Faculty of Engineering

Department of Textile Engineering

PROJECT REPORT ON

Factors affecting Air Permeability of 100% cotton single jersey fabric.

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Declaration

We are declaring that this is a project thesis report has done by us under the supervision of **Sharmin Akter, Lecturer, Department of Textile Engineering**. This report is submitted for fulfillment of the requirement of BSc in Textile Engineering Degree of Daffodil International University. We completed the paper with the help knit composite industry. We collected all information, reports from different industry. All information in this paper is genuine & correct. We also declare that neither this report nor any part of this report has been submitted elsewhere for award of any courses.

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Abstract

The aim of the study was to determine the effects of WPI, CPI, loop length, GSM, thickness of knitted fabrics on comfort parameters including air permeability. For this purpose, comfort properties of 100% cotton single jersey fabrics were determined. The air permeability of a fabric is defined as the amount of air passed over a surface under a certain pressure difference in a unit time. This value has significance with respect to the usage area. Since knitted fabrics have a loop structure, they have more pores than woven fabrics; therefore, in general, the air permeability of knitted fabrics is higher than that of woven fabrics of the same weight. It was found that knitted fabric of tighter structure has high weight and thickness but lower the value of air permeability. During our work we get some excellent test results which really help us to done our work perfectly.

Keywords:

- Knitted fabric
- Air permeability
- WPI
- CPI
- Loop length
- Thickness
- Stitch density
- GSM

Table of Contents

Chapter 1

1. Introduction

Knitting is the procedure texture is shaping by interloping yarn in a progression of associated circles utilizing needles. Knit textures give exceptional solace characteristics and it additionally have for quite some time been favored in numerous sorts of apparel. Notwithstanding solace conferred by the extensible circled structure, weaves additionally give lightweight warmth, wrinkle obstruction, and simplicity of consideration [1]. With looking at other material texture structures, as woven and meshed, Knit structures have increasingly open character [2].

Knitted textures are for the most part utilized for their simple consideration properties and high level of dress solace. Fluid dampness transport and breathability of the texture are the two most noteworthy variables of textures that profoundly influences the thermo-physiological solace of a texture. Thermo-physiological solace properties of texture make them influence parameters by which they are principally affected and the parameters are fiber type, yarn parameters, texture qualities and completing procedures.

For assessing and contrasting the 'breathability' of different textures for such end utilizes as waterproof shells, tents and uniform shirting air penetrability is regularly utilized. It assesses the execution of parachutes sails, vacuum cleaners, air packs, cruise material and modern channel textures.

Air porousness is characterized as "vertical wind current rate through a guinea pig" by Turkish Standards Institute [3]. For the execution of practical material items, for example, modern channels, tents, sails, parachutes, airbags, parka textures and open air garments, it is particularly basic. For open air dress so as to empower assurance against the breeze low air penetrability textures are favored [4]. Warm obstruction and dampness saturation is straightforwardly connected with air penetrability. An air penetrable texture likewise permits the change of fluid and vapor. The dimension of air porousness fluctuates relying upon kind of yarn, texture structure, fiber parameters. Besides, warm obstruction is connected with the air caught between the skin and the apparel. Air porousness influences the solace parts of an articles of clothing as indicated by going air through the pieces of clothing. Textures can be partitioned as high air porous and low air penetrable texture as indicated by air penetrability. High air penetrable texture gives bring down assurance against winds and low air porous textures causes overwhelming body sweat. Weaved textures are more air porous than woven textures so sewn textures are favored for human apparel. Approximately sewn texture tests which has higher measure of captured air and shows great air porousness property however poor dampness the board properties. So we can state that, it is essential for the material business to decide the air penetrability of weaved textures.

For a wide range of weaved textures, blasting quality qualities expanded and texture spirality esteems diminished with the expansion elastane sum and elastane yarn check. There is a critical connection between elastine sum and check with air penetrability, spirality, blasting quality and wrap.

Today, the generation of superior sewed merchandise has been extended by changing the strands, yarns, and sewing parameters. They are utilized to make new texture plans and by the proper determination of post-weaving completions to deliver multifunctional knitwear (e.g., sportswear, cutting edge dynamic wear, easygoing wear, swimwear, outerwear, and so on.), with remarkable highlights, for example, delicate and smooth handle, air porousness, quality and so forth [5]. Because of the incessant changes in mold patterns and prompting the generation of weaved clothes utilizing diverse yarn types, texture types, plans and style varieties sew form industry has turned out to be inescapable. These components assume a vital job in design patterns, particularly in portions, for example, easygoing wear and sportswear. Plain weaving takes up about 90% of all sewn texture utilization [6]. The sewed textures are utilized for the generation of clothing or any sort of by skin wear which are ordinarily in contact with human skin, that is the reason it is particularly essential for them to give an impression of solace. Because of their circled structure, weaved textures have great stretch capacity and it is a vital component in ideal sensorial solace. Dominant part of the mechanical and physical properties of sewed textures and the auxiliary parameters of the weaved textures are exceedingly rely upon the specialized attributes of sewing machines, the properties of yarns, (for example, the straight thickness) and the curve dimension of yarn, and also the crude material used to create the strands.

Objective of the Study:

Without target nothing can be considered a fruitful one. Our temporary position program was additionally coordinated to serve some specific goals. The primary goal of the examination is to get a general thought regarding the elements influencing air permeability of 100% cotton single jersey fabric.

Specific objectives of the Study:

- To recognize the factor's influencing air permeability of 100% cotton single jersey fabric.
- To measure the WPI and CPI of 100% cotton single jersey fabric.
- To decide the join thickness of the exploratory examples of 100% cotton single jersey fabric.
- To measure the thickness and circle length of the tests of 100% cotton single jersey fabric.
- To decide the air permeability of all the exploratory examples of 100% cotton single jersey fabric.

Limitation:

- First of all, there are some information's that are thought to be confidential to be disclosed to others that's why some people were found to be hesitant to share those and showed negative impression.

- Secondly, Time constraint was another difficulty for the completion of the report because due to the limitation of the time it was not possible to study a large sample size for which we had to deal with a small sample size in case of research. We had only three months to complete our internship program there.

