Faculty of Engineering
Department of Textile Engineering

Project (Thesis) on

EFFECTS OF DRYING ON KNIT FABRIC PROPERTIES

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A thesis submitted in partial fulfillment of the requirements for the degree of

Bachelor of Science in Textile Engineering

Advance in Wet Processing Technology

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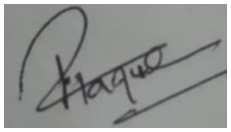
DECLARATION

We hereby declare that, this project has been done by us under the supervision of **Tanvir Ahmed Chowdhury** Assistant Professor, Department of Textile Engineering, Faculty of Engineering, Daffodil International University. We also declare that, neither this project nor any part of this project has been submitted elsewhere for award of any degree or diploma.



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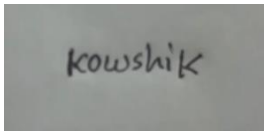

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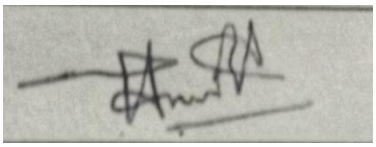
LETTER OF APPROVAL

This project report prepared by Md. Redwanul Haque Apon (ID: 151-23-4138), Kowshik Das (ID: 152-23-4234) is approved in Partial Fulfillment of the Requirement for the Degree of BACHELOR OF SCIENCE IN TEXTILE ENGINEERING. The said students have completed their project work under my supervision. During the research period I found them sincere, hardworking and enthusiastic.



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ACKNOWLEDGEMENT

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DEDICATION

This internship report is dedicated to our beloved parentsandhonorable teachers.

Abstract

This study pretend to assess the effects of drying on knit fabric properties. Mainly Dryer machine works to eliminate the extra water remains on fabric after de-watering. By using dryer machine many properties of fabric like: GSM, Dia, WPI, CPI, Stitch length, Yarn count can also be controlled. We observed many fabrics treated on open dryer machine from load to unload and collected samples and we also noted the parametrs (GSM, Dia, WPI, CPI, Stitch length, Yarn count) data both before and after.We thoroughly assessed the data and calculated the rate of changes of various properties of various knit fabrics. Dryer is a essential and primary machine for textile finishing sector.We collected the data from a open dryer from santex. The origin of the machine is Switzerland. The machine can be heated up to 180 degree. Minimum temperature of the machine is 80 degree. The machine can run at a maximum speed of 80 meter/min and at a minimum speed of 5 meter/min. The machine can give a maximum vibration of 900 to the fabric. In this project we observed many different compositions of single jersy fabric, Rib fabric and many other knitted fabrics. We noted and calculated the data very carefully.

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INTRODUCTION

Knitted fabric is a garment that comes from knitting. The characteristics are distinct from woven fabric in that it is more versatile and can be easier to build into smaller pieces, making it ideal for socks and hats. There are two main knit fabric varieties: weft-knit and warp-knit fabric. Warp-knit fabrics like tricot and milanese are immune to runs and are widely used in lingerie.

It's easier to make weft-knit fabrics and more popular. Unless they are patched, they can unravel when cut. Threads are always straight in weaving, flowing either lengthwise (warp threads) or crosswise (weft threads). The yarn in knitted fabrics, on the other hand, follows a meandering path (a course), creating symmetrical loops (also called bights) above and below the yarn's mea These meandering loops can be stretched easily in different directions, giving much more elasticity to knit fabrics than woven fabrics. Knitted garments can stretch up to 500 percent, depending on the yarn and knitting pattern. For this purpose, knitting is thought to have been invented of clothing that has to be elastic or stretched in response to the movements of the wearer, such as socks and hosiery. [2]

In knit fabric finishing dryer machine is a very essential machine. By using this machine the GSM, Diameter, WPI, CPI, Stitch Length, Shrinkage, Yarn Count can be controlled. These properties of a fabric are very important to make a high quality fabric.

A Universal Relax Dryer suitable for both open width and tubular fabrics. The system is fitted with a special infeed tool, a positive scroll roller, a heavy duty wetting padder followed by a second padder for chemical finishes, In order to obtain standardized GSM power, a well-designed pin frame entry with a vertical return pin-chain with a special edge guide and positively guided Scroll Rolls is also integrated.

The Relax Dryer has the ability to Dryer could overfeed up to 40%, which allows for a good tumbling effect to allow good fabric shrinkage. Relax Dryer is equipped with Teflon Glass Conveyors, Driven Beaters, Steaming Device, etc. As may be required, be either Single Pass, Two Pass or Three Pass. Computer suitable for 4 tons to 20 tons / day production. [5]

1.1 Objective of the study

The broad objective of the research is to establish a basic structure for effects of dryer machine on various knit fabric.

- ✓ To learn about the drying process.
- ✓ To learn about the importance of drying process.
- ✓ To learn about the important properties of a knit fabric.
- ✓ To observe the physical change of a knitted fabric after drying operation.
- ✓ To assess the GSM, Diameter, WPI, CPI, Stitch Length, Shrinkage, Yarn count change of a knit fabric for drying operation.

CHAPTER 2
Literature Review

Introduction of knit fabric:

Knitted fabric is a garment that comes from knitting. The characteristics are distinct from woven fabric in that it is more versatile and can be easier to build into smaller pieces, making it ideal for socks and hats. There are two main knit fabric varieties: weft-knit and warp-knit fabric. Warp-knit fabrics like tricot and milanese are immune to runs and are widely used in lingerie.

It's easier to make weft-knit fabrics and more popular. Unless they are patched, they can unravel when cut. Threads are always straight in weaving, flowing either lengthwise (warp threads) or crosswise (weft threads). The yarn in knitted fabrics, on the other hand, follows a meandering path (a course), creating symmetrical loops (also called bights) above and below the yarn's mea These meandering loops can be stretched easily in different directions, giving much more elasticity to knit fabrics than woven fabrics. Knitted garments can stretch up to 500 percent, depending on the yarn and knitting pattern. For this purpose, knitting is thought to have been invented of clothing that has to be elastic or stretched in response to the movements of the wearer, such as socks and hosiery.

For contrast, woven clothes spread mostly along one or the other of a linked pair of directions bet ween the warp and the weft, thus contracting in the other direction of the pair.
Curvature, on the other hand, is added in most woven garments only with sewn darts, flares, guss ets and gores, whose seams further decrease the elasticity of the woven fabric. A knitted fabric's topology is rather complex. In woven fabrics, where strings normally run horizontally and vertically straight, The knitted yarn takes a looped path along its side, like the red strand in the diagram on the left, where the loops of one line were all pulled through the loops of the row below. Because the pattern involves no single straight line of yarn, a knitted piece of fabric will extend in all directions. Such elasticity is all but impossible in woven fabrics that extend only along the bias. Most modern stretchy garments often achieve at least some of their stretching by knitted patterns, even as they rely on elastic synthetic materials for some stretching. Knitted fabrics are generally light in weight, relaxed in wearing even while traveling, but need little care to preserve their smooth appearance.

Another factor in growing their success is the ability of knits to avoid wrinkling. Knitted materials are used to model athletic apparel and sportswear. Their elastic existence allows physical activity to be plentiful. A series of stitches that suspend each stitch from the next is called a wale.

A procedure of casting on is used to secure the initial stitches of a knitted fabric; A process of binding / casting off is used to secure the final stitches in a wale. The effective stitches are manually fixed during knitting, either from individual hooks (in knitting machines) or from a knitting needle or frame in hand knitting. [2]

2.1. Knit Modeling:

Weft or filled knits are made of a yarn that is fed horizontally into knitting machine needles. The circular knitting machine induces a spiral effect as it generates a fabric in a tabular shape. Because of this spiral trait, it is often difficult to have a perfect 90-degree angle match between the wales and the knit fabric courses.
Two general methods are used to create knitted fabrics – warp knitting and weft knitting, and each process produces a variety of knitted fabrics. [2]

2.2. Knitted Fabric Knits

- Weft Knits
    - Single Knits
        - Single Jersey
        - Lacoste
    - Double Knits
        - Rib Knit
        - Purl Knit
        - Interlock Knit
        - Cable Fabric
        - Bird's Eye
        - Cardigans
        - Milano Ribs
        - Pointelle
- Specialized Weft Knits
    - Intarsia
    - Jacquard Jerseys
    - Knitted Terry
    - Knitted Velour
    - Sliver Knit
    - Fleece
    - French Terry
- Warp Knits
    - Tricot
    - Raschel

It is possible to use either a circular or a flat-bed knitting machine to make knits of weft.
Jersey stitch/plain knit

1. Purl stitch
2. Rib stitch

3. Interlock stitch (both for single and double knits) [3]

2.3. Knitted Fabric Types:

2.3.1. Flat or Jersey Knit Fabric

Flat or Jersey Knit fabrics on the front have visible flat vertical lines and on the back of the fabric dominant horizontal ribs. The flat or jersey knit stitch is frequently used, it is fast, cheap, and can be varied to produce patterned fancy fabrics. Their tendency to "run" if a yarn is broken is a major drawback of regular flat knits. The flat or jersey stitch can be varied by making terry, velour, and plush fabrics using various yarns or double-looped stitches of different lengths. In nylon hot, male bagpipes and T-shirts this stitch also is used.

