materials.
- ⌚ It provides greater degree of strength.

3.7 Disadvantages of using Fleece Fabric:

Some of the disadvantages of using fleece fabric are.

- ⌚ If not treated with a flame retardant, fleece is quite flammable, in contrast to wool, which is quite nonflammable for a textile.
- ⌚ Regular fleece is not windproof, and does not absorb moisture (although this is not often seen as a benefit per above)
- ⌚ Fleece also tends to generate a huge amount of static electricity, which causes the accumulation of lint, dust and pet hair.

- ⌚ It is also susceptible to damage from high temperature washing, tumble drying or ironing lower quality fleece material is also prone to pilling.

3.8 Determining the quality of fleece fabric:

There is a variety of fleece qualities in today's market. It is up to the discriminating sewer to determine. Whether a particular fleece is of suitable quality for the intended project just as with any other fabric, quality is determinate by many factors.

Density: The denser the fleece betters the quality.

Recovery: High quality fleece has quick recovery

Rough it up: High quality fleece go through multiple shearing and flouing processes to reduce pilling.

Sewing Techniques of Fleece Fabric:

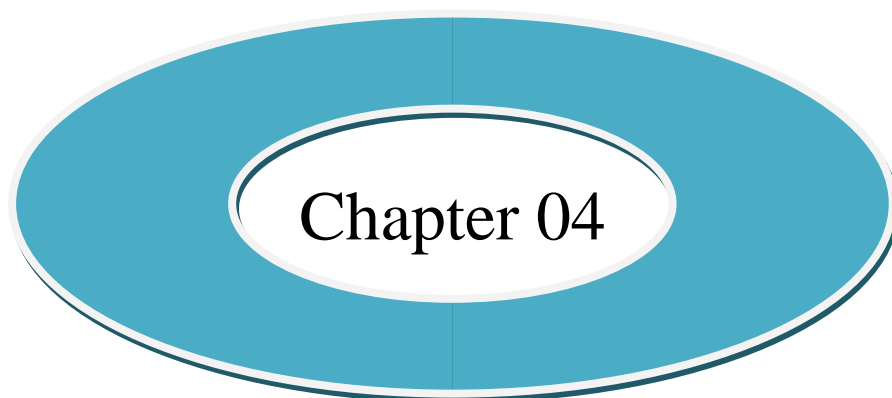
Fleece fabric is strong, hard to puncture or tear and does not pill. It also does not travel, so there is no seam allowance or hem allowance.

PINNING: Short pins get lost in the fleece so use long ones. The type with bead heads are easiest to see.

STITCHING: Use a narrow zigzag stitch. Experiment on scraps of the fleece, adjusting the stitch width and length until you like the way the seam looks. Stitch slowly and carefully, Because stitches are hard to remove, this will actually save time. When sewing around curved areas, stitch slowly and be careful not to stretch the fleece as you guide it through the machine.

PRESSING: Avoid pressing with a iron after finger pressing will do just as good a job. If the seam allowances still curfts, topstitching can eliminate the problem and add a decorative touch. If pressing is absolutely necessary, use a press cloth between the fabric and your iron.

HEMMING: For any hem, topstitching $\frac{1}{4}$ (6mm) from the cut edge of the hem allowance, throughout all of the layers.



DISCASSION OF RESULTS

Fleece knitting is a very special type of knitting that requires special arrangement to produce the fabric. There are several types of fleece knit fabrics. 3- Thread fleece is one of the most widely manufactured knit fabrics. It is used as winter clothes. Appropriate choice of face and back yarn is also very important for getting actual benefits from fleece fabrics. The face yarn is mainly used for outer surface or face side of the fabric while the fleece yarn is used to give required properties from the fabric. A low twisted and relatively coarser yarn is used as fleece yarn. The way the fabric is produced that the fleece yarn is allowed float and then tucked at certain interval and after production of the fabric the back side is passed over a roller covered with emery or sand paper. As a result the small fibres come out of the fleece yarn. This gives fleece fabric a wonderful warming capacity. The third yarn generally known as binder yarn is used to bind the fleece yarn with the face yarn.

4.1 Care of Fleece Fabric:

WASHING:

Wash the garment inside out, this will help reduce any pills or bobbles that may form, as loose fibers their way to the surface of the fabric.

- * If pilling does occur, remove by hand or device that is designed for that purpose.
- * Always wash the garment separately or with others of similar color.
- * Always use a cool wash (40 degree Celsius) only using mild detergent. Not too dirty, wash at 30 degree.
- * Some fabric conditions may harm the garment and increase the possibility of pilling.

DRYING:

- * Do not tumble dry, the fabric can be damaged and the neck, weft and cufts can lose due to the cotton shrinkage and damage the acrylic.
- * Always dry flat and out of direct sunlight.

IRONING:

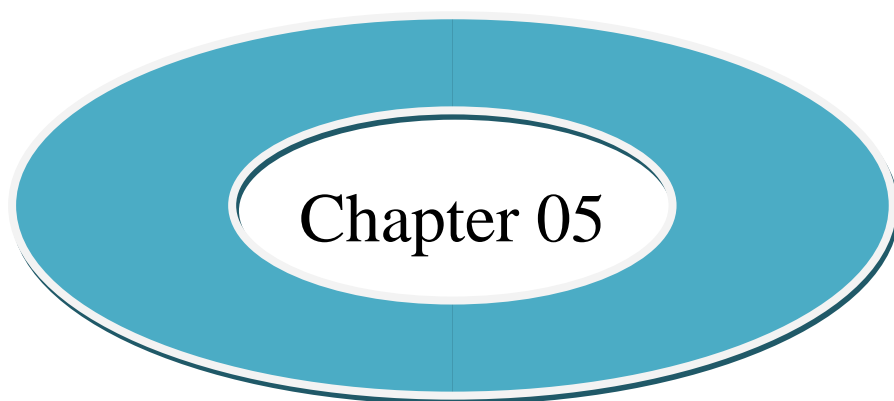
- * Never iron on the face side of fabric of the garment, as it will change the appearance of the garment to make it shiny.

* Always iron the inside of the garment.

* Never iron the cuffs/ welts/ necks as it can cause them to become brittle and lose their elasticity.

STORAGE:

* Never store in direct sunlight.



CONCLUSION

This paper will present and discuss about the Fleece knit fabric. We believe that our work will help the knitters to identify & develop the Fleece knit Fabric. So Knitters can take necessary remedial steps to improve Fleece Knit Fabric

This will help to improve the quality of the fabrics as well as reduce raw material.

Our target is to find out the easy process to get decision about yarn count selection, loop length selection, machine Diameter selection & machine gauge selection for Fleece Fabric. We strongly think that by this process we can get decision about yarn count, loop length, machine gauge, and machine diameter for the Fleece Knit fabric.

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