- More time is necessary to understand all the complexities involved in the procedures;
- Difficulty in relating theory to practice;
- Limited knowledge and ability on this part to conduct the study more effectively.

CHAPTER TWO

2.LiteratureReview

2.1WPI:

A wale is a vertical segment of circles which is created by a similar needle amid a similar weaving at progressive sewing cycles. The quantity of ridges decide the width of the texture and they are estimated in units of wales per inch.

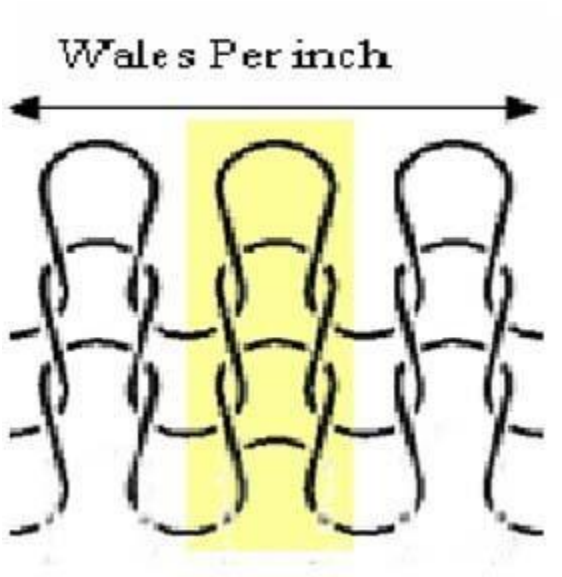

Fig: 2.1 Wales per inch

Features of wales

When loop transfer occurs it is possible to transfer a wale of loops from one needle A to another B.

- In warp knitting a wale can be produced from the same yarn if the same warp guide laps the same needle at successive knitting cycles.

- ❖ Wales are connected together across the width of the fabric by sinker loops (weft knitting) or underlaps (warp knitting).
- ❖ Wales show most clearly on the technical face and courses on the technical back of single needle bed fabric.

2.2CPI:

Courses are columns of circles over the width of the texture created by the adjoining needles amid a similar sewing at same weaving cycles. The quantity of ribs decide the width of the texture and they are estimated in units of courses per inch.

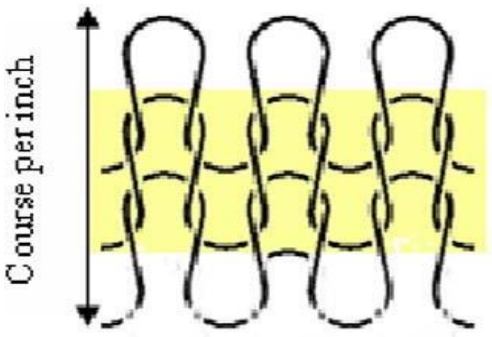

Fig: 2.2 Course per inch

2.3Stitch density:

Stitch density refers to the total number of loops in a measured area of fabric. It is the total number of needle loops in a given area (such as a square inch).

Stitch density = Wales density x Courses density

=Wales per inch x Courses per inch

=WPI x CPI

Unit no of loops per square inch or SD = CPC x WPC

2.4Thickness

Thickness is a parameter of a texture which is identified with controls handle, wrinkling, warm obstruction, weight or solidness being used and numerous different properties.

Principles:

- The Principle of the estimation of texture thickness is communicated in B.S. Hand book as pursues.

- "Essentially, the assurance of the thickness of a compressible material, for example, a material texture comprises of the exact estimation of the separation between two plane parallel plates when they are isolated by the fabric, a known self-assertive weight between the plates are connected and kept up. It is advantageous to see one of the plates as the weight foot and alternate as the iron block."

Focuses to be considered in estimating thickness

- **The shape and size of weight foot:** A roundabout foot of distance across inch is typically utilized. The proportion of foot width and material thickness ought not be under 5: 1.

- **Shape and size of Anvil:** If a roundabout iron block is utilized it ought to be something like 2 inch more noteworthy in width than the weight foot. Where the example is bigger than the blacksmith's iron, the blacksmith's iron ought to be encompassed with a reasonable help e.g. a smooth plane load up.

- **Applied weight:** Recommended weight is indicated e.g. 0.1 lb/inch2 or 10.0 lb/inch2. Reasonable weights might be added to weight foot to get these weights.

- **Velocity of weight foot:** The weight foot ought to be brought down gradually on test i.e. it

  needs moderate and cautious development.

- **Time:** The thickness is perused from the dial of the instrument when the development of pointer has ceased.

- **Indication of thickness:** A clock type dial is typically incorporated with a thickness analyzer.

Instruments for estimating texture thickness

- Reynolds and Branson thickness analyzer.
- Heal's thickness measure.
- Shirley thickness measure.
- Mag Ana thickness analyzer

2.5Loop length:

- Loop length is characterized as the measure of yarn used to frame one unit circle.
- The circle length is the supreme amount of any weaved texture and is straight forwardly identified with the circle thickness.

2.6Air permeability:

Air permeability can be defined as the properties of a fabric that permit the passage of air through the fabric's interstices. The air permeability of fabrics for active wear is very much important, as it will directly affected the thermal properties, and to some degree, the moisture management of a clothing garment or ensemble.

There are many factors that can affect the air permeability of a fabric. Several early studies of air permeability of different materials showed the following factors to affect air permeability:

- **Porosity:** Defined as the ratio of free space to fiber in a given volume of fabric.
- **Number, depth, and size of pores:** These are governed by fiber, yarn, and weave

characteristics. Studies have shown that when all of the above factors are kept constant, other parameters will affect the air permeability of a textile fabric.

- **Fabric thickness:** Air permeability will decrease as fabric thickness increases (although this is a function of porosity, as thickness will affect pore size).

- **Yarn linear density or fabric count:** As either of these is increased, air permeability will decrease.

- **Yarn twist:** An increase in yarn twist will lead to an increase in air permeability.