2.3.2. Purl Knit Fabric

On both sides of the yarn, Purl Knit Fabrics look the same. A simple stitch can be used to construct many appealing patterns and designs. Often used in the development of spherical sweaters and clothing for children. With Purl knits, the rate of development is generally slow.Purl Knit is made in one wale of the material by knitting yarn as a knit and purl stitch. The fabric has various knit and purl stitch lessons. On both sides of the material the fabric is reversible and similar. The fabric is not curling and lies flat. It is longer in the direction of distance.

2.3.3. Rib Stitch Knit Fabric

Rib Stitch Knits are made of stitches applied to both sides of the thread, forming walled columns on the front and rear of the tissue. Rib stitch manufactures fabrics that are extremely flexible. For "ribbing," which is typically found on the bottom edges of sweaters, sleeve manguets and necklines, rib knits are used. The knitted yarn is made in one course of the textile from the rib-kneaded fabric as an alternative stitch of knit and purel. The fabric has a particular stitch walled with knit and purl. It's reversible as it looks the same on both sides of the fabric. They can be created with flat or circular knitting machines.

- Cardigans

Rib Knit with half Cardigan and fully Cardigan varied is a variation of cardigans. The fabric has certain stitch patterns. Their influence is enhanced, and cardigans are therefore a thicker material.

- **Half Cardigan**

  Half cardigan is made from one knit run on both needle beds and the second knitting knit on front nads and all knitting needles on the back. The tucking loops in the fabric through the width of the string. It's not reusable tissue. They are usually stitched and used to make sweaters and sweatshirts.

- **Full Cardigan**

  Complete Cardigan consists of a regular knitting of a single course on the front needles, tucking on the rear needles and knitting of all the other courses on the front needles. On both hands, Full Cardigan looks the same. The fabric is heavy and dense with unnecessary tuck loops. It is usually knitted in gross gauge and used widely to produce sweaters and fashion clothing. Usual wool or acrylic is made for cardigans.

❖ Msilano Rib

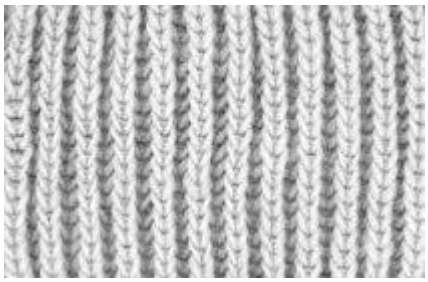
Milano Ribs is a variant of Rib Knit with variations from half of Milano and full Milano. The textile has certain knitting and missing patterns.

➢ **Half Milano**

Half Milano consists of running a round of every knit on both needle beds and knitting only on the front handles of every second round. The architecture of this system is unbalanced. It is usually knitted and used to make sweaters.

➢ **Full Milano**

Complete Milano consists of the same knit run on both napkins, the second knit knit on the front napkins only and the third knit on the back napkins only. Total Milano is a fabric finely knit and suits it better. It is more dimensional than half of the rib of Milano. It is widely used for textiles.



2.3.4. Interlock Stitch Knit Fabric

Knits are variations of knits of the rib stitch. The front and rear of the lock are identical. Stronger and thicker than regular rib knit textiles are usually these materials, except if they're used with finer yarns. Stitching avoids falls and creates clothing that doesn't wind up or curl on the ends.

2.3.5. Double Knit Fabric

Twin-stitches and their variations are made of interlocking stitches. The method consists of the use of two pairs of needles in an angle. Polyester and wool are fabrics that are widely used for producing double knits. Stringed fabrics made out from two sets of handle beds are double knitting. The construction of the fabric is stabler and more compact. The textiles do not curl and shake at the corners. You can make it with interesting texture and designs. One or two yarns are employed in the textile for knitting one course.

2.3.6. Warp Knitted Fabric

Warp knitted fabric is created with warp beam yarns in a special knitting unit. In comparison, they are cut from many yarns, and in neighboring wales, yarns form loops. A pick glass may indicate the fabric. There are vertical kneading loops on the face side while horizontal floats on the backside of the material have tilted. They do not ravel. They do not ravel. Warp knit fabrics are made with vertical or warp-directed yarn loops. All threads used for a warp knit width are arranged in a way similar to the positioning of threads in the weaving. The textiles that have high technological quality are generally made with knits from Tricot and Raschel.

2.3.7. Tricot Knit Fabric

The knitting tricot knits are made almost exclusively of filament yarn as the uniform diameter and quality of the yarn are essential for using tricot cutting machines with high speed. Tissues made by a knitting machine are usually straightforward or have a simple geometric design. There are clearly defined vertical walls on the front surface and cross-section on the rear surface.

2.3.8. Raschel Knit Fabric

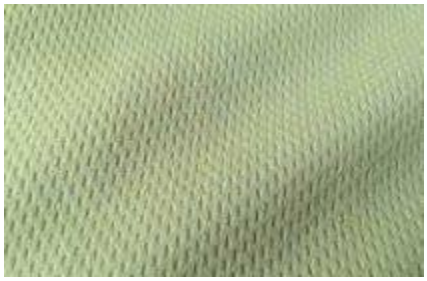
Raschael knits are made from different weights and types of spun or filament yarn. The most popular raschel knits are the complex patterns, the transparent spatial appearance of crochet or lace and an almost 3-dimensional nature of a surface effect.

2.3.9. Cable Knit Fabric

Cable is a twin-knit tissue developed by a special technology for loop transfer. The walls of the fabric look like a thread, with treads focused on exchanging loops to neighboring wales. The texture of the fabric has an intriguing fabric like braids as the loops converge. It is usually used as a pullover.

2.3.10. Bird's Eye Knit Fabric

The eye of Bird is a two-layered material combined with tuck stitches. The tuck stitch produces an interesting effect on the surface of the textile that looks like a bird's eye. Made of multi-colored threads. The fabric usually produces the scratch effect. The fabric can be constructed with eyelet designs. They are a common fabric for clothing, particularly the wear of women.



2.3.11. Pointelle Knit Fabric

Form of double knit fabric is Pointelle. The fabric has lost stitches created. The fabric looked like breaking and these moved stitches created gaps. The feminine nature of the fabric make it perfect for carrying the heads of women and children.

2.3.12. Intarsia Knit Fabric

Single knit fabric is based in Intarsia. It consists of several bright yarns knitting. The fabric is knitted in various colors with different yarns in the same direction. It has colored designs in the form of blocks in various colors. The patterns on both sides of textile.tops and children are identical. On the back of the fabric there are no floats seen. It is usually used for making tops, sweaters and blouses.

2.2.13. Jacquard Knit Fabric

The Jacquard Jerseys are single jersey manufactured by the mechanism of Jacquard from the Circular Knitting machine. They are the easiest way to make made textiles. They are generated with the following interesting patterns:

- Combinations of stitches
- Combinations of yarn types in terms of color textures etc.

In the same way, Jacquard fabrics have several colored loops of different threads. Single jersey jackets are an inherent feature. They are growing in the sweater industry.

2.2.14. Knitted Terry Fabric

Knitted Terry is a fabric of stacked jersey made with an attachment that resembles woven fabrication in regular circular knitting machines. This fabric consists of two yarn sets, in which one yarn sets the stack while the other yarn sets the foundation fabric. The knit terry is more soft and flexible than the woven terry fabrics and is more comfortable. But they aren't as tissue terry firm and durable. It is widely used in beachwear, towels, bathrobes, etc. because of its softness and absorption.

- **French Terry Fabric**

  French Terry This is a Weft Insertion Jersey type. French Terry The stacks on the fabric are not and the fabric is used on the technical rear. On one side only has French Terry loops or stacks. The French Terry's stacks are significantly shorter than normal Terry. The fabric has an excellent length and a handle gives flesh. French Terry This is a type of jersey weft insertion. French Terry No fabric stacks and the fabric on the mechanical rear. The stacks were sealed. Francisco Terry only has loops or stacks on one side. The stacks of the French Terry are much shorter than normal Terry. The cotton is very long and has a handle.

2.2.15. Knitted Velour Fabric

The knitted velours are fabrics made of piles of soft fibers that stand out on the face of the material. These often consist of a collection of yarns that create stacks on the surface of a cloth, as with knit terry. Nevertheless, these stack loops are evenly shaved and brushed in Velour. It can be coloured and typically available in solid colours. We are used in luxurious suits, coats, shoes, etc.

2.3.16. Sliver Knit Fabric

Pile jersey fabric is the sliver knit. In contrast to Velour, Sliver Knit Substance has a long pile on its textile surface. It is made of special circular knitting machines, with a knitting sliver along with a base fabric yarn in which surface fibers that resemble the fur are added to the material. Sliver knit fabrics are more long and thicker than the other pile jersey on the fabric layer. Sliver fabrics printed on animals are widely used for imitating fur textiles. They're more popular than pelts because they are lightweight, stretchable and need no special storage treatment. They are very common in the production of jacks and coats.

2.3.17. Fleece Knit Fabric

Fleece is an insert jersey type. Weft insert textiles are knitted woven fabrics in which a further yarn for each course is added. Such additional threads are not knitted but are held in each corner of the fabric by the loops. The thread added can be decorative or practical as stretch yarns. It provides stability, defense and comfort. The fiber addition is generally lighter than the base yarn. If masses of insertion wool are cut and napped, it is referred to as fleece. We usually consist of

cotton, wool and acrylic. They are made from wool. Jacks, skirts, sweaters and sportwear are included in the end uses.

2.4. Dryer Machine

A Universal Relax Dryer suitable for both open width and tubular fabrics. The system is fitted with a special in feed tool, a positive scroll roller, a heavy duty wetting padder followed by a second padder for chemical finishes, In order to obtain standardized GSM power, a well-designed pin frame entry with a vertical return pin-chain with a special edge guide and positively guided Scroll Rolls is also integrated.

The Relax Dryer has the ability to Dryer could overfeed up to 40%, which allows for a good tumbling effect to allow good fabric shrinkage. Relax Dryer is equipped with Teflon Glass Conveyors, Driven Beaters, Steaming Device, etc. As may be required, be either Single Pass, Two Pass or Three Pass. Computer suitable for 4 tons to 20 tons / day production.
The main purpose of a dryer machine is to eliminate the residual water in fabric, to control the moisture, to control the shrinkage, to control the shade of fabric to some extend, to control the GSM, to control the Diameter.

Dryer machine dries the fabric with the help of blower and burner. This machine prepare the fabric for the next subsequent process.

Dryer machine can be of two types:

- Open width dryer
- Tubular form dryer.

According to sources dryer machine can be classified into three class:

- Gas Dryer
- Thermo Heated
- Steam Heated.

2.5. Effect of dryer machine on various knitted fabric :

Dryer machine in fabric finishing process is a very necessary tool. Dryer machine is widely used in textile finishing as it has many advantages such as drying GSM fabric & power, size, shrinkage, spiral and shade variation. The drying process is a mechanical process that the dryer system conducts. It was very interesting to look at the effects of drying on the properties of knit fabric. The title of the project was planned as "Effect of Dryer Machine on knit fabric properties." We picked nine different knit fabric samples including single jersey, terry fleece, Lacoste, (1x1) thread, pique, stripe, interlock and collar fabric used in this research work.Our research aimed at assessing the effects of the drying system on the properties of the knitted fabric. Before and after drying, GSM and WPI, CPI, SL of these knit fabrics were measured and the results were observed. This research has shown that GSM is decreased after drying the fabric because the fabric comes from the squeezer system and here the fabric carries some water and the GSM decreased after drying to dry the fabric. But after drying, some of the fabrics WPI, CPI, & SL are increased. The process of changing these parameters is related to the speed, temperature and overfeed (percent) of the machine and has been studied with great care.[ref no-1]

2.5.1. Single jersey:

Single jersey is knitted fabric that consists of a collection of needles. Single jersey is the most widely used to produce cotton t-shirts. The appearance of the face and back side of a single jersey is different. This fabric is very warm, flexible, stretchy, and therefore becomes popular to wear for comfort.

Dryer effect on single jersey :

Firstly we take some samples of single jersey fabrics and their GSM are respectively 142, 148, 153, 166. The sample of lower GSM fabrics required lower temperature for drying on dryer machine. In this process, the fabric who containing GSM 142 that required lower temperature than others & the temp is 130°C, for containing GSM of 148 fabric required 140°C, for containing GSM of 153 & 166 fabric required 150°C.

Likewise, The S.L was before dryer 2.72, 2.70, 2.72 and 2.74 after dryer 2.84 , 2.80, 2.80, 2.81. The Dia was before dryer 75” ,75” ,69 and 69 after dryer 76” 72” , 72” and 70” . Then , WPI was before dryer 58, 57, 56 and 56 after dryer 60, 55, 52 and 60 . The CPI was before dryer 36, 36, 32 and 34 after dryer 32, 37 ,31 and 39

2.5.2. Rib knit fabric:

Throughout knitting, ribbing is a pattern in which stockinette stitch vertical stripes alternate with reverse stockinette stitch vertical stripes. ... The fabric has no tendency to curl when they are equal, unlike The thread of the stockinette. On both sides, these ribbing looks the same and is useful for garments such as scarves.

Dryer effect on rib knit fabric :

Firstly we take some samples of rib fabrics and their GSM are respectively 172, 178, 181, 189. The sample of lower GSM fabrics required lower temperature for drying on dryer machine. In this process, the fabric who containing GSM 172 that required lower temperature than others & the temp is 145°C, for containing GSM of 178 fabric required 150°C, for containing GSM of 181 & 189 fabric required 160°C.

Likewise, The S.L was before dryer 2.60, 2.80, 2.70 and 2.74 after dryer 2.80 , 2.90, 2.85 and 2.82. The Dia was before dryer 75" ,74" ,66 and 69 after dryer 76" 72" , 73" and 74" . Then , WPI was before dryer 58, 57, 56 and 56 after dryer 60, 55, 52 and 60 . The CPI was before dryer 32, 30, 32 and 34 after dryer 30, 33 ,35, 37

2.5.3. Lacoste fabric :

Made of mercerized cotton or polyester / cotton blend yarn with tight loops, Honeycomb fabric is commonly used in t-shirts and casual tops.

Dryer effect on lacoste fabric :

Firstly we take some samples of Lacoste fabrics and their GSM are respectively 192, 208, 211, 216. The sample of lower GSM fabrics required lower temperature for drying on dryer machine. In this process, the fabric who containing GSM 192 that required lower temperature than others & the temp is 150°C, for containing GSM of 208 & 211 fabric required 160°C, for containing GSM of 216 fabric required 170°C.

Likewise, The S.L was before dryer 3.10, 2.90, 2.95 and 2.85 after dryer 2.60 , 2.80, 2.9 and, 2.81. The Dia was before dryer 71" ,75" ,66" and 69" after dryer 72" 75" , 78" and 73" . Then , WPI was before dryer 58, 57, 56 and 56 after dryer 60, 55, 52 and 60 . The CPI was before dryer 36, 30, 34 and 36 after dryer 34, 37 ,33, 38

2.5.4. Fleece fabric:

Fleece knit fabric with a dense, deep pile is a durable, soft, and stretch fabric. Fleece fabric dries rapidly, making it suitable for active wear.

Dryer effect on fleece fabric

Firstly we take some samples of Fleece fabrics and their GSM are respectively 242, 258, 273, 306. The sample of lower GSM fabrics required lower temperature for drying on dryer machine. In this process, the fabric who containing GSM 242 & 258 that required lower temperature than others & the temp is 165°C, for containing GSM of 273 fabric required 170°C, for containing GSM of 306 fabric required 180°C.

Likewise, The S.L was before dryer 2.71, 2.76, 2.68 and 2.73 after dryer 2.82 , 2.87, 2.80, 2.85. The Dia was before dryer 75" ,64" ,66 and 71 after dryer 70" 77" , 75" and 72" . Then , WPI was before dryer 58, 57, 56 and 56 after dryer 60, 55, 52 and 60 . The CPI was before dryer 33, 31, 30 and 34 after dryer 35, 32 ,34 and 38

Chapter 3
Experimental Details

3.1. Materials

We have collected five types of sample of different GSM for completed this research. Each fabric was dried. After drying how much change GSM, WPI, CPI, SL and yarn count etc. We have measured it. The swatch we worked on is mentioned in bellow table.

swatch no	Swatch Name
01	S/J
02	RIB(1✖1)
03	Single Lacoste
04	Double Lacoste
05	Fleece

Specification of the dryer machine are mentioned below table….., which we have completed our research.

Brand Name	Santex
Company Name	Santex
Origin	Switzerland
Manufacture year	2001
Temperature	180℃
Speed Range	5-80 m/min
Maximum fabric width	100”
Maximum Fabric width	10”

[10]

Methodology

3.2 Method Of the calculation of fabric GSM

GSM refers gm. per square meter that's indicate the weight of fabric of gm. per one square meter, also it's refers the hand feel of fabric the heavier or lighter. We had collected five types of sample S/J, Rib, Single Lacoste, Double Lacoste and fleece, Firstly we want to say that GSM has increased for each fabric. Because overfeed has been enhanced for each fabric.

We did the calculation of GSM by industrial rules and our education rules

First take measure the GSM cutter sample×100

Or,

GSM= WPI×CPI×S.L×0.9155/yarn count

[10]

3.2.1 Method of the calculation of Stitch Length:

Count of 100 needles of stitch on the horizontal line from fabric. Then we did bring out the closer yarn on the fabrics boundary line & measure the length by using scale of that yarn in mm.

3.2.2. Method of the calculation of fabric width

We took the measurement of fabric width from before and after dryer machine in inch, by using measuring tape.