- **Yarn crimp:** As yarn crimp increases, so too does air permeability due to the increased extensibility of the fabric.

- **Fabric construction:** A study of fabric structures (Dhingra & Postle, 1977) found that air permeability was directly connected with fabric extensibility. Knitted fabrics were found to have higher air permeability than woven fabrics due to the inherent extensibility of knitted fabrics.

- **Layering in garment ensembles.**

- **Moisture within garment ensembles:** Absorption of atmospheric water can cause swelling of hydrophilic/hygroscopic fibers such as cotton and wool, which in turn changes fabric porosity and thickness, resulting in changes in air permeability

2.7GSM:

The GSM of fabric is very important specification of fabric which is necessary for a textile engineer for understanding and production of fabric. ‘GSM’ means ‘Gram per square meter’ that is the weight of fabric in gram per one square meter. By this one can compare the fabrics in unit area which is heavier and which is lighter.

Two ways of expressing paper density are commonly used:

- Expressed in grams per square meter (g/m^2), paper thickness is otherwise called grammage. This is the most famous measure that is utilized in many parts of the world.

- Expressed regarding the mass (communicated as weight) per number of sheets, it is known as premise weight. The tradition utilized in the United States and a couple of different nations utilizing US paper sizes is pounds of a ream of 500 (or now and again 1000) sheets of guaranteed (crude, still whole) premise measure. Japanese paper is communicated as the weight in kg of 1000 sheets

2.8YarnCount:

Count is a numerical value, which express the coarseness or fineness of the yarn and its indicate the relationship between length and weight of that yarn. Therefore, the concept of yarn count has been introduced which specifies a certain ratio of length to weight.

The fineness of the yarn is normally expressed in terms of its linear density or count. There are a number of systems and units for expressing yarn fineness. But they are classified as follows.

Types of Yarn Count:

1. Direct Count System
2. Indirect Count System

CHAPTER THREE

3.Materials and Method

In knit fabric yarn is measure in course and wales direction. CPI means yarn is in Course per inch and WPI means Wales per inch.

3.1Measurement of WPI:

Measure the WPI with the magnifying glass setting multiplier:

1. At first, take the fabric which to be measured & marking 1 inch with the ball pen according to the Course & Wales wise of a knitted fabric.

2. Then set the marking point with the multiplier scale & counting the WPI of knitted fabric in 1inch.

3. Wales per inch is counted by the magnifying counting glass.

Fig: 3.1 Counting Glass

3.2Measurement of CPI:

Measure the CPI with the magnifying glass setting multiplier:

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Focuses to be considered in estimating thickness

- **The shape and size of weight foot:** A roundabout foot of distance across inch is typically utilized. The proportion of foot width and material thickness ought not be under 5: 1.

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Instruments for estimating texture thickness

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- Mag Ana thickness analyzer

Mag Ana thickness tester:

This instrument is reasonable for the greater part of textures like woven texture, sewed and layered texture, heap texture, un-sized, intensely measured texture, covered texture and sap treated texture.

Fig: 3.3Mag Ana thickness tester

Parts of Mag Ana thickness tester:

1.Pressure weight

2.Weight container

3.Indicator

4.Lifter to put the example piece

5.Dial to show thickness

6.Support segment

7.Pressure foot

8.Testing base

9.Base

10.Rubber hedge to put on the table

Procedure of Mag Ana thickness tester:

1.The example ought to be molded at standard air condition.

2.The weight foot is lifted with the assistance of the lifting switch.

3.The example is set on the iron block just underneath the weight foot and the weight foot is tenderly brought on down to the example.

4.The perusing of the dial measure is noted to get the thickness of the example at ordinary load.

5.Then, the weights are set in the best container of the analyzer in an expanding request and readings are noted.

6.The above system is rehashed for somewhere around five areas to acquire the estimation of thickness of arbitrarily disseminated area over the entire of the example.

7.Selvedges, wrinkles, folds, hitches, missing closures, missing picks, skim, beginning imprints, inconsistency and some of unmistakable imperfections ought to be stayed away from.

8.The mean estimation of the considerable number of readings of thickness is determined and the normal thickness of the example is accounted for

3.4Measurement of Loop length:

The weaved texture is made by the arrangement of circle. A portion of the texture properties rely upon circle length. Along these lines, we have to know circle length of the texture that we will use in articles of clothing.

To gauge circle length of a sews texture test we can utilize following advances

Stage 1: Take test. Cut texture swatch of 10 cm X 10 cm from the texture test. While cutting texture swatch, consider cutting on the grains line. Include number of grains the 10 cm of texture swatch.

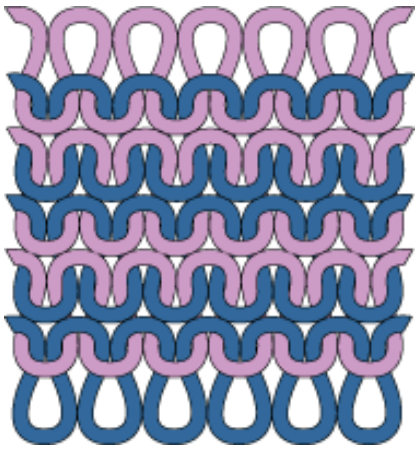


Fig: 3.4 Loop length measurement

Stage 2: Take out yarns by pulling the circle. Try not to consider yarns those are not the full length of a swatch. Take five yarns of finish length and stretch yarns to expel twisting on yarns.

Stage 3: Measure yarn length. Use estimating tape or scale to quantify yarn length. Measure each of the 5 test yarns. Note yarn lengths in a paper or journal. Ascertain normal length of the example yarns.

Stage 4: Calculate the circle length. Presently partition the normal length of the yarns by no. of circles on the texture test.

Assume 'X' no. of circles (ribs) in the swatch and normal length of the extended yarns are 'Y' cm. Subsequently circle length of the example texture will be equivalent to Y/X centimeters

3.5Measurement of Air permeability:

Texture air porousness is a nature of air going through texture, typically under the circumstance that opposite sides of texture exist weight distinction, in other words, it is speed that wind stream vertically experiences texture in a recommended test zone, weight drop and time, whose unit is ""mm/s" or "m/s". Air porousness analyzer is the normal used to quantify it. The standard is that in a recommended weight distinction, measure of wind current going through a specific region of texture in a specific time is estimated, with the goal that air porousness is determined.