3.2.3 Method of Calculation of yarn Count:

we took some sample of fabric of single jersey, rib, single Lacoste, and fleece. Then we did calculate the yarn count of those fabric by using the following rules:
For, S/J= 4300/Gsm
For, lacrya 1×1rib= (-0.119×Gsm)+59.12
For, Single lacoste= (5500÷Gsm)
For, Fleece= (7200÷Gsm)

3.2.4 Method of calculation of WPI

We took some sample fabric of single jersey, rib, fleece & Single Lacoste. Then put the fabric on the table on gray line position. Then we put counting glass on this sample & count horizontally into 1 inch. Finally found the wales per inch.

3.3 Method of Evaluation:

Determination of fabric GSM:

Firstly we had calculation the GSM of sample fabric. GSM express that gm. per square meter. In other words how much cloths are there in per meter square. By the GSM refers heavier and lighter of a fabric. We saw the GSM increased for each fabric. Because the fabric overfeed was more about 40, or 45%.Behind the GSM increase also have contribute the taplon pressure. When set up the fabric overfeed at max % at the same time taplon pressure also set up, which increase the fabric density. So taplon pressure and overfeed is very important role for increase the fabric GSM. So we can say if we give the more overfeed then the fabric hand feel is heavier.

Determination of SL:

By the SL refers that the length of yarn in a knitted loop. We can saw for the stitch length sometimes it's increased and sometimes it's decreased. But most of the time it's increased. So we can tell it is proportional to other between GSM and Stitch length, that means if stitch length is increased GSM is increased and if stitch length is decreased GSM is lower.

Determination of Fabric Width:

Fabric width refers that the distance between one selvedges to another selvedge. For standard method fabric width measure should be taken after relaxation of fabric at standard atmosphere (24 hours). We can saw most of the time the width of fabric is decreased. It's completely handle by operator from dryer machine. Fabric width has no relation with GSM or Stitch length.

Determination of yarn count:

Yarn count refers the numerical expression by direct or indirect system of a yarn fineness and coarseness. Count number indicate mass per unit length or length per unit mass. Yarn count must be change after compacting. Yarn count effect on fabric GSM. For indirect system more count of yarn is thin, and less count of yarn is thick. Here we measured the yarn count by indirect system. Here we get the variable yarn count after compacting, sometimes more or sometimes less. It's depended on fabric GSM.

Determination of WPI:

WPI refers (wales per inch) that means no of wales loop per one inch in a knit fabric. We saw sometimes WPI increase and sometimes its decrease. WPI effect on fabric GSM. If GSM is increase WPI (wales per inch), also increase after compacting.

Determination of CPI:

CPI refers (course per inch) that means no of course loop per one inch in a knit fabric. We saw sometimes CPI increase and sometimes its decrease. Also CPI effect on fabric GSM. If GSM is increased CPI (course per inch) also increase after compacting.

[4]

CHAPTER 4
DISCUSSION OF RESULT

4.1 Change in GSM of different types fabric after drying process

The change in GSM of fabric after drying process, different average value is found. The changes in GSM of different types of fabric were used after the drying process to draw the following Figure 4.1. [9,10]

4.1.1 Effect of Dryer Machine on Single Jersey Fabric GSM

Fabric types	GSM before Dryer	GSM after Dryer	GSM change	GSM change%	Temperature	Average change GSM
Single jersey-1	150	152	2	1.3%	150°c	2.86%
Single jersey-2	136	140	4	2.85%	140°c	
Single jersey-3	140	145	5	3.45%	145°c	
Single jersey-4	150	156	6	3.85%	148°c	

Here, we take four sample of single jersey fabric. There GSM were 150,136,140,150 before drying and after drying the GSM were increased in 152,140,145,156. The change% of those samples was respectively 1.3%, 2.85%, 3.45% and 3.85%. Finally the average GSM change% is 2.86% for single jersey fabric.

4.1.2 Effect of Dryer Machine on RIB Fabric GSM

Fabric types	GSM before Dryer	GSM after Dryer	GSM change	GSM change%	Temperature	Average change GSM
Rib 1*1	164	168	4	2.38%	160°c	2.88%
Rib 2*1	172	177	4	2.82%	166°c	
Rib 2*2	168	174	6	3.44%	162°c	

Here, we take three sample of rib fabric. There GSM were 164,172,168 before drying and after drying the GSM were increased in 168,177,174. The change% of those samples was respectively 2.38%, 2.82% and 3.44%. Finally the average GSM change% is 2.37% for rib fabric.

4.1.3 Effect of Dryer Machine on Lacoste Fabric GSM

Fabric types	GSM before Dryer	GSM after Dryer	GSM change	GSM change%	Temperature	Average change GSM
Single lacoste-1	190	198	-8	4.0%	167°c	3.42%
Single lacoste-2	199	207	-8	3.86%	170°c	
Double lacoste-1	202	207	-5	2.41%	165°c	

Here, we take four sample of single Lacoste fabric. There GSM were 190,199,202 before drying and after drying the GSM were increased in 198,207,207. The change% of those samples was respectively 4.0%, 3.86% and 2.41%. Finally the average GSM change% is 3.42% for Lacoste fabric.

4.1.4 Effect of Dryer Machine on Fleece Fabric GSM

Fabric types	GSM before Dryer	GSM after Dryer	GSM change	GSM change%	Temperature	Average change GSM
Fleece-1	280	290	-10	3.44%	170°c	3.21%
Fleece-2	275	280	-5	1.78%	174°c	
fleece-3	260	272	-12	4.41%	175°c	

Here, we take three sample of Fleece fabric. There GSM were 280,275,260 before drying and after drying the GSM were increased in 290,280,272. The change% of those samples was respectively 3.44%, 1.78% and 4.41%. Finally the average GSM change% is 3.21% for Fleece fabric

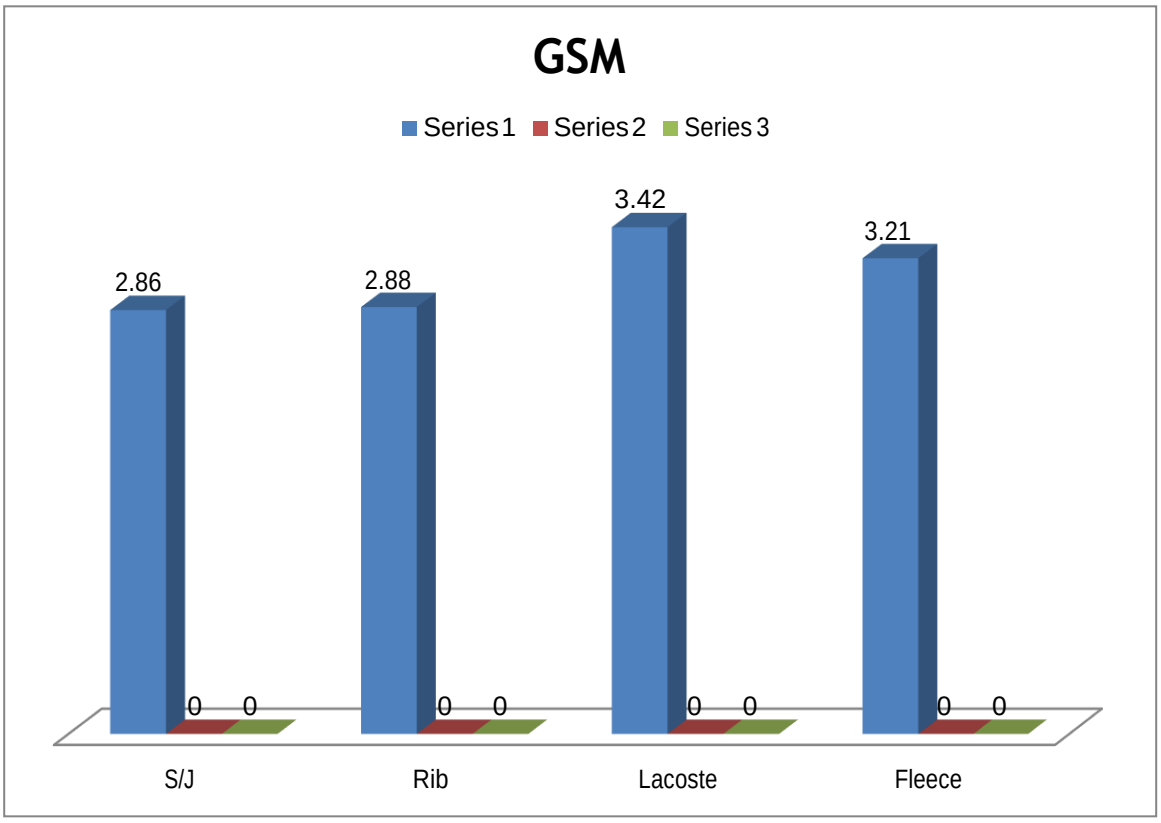


Figure 4.1: Column diagram represents the GSM changes% of different type fabrics

GSM stands for 'grams per square meter' and is the metric measurement of the weight of a fabric. The higher the gsm of the fabric is the higher the fabric weight is. GSM is a very important property of fabric. GSM is measured using a gsm cutter and a digital balance. It indicates whether the fabric is suitable for winter or summer. The gsm or grams per square meter of a fabric can be changed in dryer as well as in stanter and in dryer m/c as well. The chart attached above containing some fabrics gsm change data before and after the fabric treated in open width dryer machine. The chart proves dryer machine surely have an impact on fabric's gsm change. In dryer machine the gsm can be increased or can be decreased. In the chart we can see the gsm of the single jersey fabrics are decreased by 4 or 5 grams. The s/j fabric with the composition of cvc increased the gsm value by 5. The slub's gsm decreased by 2 grams. The dryer machine basically changes the dia and the wpi/cpi of a fabric and gives a vibration to the fabric. The temperature for drying a fabric having gsm around 145-150 is approximately 130-150 degree centigrade.