Air Permeability Tester FX3300-IV

The TEXTEST Air Permeability Tester is used for fast, simple, and accurate determination of the air permeability of all kinds of flat materials and of foam cubes. The measuring range covers dense papers and airbag fabrics as well as extremely open non-woven and forming fabrics.

Advantage of FX3300-IV

- Benefit thanks to clever design
- Benefit thanks to clever design
- Benefit thanks to evaluation and printing options
- Benefit thanks to automatic selection of the measuring range

Fig: 3.5Air Permeability Tester FX3300-IV

Air penetrability test

a) Apparatus and materials

Air porousness analyzer, scissor, an assortment of texture.

b) Test Procedure

As indicated by the technique and test parameter, test is cinched reporting in real time channel and afterward altering winder's speed to influence opposite sides of texture to accomplish certain weight drop. As per spout gap and opposite sides' weight distinction, texture air penetrability is estimated. Air porousness is that measure of wind stream vertically experiences per zone of texture in per unit time, under a specific weight distinction of opposite sides of texture, whose unit is "mm/s".

c)Test technique

1.Sample planning

The entire bit of texture at any rate 1m is cut from a material, as test. It ought to be picked arbitrarily from 3m or above edge of material, without wrinkle and obvious spots.

2.Test arrangement

Change the parity of machine; check snugness and air snugness of each associating connection of air porousness analyzer.

3.Test procedure

- At first pick reasonable spout for texture, test zone and weight drop. Set parameter, align, clear. Weight drop for articles of clothing use is 100Pa, and for industry use is 200Pa. on the off chance that the referenced weight drop can be come to or un-appropriate, one can pick 50Pa or 500Pa after transaction, or test territory can utilize 5 cm2, 50 cm2, 500 cm2. For looking at the test outcome, same test zone and weight drop ought to be embraced.

- Then test setting circle is mounted on test seat and spout is mounted into air estimated glass.

- Machine is control on.

- After that squeeze "Set" to set spout No. at the point when the pointer light is on at the upper left corner of spout number-showed screen. Press "Set" again to set test zone when the marker light is on at the upper left corner of air penetrability/weight drop showed screen. Press the catch again to set weight drop of opposite sides of texture when the pointer light is on at the upper left corner of weight drop showed screen. At that point squeeze "Set" to stop.

- Sample is put on the test bed, with straight weight ring squeezed and weight handle pulled squeeze it firmly. At the time the example installation is introduced well, squeeze "Begin" to begin the test (During the test handling, weight distinction is appeared reporting in real time porousness volume showed screen. The weight distinction ought to be "600~3300" when it accomplishes set an incentive as showed on weight drop screen. Something else, spout or test territory ought to be balanced until the point when it is in this range, however as a rule, size of spout is balanced). At the point when the weight contrast accomplishes the set esteem, air penetrability will be indicated consequently on the screen of weight drop, and afterward the machine will stop naturally. Information of air penetrability rate are recorded.

- After completing the test, pushing down the weight handle and driving the ball on the handle toward inside, the handle is lifted, extricating test weight make a beeline for change the example to do another equivalent test. Under similar conditions, diverse parts of a similar example ought to be tried more than once for something like multiple times, recording it and ascertaining its normal esteem.

3.6Measurement of GSM:

The weight of a fabric can be expressed in two ways, it can be the ‘weight per unit area’ or the ‘weight per unit length’; the former is self-explanatory but the latter requires a little explanation as the weight of a unit length of fabric will obviously be affected by its width. For the woven fabric, the weight per unit length is normally referred to as the ‘weight per running yard’. It is necessary therefore to know the agreed standard width upon which the weight per running yard is based. Usually this width depends upon the width of loom. Before coming the term ‘GSM’ there was another term called ‘lb/100 yards’. This expression is used by British Standard. For measuring this there are a template and a quadrant balance. The template area is 1/100 square yards of which each arm is 1/10 yards in length. For measuring GSM, a GSM cutter is used to cut the fabric and weight is taken in balance. Both of these measurement and method is equally used for both woven and knitted fabrics.

Apparatus:

1.GSM cutter
2.Electricbalance.

GSM cutter:

- Made of high quality Aluminium pressuredie
- Light weight and resilient
- Deliver highly accurate results
- Equipped with heavy duty German cutting blades

Fig: 3.6GSM cutter

Electric balance:

- Superior shock resistance and overload Protection
- High constant LCD display
- Software lock switch and integrated transportation lock
- Adjustable foo test with level indicator
- Airproof shield cover available on request

Fig: 3.7Electric balance

Working Procedure of Measuring GSM of a Fabric:

1. For Measuring GSM, fabric sample is cut by GSM cutter
2. Then weight is taken by electric balance.
3. By this way we get the weight in gram per one square meter fabric.
4. Here GSM of the fabrics by the GSM cutter is obtained by the multiplying the sample weight with100.

Fig: 3.8GSM measuring system

3.7Measurement of Yarn Count:

The fineness of the yarn is generally communicated as far as its straight thickness or tally. There are various frameworks and units for communicating yarn fineness. Yet, they are named pursues.

Kinds of Yarn Count:

1.Direct Count System

2.Indirect Count System

Direct Count System:

The heaviness of a settled length of yarn is resolved. The weight per unit length is the yarn tally. The regular highlights of all immediate tally frameworks are the length of yarn is settled and the heaviness of yarn shifts as indicated by its fineness.

The following formula is used to calculate the yarn count: $N= (W \times l) / L$

Where,

N =Yarn count or numbering system

W =Weight of the sample at the official regain in the unit of the system L=Length of the sample

l=Unit of length of the sample

Indirect Count System:

The length of a settled weight of yarn is estimated. The length per unit weight is the yarn check. The normal highlights of all circuitous check frameworks are the heaviness of yarn is settled and the Length of yarn differs as indicated by its fineness.

The following formula is used to calculate count:

$N = (L \times w) / (W \times l)$

Where,

N =Yarn count or numbering system

W =Weight of the sample at the official regain in the unit of

the system L=Length of the sample

l=Unit of length of the sample

w = Unit of weight of the sample.

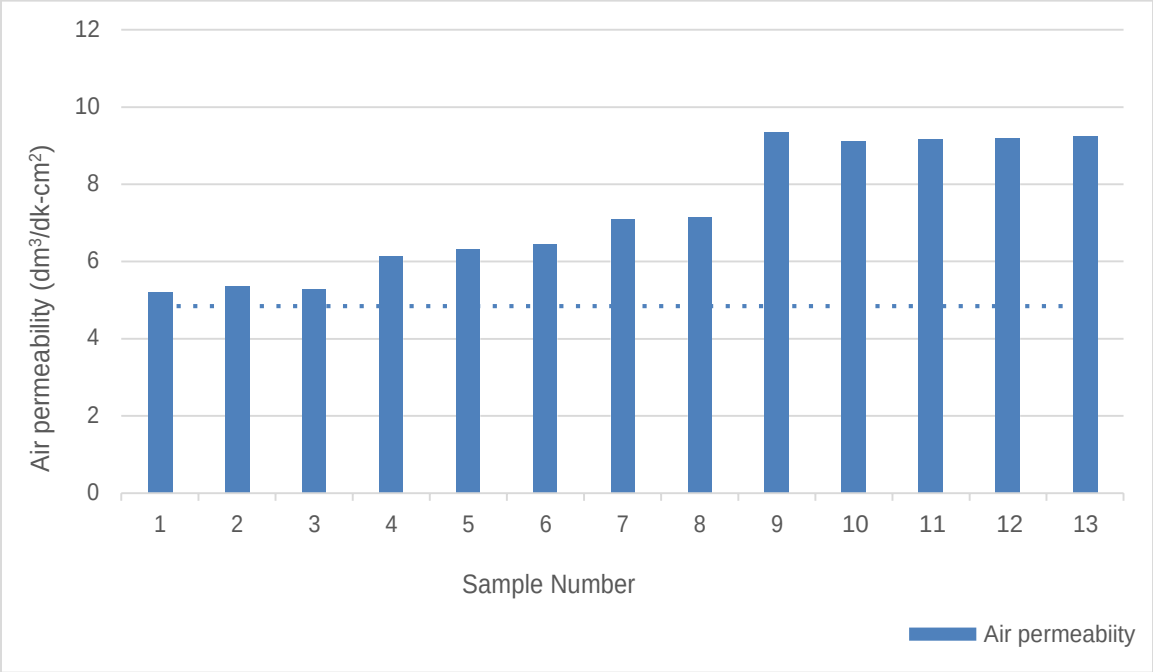
CHAPTER FOUR

4.Result and discussion

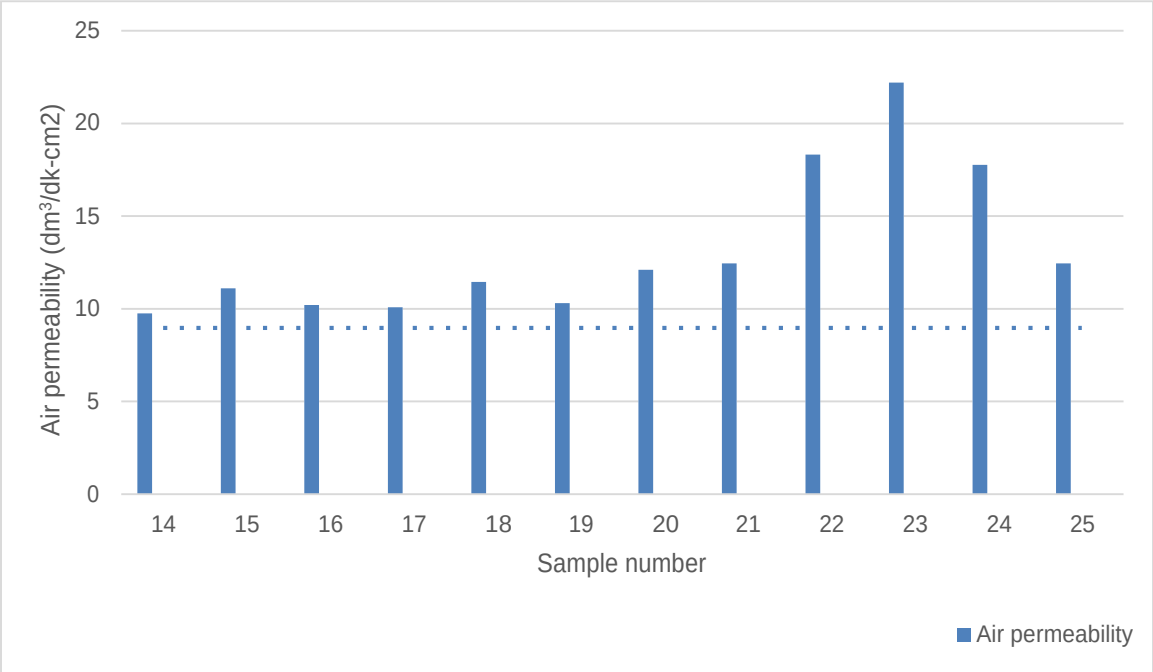
Sample Number	Fabric type	Yarn count (Ne)	GSM	Yarn type	Loop length (mm)	Course count per inch	Wale count per inch	Stitch density	Thickness (mm)	Air permeability (dm^3/dk- cm^2)
1	100% cotton,S/J	24	170	Ring	1.84	54	30	166.58	0.41	5.19
2	100% cotton,S/J	26	160	Ring	2.18	60	28	169.00	0.40	5.36
3	100% cotton,S/J	26	165	Ring	2.78	56	30	169.89	0.40	5.28
4	100% cotton,S/J	26	168	Ring	2.77	59	31	171.52	0.39	6.14
5	100% cotton,S/J	28	150	Compact	2.84	58	35	178.22	0.40	6.31
6	100% cotton,S/J	28	155	Compact	2.84	56	32	177.00	0.39	6.44
7	100% cotton,S/J	28	153	Ring	2.18	54	35	176.00	0.39	7.10
8	100% cotton,S/J	30	140	Ring	2.25	52	34	277.78	0.38	7.14
9	100% cotton,S/J	30	142	Ring	2.83	66	32	314.30	0.39	9.35
10	100% cotton,S/J	30	140	Ring	2.85	64	34	278.00	0.38	9.11
11	100% cotton,S/J	30	140	compact	3.12	59	38	311.43	0.37	9.17
12	100% cotton,S/J	31	135	Ring	2.84	62	58	246.28	0.37	9.19