Finally, from the diagram we can see that, the changes% values of GSM of different types of fabrics after drying process is different. At this stage Lacoste fabrics change% of GSM is higher than other fabrics & Rib fabrics change% of GSM in lower than others. We found different GSM values for the different types of fabrics.

4.2. Change in Stitch length of different type's fabric after drying process

The change in Stitch length of fabric after drying process, different average value is found. The changes in Stitch length of different types of fabric were used after the drying process to draw the following Figure 4.2

4.2.1 Effect of Dryer Machine on Single Jersey Fabric Stitch Length

Fabric types	S.L before dryer	S.L after Dryer	S.L change	S.L change%	Temperature	Average change S.L
Single jersey-1	2.72	2.84	0.12	4.23%	150°c	3.28%
Single jersey-2	2.70	2.80	0.10	3.57%	140°c	
Single jersey-3	2.72	2.80	0.08	2.85%	145°c	
Single jersey-4	2.74	2.81	0.07	2.49%	148°c	

Here, we take four sample of single jersey fabric. There S.L were 2.72, 2.70, 2.72 and 2.74 before drying and after drying the S.L were increased in 2.84, 2.8,2.8,2.81 . The change% of those samples was respectively 4.23%, 3.57%, 2.85% and 2.49%. Finally the average GSM change% is 3.28% for single jersey fabric.

4.2.2 Effect of Dryer Machine on RIB Fabric Stitch Length

Fabric types	S.L before Dryer	S.L after Dryer	S.L change	S.L change%	Temperature	Average change S.L
Rib 1*1	2.6	2.65	-0.05	1.9%	160°c	3.53%
Rib 2*1	2.8	2.90	-0.1	3.44%	166°c	
Rib 2*2	2.7	2.85	-0.15	5.26%	162°c	

Here, we take four sample of rib fabric. There S. L was 2.6, 2.8 and 2.7 before drying and after drying the SL was increased in 2.65, 2.90 and 2.85. The change% of those samples was respectively 5.26%, 3.44% and 5.26%. Finally the average GSM change% is 3.53% for single jersey fabric.

4.2.3 Effect of Dryer Machine on Lacoste Fabric Stitch Length

Fabric types	S.L before Dryer	S.L after Dryer	S.L change	S.L change%	Temperature	Average change S.L
Single lacoste-1	3	2.6	0.4	13.33%	167°c	7.70%
Single lacoste-2	3.0	2.9	0.1	3.33%	170°c	
Double lacoste-1	2.9	3.1	0.2	6.45%	165°c	

Here, we take three sample of Lacoste fabric. There S.L. were 3.0, 3.0 and 2.9 before drying and after drying the SL were decreased in 2.6, 2.9 and increased in 3.1. The change% of those samples was respectively 13.33%, 3.33% and 6.45%. Finally the average GSM change% is 7.70% for Lacoste fabric.

4.2.4 Effect of Dryer Machine on Fleece Fabric Stitch Length

Fabric types	S.L before Dryer	S.L after Dryer	S.L change	S.L change%	Temperature	Average change S.L
Fleece-1	3.60	3.8	- .2,	-4.5%,	170°c	
Fleece-2	4.9	5.2	,- .3	-6.66%	174°c	5.58%
fleece-3	1.50	1.7	-.2,	-5.6%,	175°c	

Here, we take four sample of Fleece fabric. There S.L. was 3.60, 4.9, 1.50 before drying and after drying the SL were increased in and 2, 3, 2. The change% of those samples was respectively 4.5%, 6.66% and 5.65%. Finally the average GSM change% is 5.58% for Lacoste fabric.

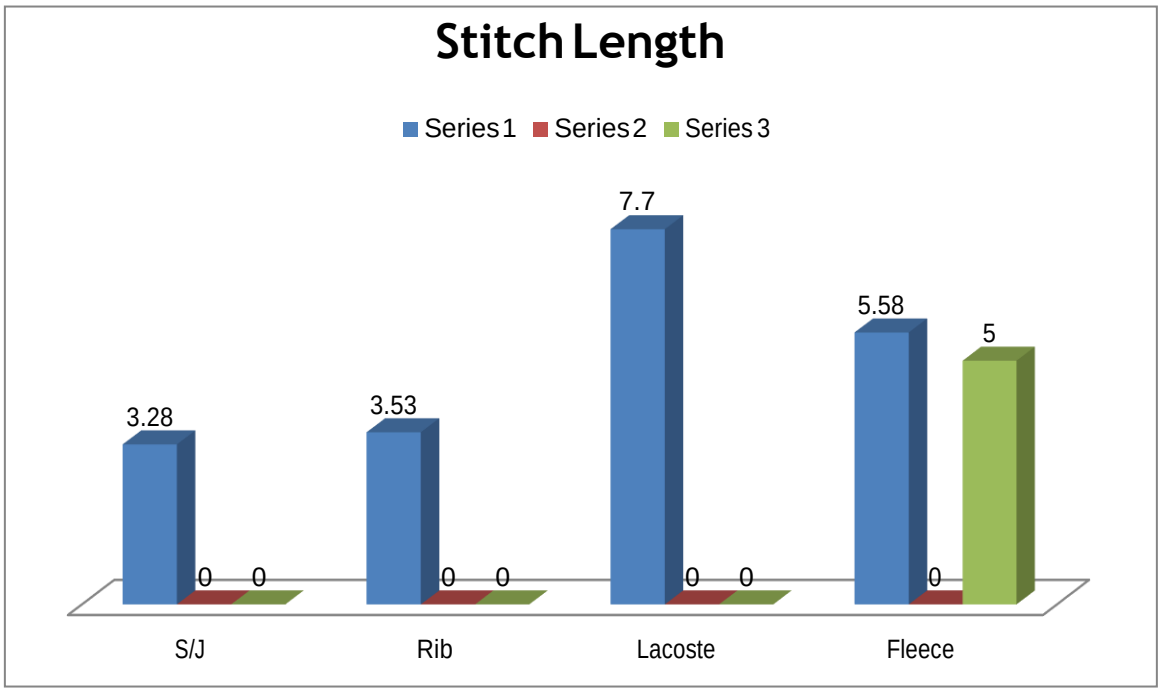


Figure 4.2: Column diagram represents the S.L changes% of different type fabrics

Stitch length is the length of yarn required to complete a stitch. The procedure of measuring stitch length is first we have to count 100 wales and coarse. Then should unroll one yarn and measure its length. The formula to measure stitch length is-

$$\textbf{\textit{Stitch length}} = \frac{Measured\ length\ of\ 100\ wales\ in\ mm}{Total\ no.of\ wales\ (100)}$$

Because the dryer m/c controls the dia of the fabric, it changes the stitch length as well. In the chart we can see dryer m/c bring slight changes on various fabrics stitch length.

From this diagram we can see that after drying the changes% of stitch length of single jersey fabric is lower than Lacoste fabric, Rib & Fleece fabric.

From this diagram we can see that after drying the changes% of stitch length of Rib fabric is lower than Lacoste & Fleece fabric.

From this diagram we can see that after drying the changes% of stitch length of Lacoste fabric is higher than Rib fabric single jersey fabric and Fleece fabric.

From this diagram we can see that after drying the changes% of stitch length of Fleece fabric is higher than Single jersey, rib fabric &lower than Lacoste fabric.

Finally, from the diagram we can see that, the changes% values of stitch length of different types of fabrics after drying process is different. At this stage single jersey fabrics change% of stitch length is higher than other fabrics & Rib fabrics change% of stitch length in lower than others. We found different stitch length values for the different types of fabrics.

4.3. Change in Diameter of different type's fabric after drying process

The change in diameter of fabric after drying process, different average value is recorded. After drying process the changes in diameter of different types of fabric has been used to draw the following Figure 4.3

4.3.1 Effect of Dryer Machine on Single Jersey Fabric Dia

Fabric types	Dia before Dryer	Dia after Dryer	Dia change	Dia change%	Temperature	Average change Dia
Single jersey-1	75”	76”	1”	1.32%	150°c	2.71%
Single jersey-2	75”	72”	3”	3.95%	140°c	
Single jersey-3	69”	72”	3”	4.17%	145°c	
Single jersey-4	69”	70”	1”	1.43%	148°c	

Here, we take four sample of single jersey fabric. There dia were 230, 198 .2, 182 and 182 before drying and after drying the dia were increased in 1”, 3”, and 1” decreased in 3” . The change% of those samples was respectively 1.32%, 3.95%, 4.17% and 1.43%. Finally the average dia change% is 2. 71% for single jersey fabric.

4.3.2 Effect of Dryer Machine on RIB Fabric Dia

Fabric types	Dia before Dryer	Dia after Dryer	Dia change	Dia change%	Temperature	Average change Dia
Rib 1*1	78”	80”	2”	2.5%	160°c	2.58%
Rib 2*1	66	64	4	2.40%	166°c	
Rib 2*2	71	75	5	2.85%	162°c	

Here, we take three sample of Rib fabric. There dia were 75,66 and 71 before drying and after drying the dia were decreased in 64 increased in 80,75 . The change% of those samples were respectively 2.5%, 2.40% and 2.85%. Finally the average Dia change% is 2.58% for rib fabric.

4.3.3 Effect of Dryer Machine on Lacoste Fabric Dia

Fabric types	Dia before Dryer	Dia after Dryer	Dia change	Dia change%	Temperature	Average change Dia
Single lacoste-1	88	89	-1	-1.12%	167°c	2.14%
Single lacoste-2	98	96	2	2.04%	170°c	
Double lacoste-1	92	89	3	3.26%	165°c	

Here, we take three sample of Lacoste fabric. There dia were 88, 98 and 92 before drying and after drying the dia were decreased in 96 , 89 and increased in 89 . The change% of those samples were respectively 1.12%, 2. 04%, 2%. Finally the average dia change% is 2. 14% for Lacoste fabric.

4.3.4 Effect of Dryer Machine on Fleece Fabric Dia

Fabric types	Dia before Dryer	Dia after Dryer	Dia change	Dia change%	Temperature	Average change Dia
Fleece-1	83	77	6	7.2%	170°c	5.08%
Fleece-2	81	79	2	2.64%	174°c	
fleece-3	78	74	4	5.42%	175°c	

Here, we take three sample of fleece fabric. There dia were 83, 81, 78 before drying and after drying the dia were decreased in 77, 79, 74. The change% of those samples was respectively 7 .2%, 2.64% and 5.42%. Finally the average dia change% is 5.08% for fleece fabric.

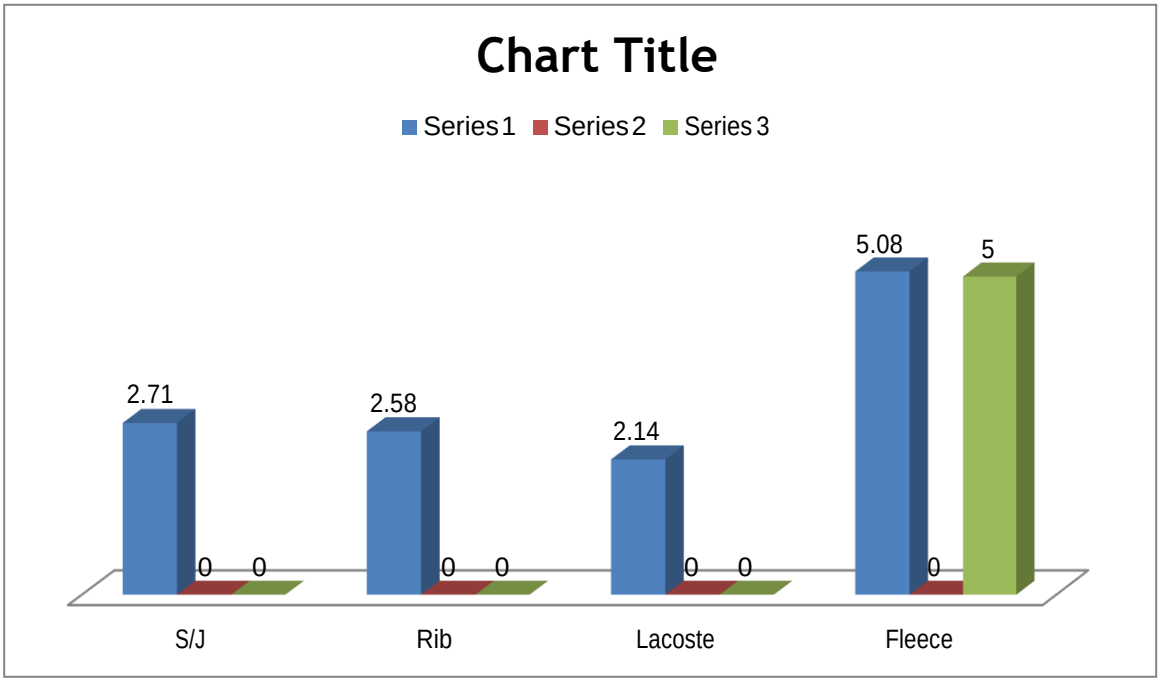


Figure 4.3: Column diagram represents the diameter changes% of different type fabrics

Dia is a very important property of fabric. Dia is measured using a inch tape. It indicates the width of the fabric. The dia of a fabric can be changed in dryer as well as in stanter and in dryer m/c as well. The chart attached above containing some fabrics dia change data before and after the fabric treated in open width dryer machine. The chart proves dryer machine surely have an impact on fabric's dia change. In dryer machine the dia can be increased or can be decreased. Dryer brings a slight change in fabric dia to 1"-5". Dia change also change the fabrics dimension and its gsm, WPI, CPI, SL etc.
From this diagram we can see that after drying the changes% of diameter of single jersey fabric is higher than Lacoste fabric and Rib & lower than Fleece fabric.

From this diagram we can see that after drying the changes% of diameter of Rib fabric is lower than Single jersey & Fleece fabric & higher then Lacoste fabric.

From this diagram we can see that after drying the changes% of diameter of Lacoste fabric is lower than Rib fabric, single jersey fabric and Fleece fabric.

From this diagram we can see that after compacting the changes% of diameter of Fleece fabric is higher than Rib fabric, single jersey fabric & Lacoste fabric.

Finally, from the diagram we can see that, the change% values of diameter of different types of fabrics after drying process is different. At this stage Rib fabrics change% of diameter is higher than other fabrics & Lacoste fabrics change% of stitch length in lower than others. We found different diameter values for the different types of fabrics.

4.4. Change in yarn count of different type's fabric after drying process

The change in diameter of fabric after drying process, different average value is recorded. After drying process the changes in yarn count of different types of fabric has been used to draw the following Figure 4.3 [9, 10]

4.4.1 Effect of Dryer Machine on Single Jersey Fabric Yarn Count

Fabric types	Yarn count before Dryer	Yarn count after Dryer	Yarn count change	Yarn count change%	Temperature	Average change Yarn count
Single jersey-1	27	28	-1	-3.57%	150°c	3.20%
Single jersey-2	28	29	-1	-3.44%	140°c	
Single jersey-3	32	33	-1	-3.03%	145°c	

Here, we take four sample of single jersey fabric. There yarn count were 2, 28, 32 and 35 before drying and after drying the yarn county were decreased in 28, 29, 33 , and 36 increased in 1,1,1,1 . The change% of those samples was respectively 3. 57%, 3 .44%, 3.03% and 2.77%. Finally the average count change % is 2. 15% for single jersey fabric.

4.4.2 Effect of Dryer Machine on RIB Fabric Yarn Count

Fabric types	Yarn count before Dryer	Yarn count after Dryer	Yarn count change	Yarn count change%	Temperature	Average change Yarn count
Rib 1*1	35	37	-2	-5.4%	160°c	5.60%
Rib 2*1	38	35	3	8.57%	166°c	
Rib 2*2	36	35	1	2.85%	162°c	

Here, we take three sample of Rib fabric. There yarn count were 35,38and 36 before drying and after drying the yarn county were decreased in 37, 35, 35. The change% of those samples was respectively 5.4%, 8.57%, 2.85% finally the average count change % is 5.60% for Rib fabric.