13	100% cotton,S/J	32	130	Ring	3.21	65	32	292.28	0.34	9.24
14	100% cotton,S/J	32	138	Ring	3.22	63	35	313.45	0.34	9.76
15	100% cotton,S/J	32	134	Ring	3.12	56	32	313.00	0.31	11.10
16	100% cotton,S/J	34	120	Ring	3.28	63	34	277.00	0.30	10.20
17	100% cotton,S/J	34	122	Ring	3.24	66	61	216.89	o.29	10.08
18	100% cotton,S/J	34	126	Ring	3.32	65	59	187.98	0.27	11.44
19	100% cotton,S/J	34	121	Ring	2.89	67	58	211.10	0.23	10.31
20	100% cotton,S/J	40	100	Ring	3.41	56	35	177.60	0.28	12.10
21	100% cotton,S/J	40	105	Ring	3.11	62	74	221.20	0.19	12.44
22	100% cotton,S/J	40	110	compact	3.26	62	34	179.00	0.26	18.32
23	100% cotton,S/J	40	110	compact	3.18	64	32	189.00	0.20	22.20
24	100% cotton,S/J	40	105	compact	3.12	62	31	231.40	o.19	17.76
25	100% cotton,S/J	40	108	Ring	2.92	61	67	223.20	0.21	12.44

Table: 1

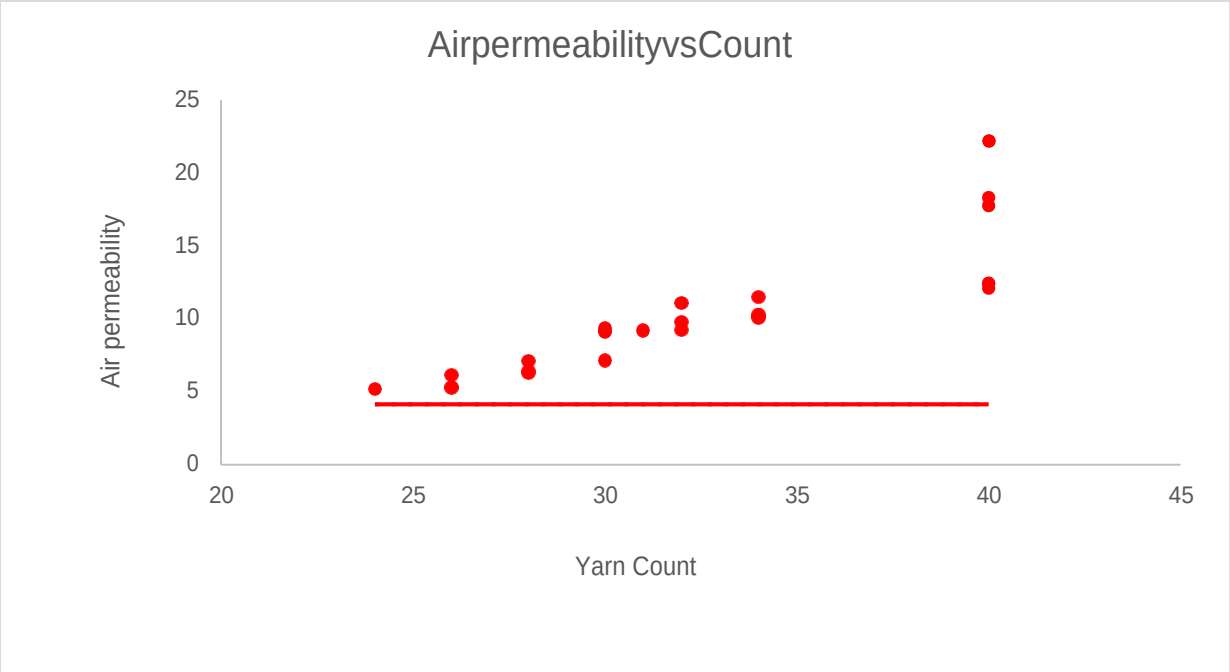


In the above graph we take 13 sample of 100% cotton single jersey fabric and test the air permeability values for every fabric. From our test result we can see that the air permeability value of 100% cotton single jersey fabric has been increased with the increasing of yarn count that is used to contract the fabric. Here we see the air permeability value of 24 Ne is 5.19. For 26 Ne the air permeability values are5.36,5.28 and 6.14 respectively. For 28 Ne we also test three sample and the air permeability values are 6.31, 6.44 and 7.10 respectively. For 30 Ne wet test four sample and the air permeability value sare7.14,9.35,9.11,9.17 respectively. For 31 Ne the air permeability value is 9.19. And for 32 Ne the air permeability value is 9.24.