4.4.3 Effect of Dryer Machine on Lacoste Fabric Yarn Count

Fabric types	Yarn count before Dryer	Yarn count after Dryer	Yarn count change	Yarn count change%	Temperature	Average change Yarn count
Single lacoste-1	29	27	2	6.78%	167°c	6.47%
Single lacoste-2	29	31	-2	-6.45%	170°c	
Double lacoste-1	32	30	2	6.25%	165°c	

Here, we take three sample of lacoste fabric. There yarn counts were 29, 29 and 32 before drying and after drying the yarn counties were decreased in 27, 31, 30. The change% of those samples was respectively 6.78%, 6.45%, 6.25% Finally the average count change % is 6.47% for Rib fabric

4.4.4 Effect of Dryer Machine on Fleece Fabric Yarn Count

Fabric types	Yarn count before Dryer	Yarn count after Dryer	Yarn count change	Yarn count change%	Temperature	Average change Yarn count
Fleece-1	30	32	2	6.66%,	170°c	5.73%
Fleece-2	28	29,	1	3.4%,	174°c	
fleece-3	,28	26	2	7.14%	175°c	

Here, we take three sample of fleece fabric. There yarn count were 30,28and 28 before drying and after drying the yarn county were decreased in 32, 29, 26. The change% of those samples were respectively 6.66%, 3.4%,2% Finally the average count change % is 5.73% for Rib fabric

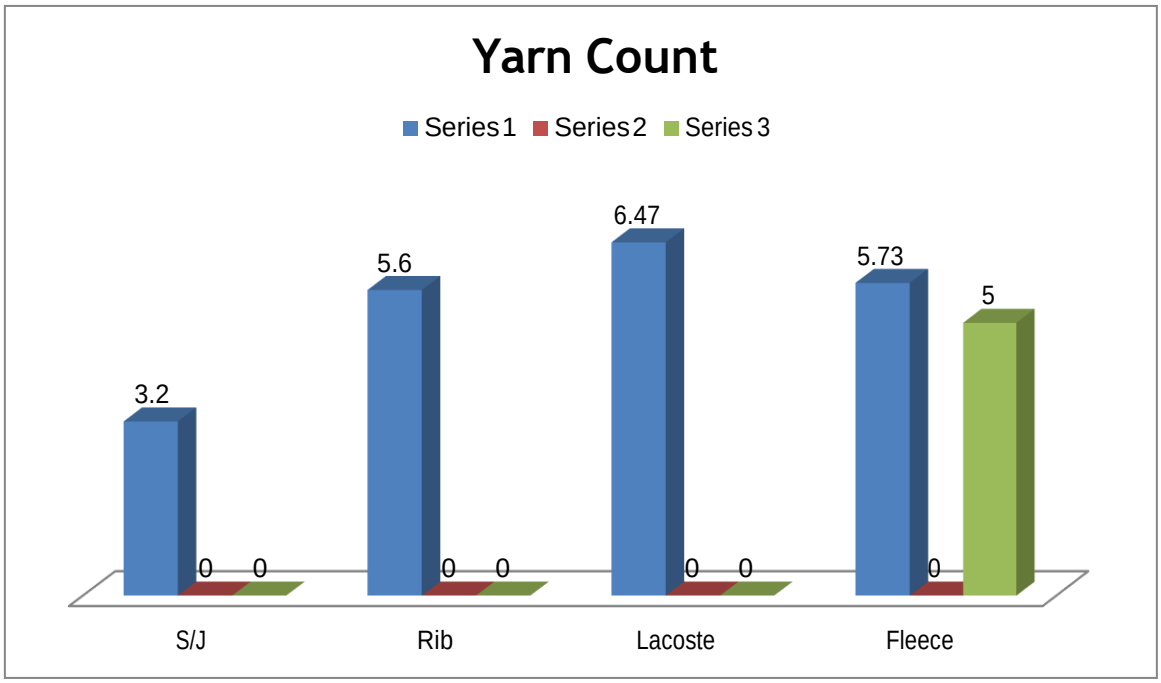


Figure 4.4: Column diagram represents the yarn count changes% of different type fabrics

From this diagram we can see that after drying the changes% of yarn count of single jersey fabric is lower than Lacoste fabric, Rib & Fleece fabric.

From this diagram we can see that after drying the changes% of yarn count of Rib fabric is lower than Lacoste and Fleece and higher than Single jersey.

From this diagram we can see that after drying the changes% of yarn count of Lacoste fabric is higher than Rib fabric, single jersey fabric and Fleece fabric.

From this diagram we can see that after drying the changes% of yarn count of Fleece fabric is lower than Lacoste and higher than single jersey & Rib fabric, fabric.

Finally, from the diagram we can see that, the change% values of yarn count of different types of fabrics after drying process is different. At this stage Lacoste fabrics change% of yarn count is higher than other fabrics & single jersey fabrics change% of stitch length in lower than others. We found different diameter values for the different types of fabrics [9]

4.5. Change Wales per Inch of different type's fabric after drying process

The change in wales per inch of fabric after drying process, different average value is recorded. After drying process the changes in wales per inch of different types of fabric has been used to draw the following Figure 4.5 [9,10]

4.5.1 Effect of Dryer Machine on Single Jersey Fabric WPI

Fabric types	WPI before Dryer	WPI after Dryer	WPI change	WPI change%	Temperature	Average change WPI
Single jersey-1	58	60	2	3.33%	150°c	5.16%
Single jersey-2	57	55	2	3.5%	140°c	
Single jersey-3	56	52	4	7.14%	145°c	
Single jersey-4	56	60	4	6.67%	148°c	

Here, we take four sample of single jersey fabric. There WPI were 58,57,52,60 before drying and after drying the WPI were increased in 60,55,52,60. The change% of those samples was respectively 3.33%, 3.5%, 7.14%, and 6.67%. Finally the average WPI change% is 5.16% for single jersey fabric.

4.5.2 Effect of Dryer Machine on RIB Fabric WPI

Fabric types	WPI before Dryer	WPI after Dryer	WPI change	WPI change%	Temperature	Average change WPI
Rib 1*1	56	58	-2	-3.4%	160°c	3.8%
Rib 2*1	58	56	2	3.44%	166°c	
Rib 2*2	62	59	3	4.83%	162°c	

Here, we take three sample of Rib fabric. There WPI were 56,58,62 before drying and after drying the WPI were decreased in 56 and increased in 58,59. The change% of those samples were respectively 3.4%,3.44% and 4.83%. Finally the average WPI change% is 3.56%for Rib

4.5.3 Effect of Dryer Machine on Lacoste Fabric WPI

Fabric types	WPI before Dryer	WPI after Dryer	WPI change	WPI change%	Temperature	Average change WPI
Single lacoste-1	64	66	-2	-3.3%	167°c	3.38%
Single lacoste-2	60	62	-2	-3.22%	170°c	
Double lacoste-1	63	61	2	3.33	165°c	

Here, we take three sample of Lacoste fabric,(single lacoste and double lacoste). There WPI were 64,60,63 before drying and after drying the WPI were increased in 66,62,and decreased 61,

57.5, The change% of those samples were respectively 3.3%,3.42%,3.33%. Finally the average WPI change% is 3.16% for Lacoste fabric.

4.5.4 Effect of Dryer Machine on Fleece Fabric WPI

Fabric types	WPI before Dryer	WPI after Dryer	WPI change	WPI change%	Temperature	Average change WPI
Fleece-1	24	24.5	-0.5	2.04%	170°c	3.01%
Fleece-2	22	23	-1	2.4%	174°c	
fleece-3	23	23.5	-.5	-4.6%	175°c	

Here, we take three sample of fleece fabric. There WPI were 24,22,23 before drying and after drying the WPI were increased in 24.5,23,23.5 , The change% of those samples were respectively 2.04%,4.37%,4.6%.Finally the average WPI change% is 3.01% for fleece fabric.

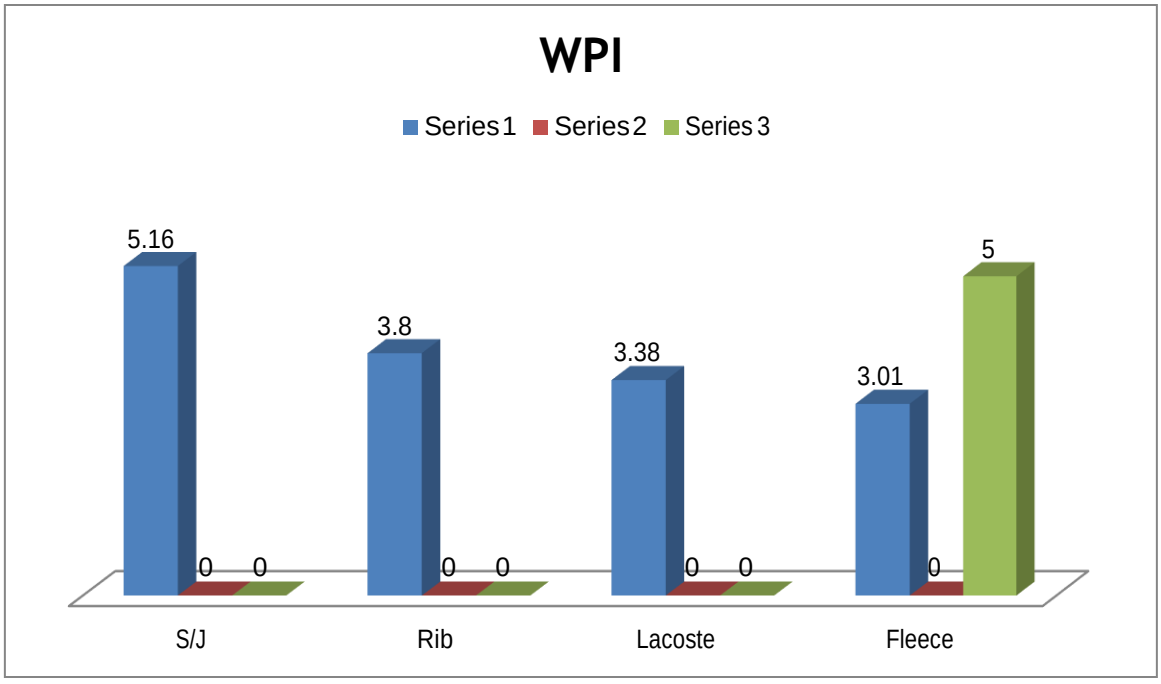


Figure 4.5: Column diagram represents the wales per inch changes% of different type fabrics

From this diagram we can see that after drying the changes% of wales per inch of single jersey fabric is higher than Lacoste fabric, Rib & Fleece fabric.