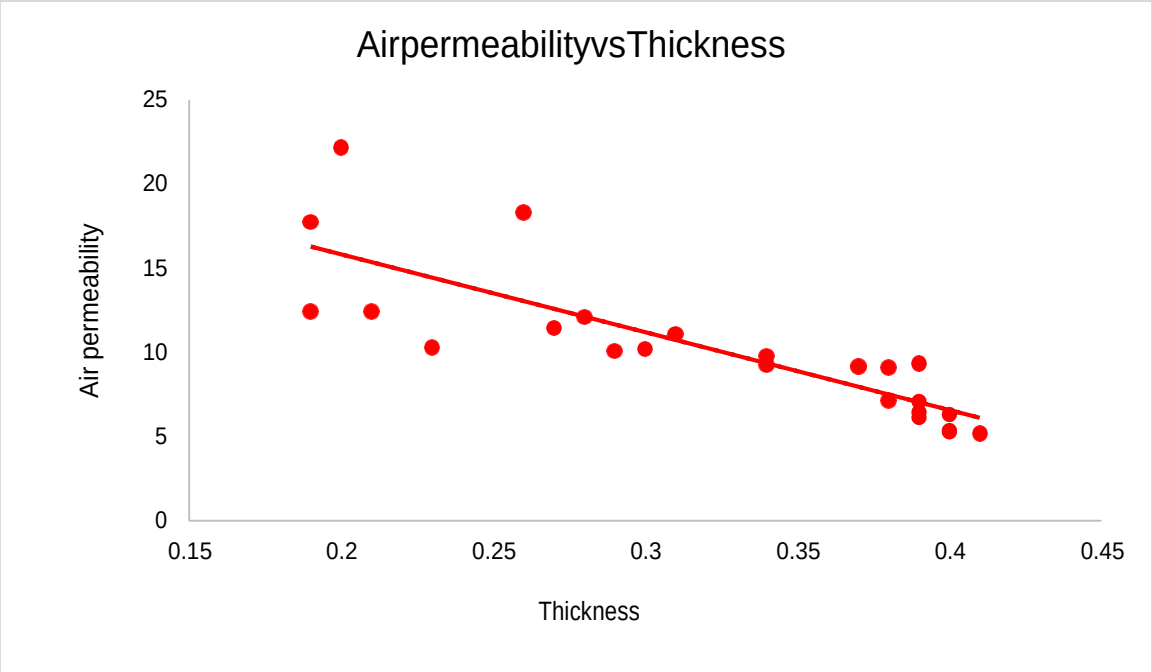
In the above graph we take 12 sample of 100% cotton single jersey fabric and test the air permeability values for every fabric. From our test result we can see that the air permeability value of 100% cotton single jersey fabric has been increased with the increasing of yarn count that is used to contract the fabric. Here we see the air permeability value of 32 Ne is 9.76 and 11.10 respectively. For 34 Ne we test four sample and the air permeability values are 10.20, 10.08, 10.44 and 10.38 respectively. For 40 Ne we test six sample and the air permeability values are 12.10, 12.44, 18.32, 22.20, 17.76, 12.44 respectively. Here we cannot found even result because here we use compact yarn also.

Air permeability vs Count



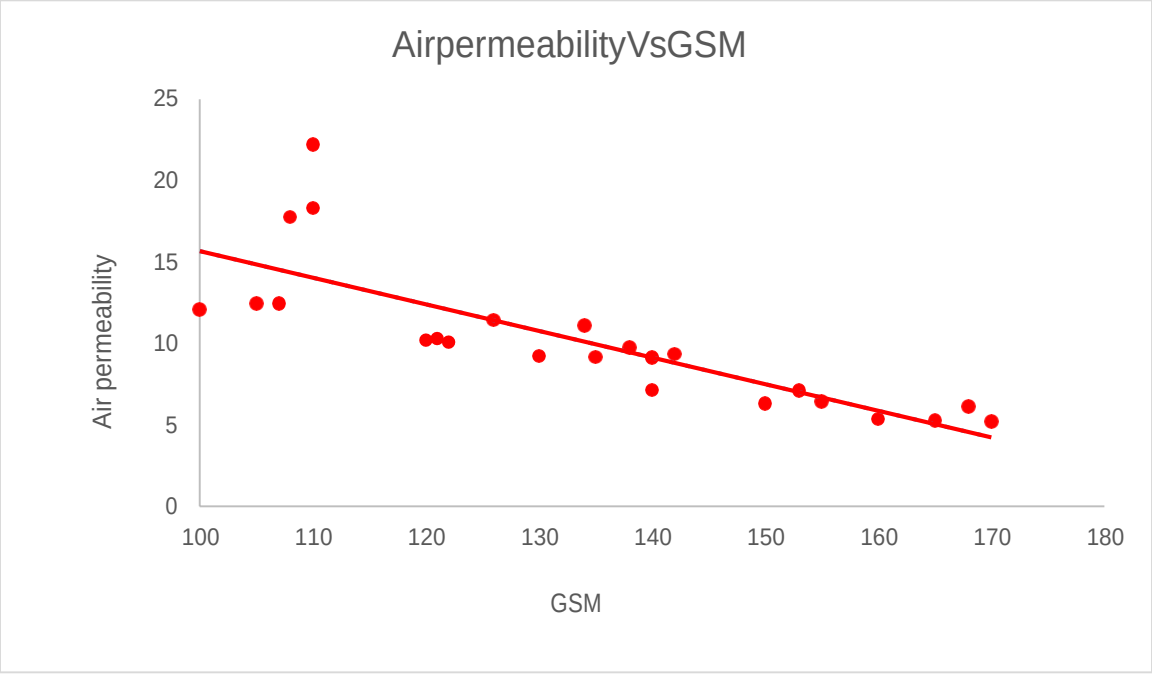
From the above graph we can see that the air permeability value of 100% cotton single jersey fabric is increased with the increasing of yarn count. From theoretical knowledge we also know that air permeability is increased with the increasing of count. So we can say that our test result is been very good.

Air permeability vs Thickness



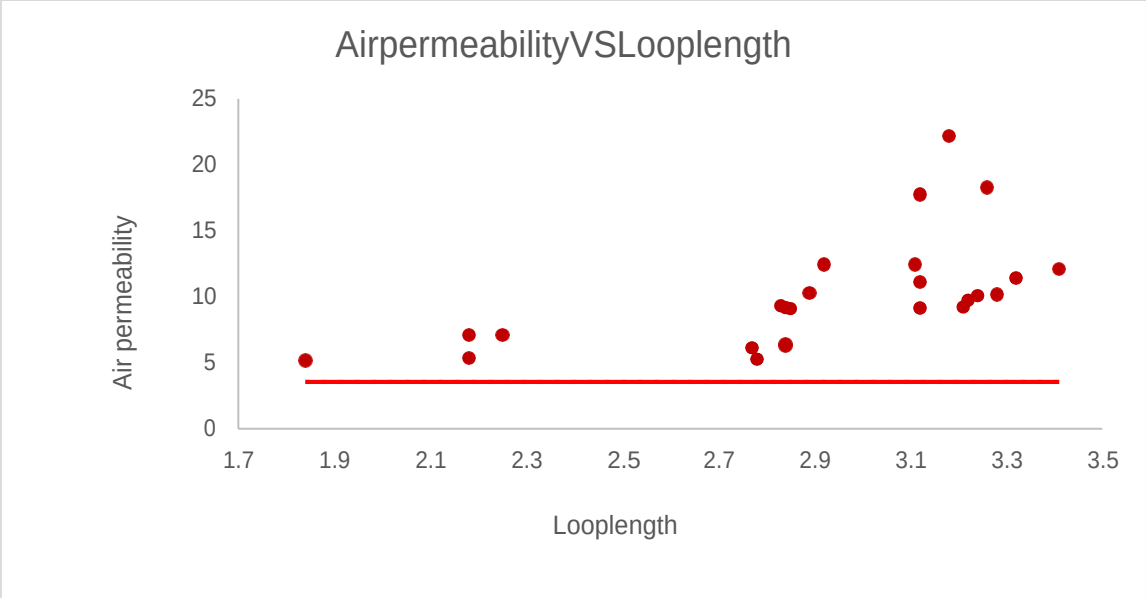
From the above graph we can see that the air permeability value of 100% cotton single jersey fabric is decreased with the increasing of thickness. From theoretical knowledge we also know that air permeability is been decreased with the increasing of thickness. So we can say that our test result is been very good.

Air permeability vs GSM



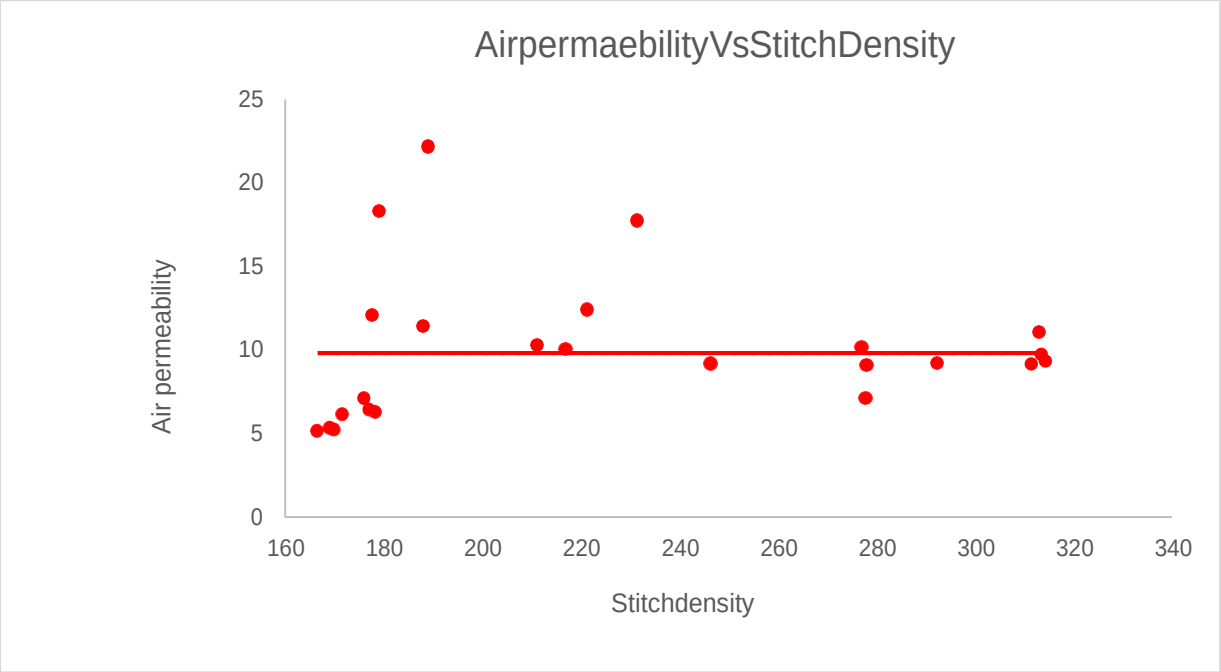
We know that with the increasing of GSM air permeability is decreased. In the above graph we also see that the air permeability value is decreased with the increasing of GSM. More GSM means more lees in loop length and as a result air permeability is decreased. So we can say that our test method and procedure is been perfect that's why we get very good test result.

Air permeability vs Loop length



From the above graph we can see that the air permeability is increased with the increasing of loop length. Increasing of loop length means looseness of fabric structure and that's why more pores is been obtained on the fabric. As a result, air permeability is increased. From our test result we get very even result that indicates the perfectness of our work.

Air permeability vs Stitch density



From this graph its shown a relationship between stitch density and Air permeability. Stitch density of single jersey 100% cotton knitted fabric is measured by the number of stitches per unit area on these fabric. Air permeability may be changed based on the stitch density. We took 25 sample and checked stitch density then we measured Air permeability. With the change of stitch density there Air permeability also changed. And we got a very good result.

5.Chapter Five
Conclusion

Air permeability is one of the most important properties of knit fabric. In our report we work on 25 sample of 100% cotton single jersey fabric of different count and GSM. We work on different factors which affecting the air permeability. After completing our task we see that if yarn count is increased then air permeability is also increased, if fabric thickness is increased then air permeability is decreased, if GSM increased then air permeability is decreased, if loop length increased then air permeability is also increased. There are some limitation during completing our work that's really hampers our work result. If we get more friendly work environment we think our test result is more even and perfect. Still our test result is near about perfect. We think this thesis report important for garments industry and textile students to know how line balancing is helped to reduce the idle time of a worker. Hopefully this will help us in the future.

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