From this diagram we can see that after drying the changes% of wales per inch of Rib fabric is lower than single jersey and higher than Lacoste & Fleece fabric.

From this diagram we can see that after drying the changes% of wales per inch of Lacoste fabric is lower than Rib fabric, single jersey fabric and higher than Fleece fabric.

From this diagram we can see that after drying the changes% of wales per inch of Fleece fabric is lower than Rib fabric single jersey fabric and Lacoste fabric.

Finally, from the diagram we can see that, the change% values of wales per inch of different types of fabrics after drying process is different. At this stage single jersey fabrics change% of wales per inch is higher than other fabrics & single jersey fabrics change% of wales per inch in lower than others. We found different wales per inch values for the different types of fabrics.

4.6. Change Course per Inch of different type's fabric after drying process

The change in course per inch of fabric after drying process, different
average value is recorded. After drying process the changes in wales per inch of different types of fabric has been used to draw the following Figure 4.6 [9, 10]

4.6.1 Effect of Dryer Machine on Single Jersey Fabric CPI

Fabric types	CPI before Dryer	CPI after Dryer	CPI change	CPI change%	Temperature	Average change CPI
Single jersey-1	36	32	4	11.1%	150°c	10.55%
Single jersey-2	30	34	4	11.76%	140°c	
Single jersey-3	34	31	3	8.82%	145°c	
Single jersey-4	34	38	4	10.52%	148°c	

Here, we take four sample of single jersey fabric. There CPI were 36,30,34,34 before drying and after drying the CPI were increased in 32,34,31,38, The change% of those samples were respectively 11.1%,11.76%,8.82%,10.52%. Finally the average CPI change% is 10.55% for single jersey fabric.

4.6.2 Effect of Dryer Machine on RIB Fabric CPI

Fabric types	CPI before Dryer	CPI after Dryer	CPI change	CPI change%	Temperature	Average change CPI
Rib 1*1	34	36	-2	-5.55%	160°c	4.38%
Rib 2*1	32	30	2	6.66%	166°c	
Rib 2*2	34	33	1	2.9%	162°c	

Here, we take three sample of Rib fabric. There CPI were 34,32,34 before drying and after drying the CPI were increased in 36 and decreased in 30,33, The change% of those samples were respectively 6.66%,5.55%,2.9%and Finally the average CPI change% is 4.13% for Rib fabric.

4.6.3 Effect of Dryer Machine on Lacoste Fabric CPI

Fabric types	CPI before Dryer	CPI after Dryer	CPI change	CPI change%	Temperature	Average change CPI
Single lacoste-1	38	40	-2	-5%	167°c	4.78%
Single lacoste-2	30	32	-2	-6.25%	170°c	
Double lacoste-1	33	31	2	2.96%	165°c	

Here, we take three sample of Lacoste fabric. There CPI were 30,38,33 before compacting and after compacting the CPI were increased in 32,40 and decreased in 31 The change% of those samples were respectively 6.25%,5%,2.96%,Finally the average CPI change% is 4.78% for Single Lacoste fabric.

4.6.4 Effect of Dryer Machine on Fleece Fabric CPI

Fabric types	CPI before Dryer	CPI after Dryer	CPI change	CPI change%	Temperature	Average change CPI
Fleece-1	15	14	1	6.66%	170°c	6.59%
Fleece-2	16	15	1	6.56%	174°c	
fleece-3	16	15	1	6.56%	175°c	

Here, we take three sample of fleece fabric. There CPI were 15,16,16 before compacting and after compacting the CPI were decreased in 14,15,15, The change% of those samples were respectively 6.66%,6.56%,6.56. Finally the average CPI change% is 6.59% for Fleece fabric.

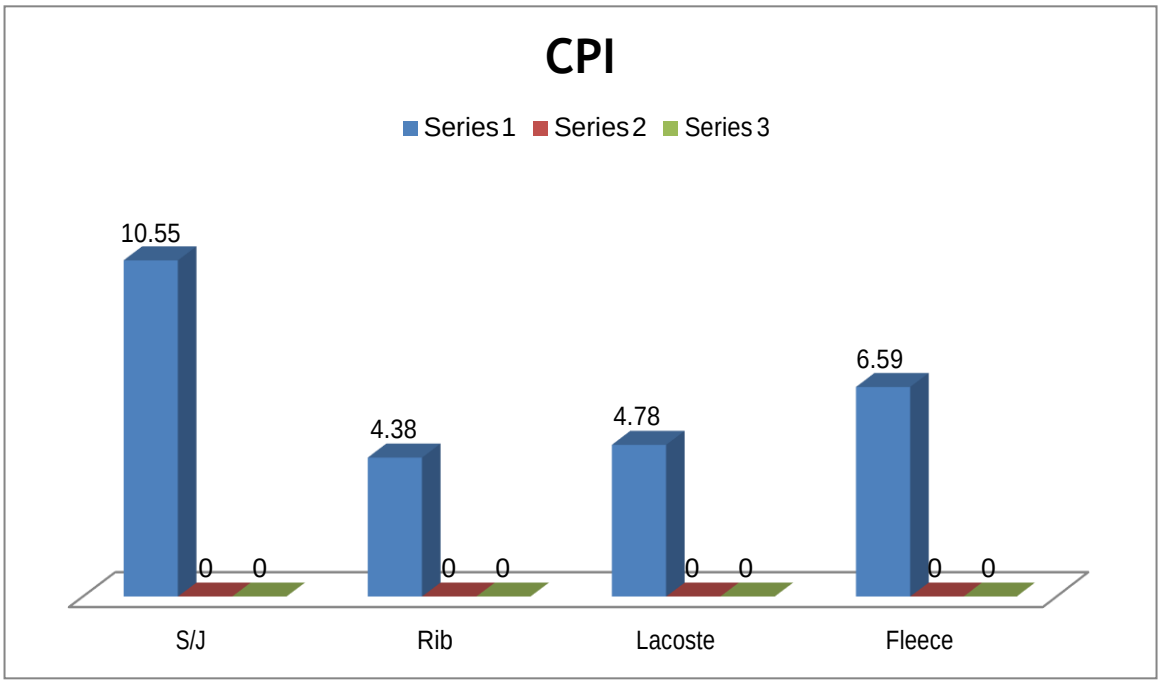


Figure 4.6: Column diagram represents the course per inch changes% of different type fabrics

From this diagram we can see that after drying the changes% of course per inch of single jersey fabric is higher than Lacoste fabric, Rib & Fleece fabric.

From this diagram we can see that after drying the changes% of course per inch of Rib fabric is lower than single jersey, Fleece fabric and higher than Lacoste.

From this diagram we can see that after drying the changes% of course per inch of Lacoste fabric is lower than single jersey fabric and Fleece fabric and higher than Rib fabric.

From this diagram we can see that after drying the changes% of course per inch of Fleece fabric is lower than fabric single jersey fabric and higher than Lacoste fabric & Rib fabric.

Finally, from the diagram we can see that, the change% values of course per inch of different types of fabrics after drying process is different. At this stage single jersey fabrics change% of course per inch is higher than other fabrics & single jersey fabrics change% of stitch length in lower than others. We found different course per inch values for the different types of fabrics.

4.7 SAMPLE ATTATCHMENT

Single Jersey			
S/J (1)	S/J (2)	S/J (3)	S/J (4)

Rib (1×1)			
Rib (1)	Rib (2)	Rib (3)	Rib (4)

Lacoste			
Single lacoste (1)	Single lacoste (2)	Double lacoste (1)	Double lacoste (2)

Fleece			
Fleece (1)	Fleece (2)	Fleece (3)	Fleece (4)

CHAPTER 5

CONCLUSION

We have come to know the effects of drying on knit fabric properties after completing the thesis (project) research. Before doing this thesis (project) we did not know the impact of the drying process on various knit fabrics about the actual information. Now we can claim that GSM, CPI, WPI, SL, Diameter, and Yarn count is increased or decreased depending on the construction of the fabric after the drying process.

- We see that most GSM knit fabrics increased after dryer because GSM is strong before drying fabrics. For this reason, drying fabrics occurs during the competitive drying process after drying sample GSM is high as before.
- We see that most of the Stitch Length knit fabrics increased after drying process due to drying the fabrics.
- We see that after drying process most of the knit fabrics Diameter decreased because of drying the fabrics.
- We see that after drying process most of the knit fabrics Yarn count increased because of drying the fabrics.
- We see that after drying process most of the knit fabrics WPI increased because of drying the fabrics.
- We see that after drying process most of the knit fabrics CPI increased because of drying the fabrics. [9,10]

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