Faculty of Engineering

Department of Textile Engineering

Project On

Assessing How Yarn Count Affecting Various Properties of Knit Fabrics.

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Submitted By

Md. Morshedul Hassan

ID : 181-23-5352

Md. Nabiuzzaman Nishat

ID :181-23-5351

Faculty of Engineering

Daffodil International University

Supervised By

Ms. Fahmida Siddiqa

Senior Lecturer

Department of Textile Engineering

Daffodil International University

This project presented in partial fulfillment of requirement for the degree of Bachelor of Science in Textile Engineering.

Declaration

We thus guarantee that, this report has been completed by both of us together under the supervision of. Fahmida Siddiqa, senior Lecturer, Department of Textile Engineering, Daffodil International University. We additionally guarantee that, We did it very carefully and observe everything practically during our internship period and this task report is a unique work and no piece of this report has been replicated from somewhere else.

Supervised By:

Fahmida Siddiqa
Senior Lecturer
Dept. of Textile Engineering
Daffodil International University

Prepared By:

Name	ID	Signature
Md.Morshedul Hassan	**181-23-5352**	Morshedul Hassan
Md.Nabiuzzaman Nishat	**181-23-5351**	Nabiuzzaman Nishat

Department of Textile Engineering

Daffodil international university

Letter Of Approval

This thesis report on **"Assessing How Yarn Count Affecting Various Properties of Knit Fabrics"** is prepared by **Md.Morshedul Hassan** And **Md.Nabiuzzaman Nishat** .This report is submitted in Partial Fulfillment of the Requirement for the Degree of B.Sc Textile Engineering. The whole report of thesis has completed under my supervision. During the research period I have found them sincere, hardworking, punctual and enthusiastic.

Fahmida Siddiqa
Senior Lecturer
Dept. of Textile Engineering
Daffodil International University

Dedication

The study is whole heartedly dedicated to our parents, who have been our source of inspiration and gave us strength when we thought of giving up, who continuously provide their moral, spiritual, emotional and financial support.

And lastly, we dedicated this book to the almighty God, thank you for the guidance, strength, power of mind, protection and skills and for giving us a healthy life. All of these, we offer to you.

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Abstract

Yarn is the raw material of fabric production and yarn count is the core property of yarn quality which significantly affects the fabric property as well. In this study we have discuss how the finished GSM , stitch length affected by the yarn count in knitting of fabrics during the manufacturing process .In this study we analyzed four fabric knit fabric samples with increasing yarn count which gradually decreases the GSM.

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Chapter 1 :

1. Introduction :

Fiber is a characteristic or manufactured substance that is fundamentally longer than it is wide. A material fiber is a long slim article with a high proportion of length to thickness .It is portrayed by a serious level of fineness and extraordinary adaptability. What's more, it ought to have layered and warm steadiness and least degrees of solidarity and extensibility reliable with the end use.A yarn is characterized as ―an gathering, of significant length and generally little cross-area, of strands or fibers, regardless of contort. Yarn is the key unit of texture. Yarn contains a ton of properties (factors) which can influence on weaved texture completed characteristics. The constructional properties of a weft sewed texture relies upon line length and yarn count. Yarns are the natural substances controlled during weaving. An accomplished knitter will depict many yarn properties and weaving factors, all of which, from his experience, influence the qualities of sewn textures. Any of these properties, he might track down it important to change or control to acquire a completed texture of the necessary actual properties .The fundamental yarn properties are yarn count and yarn twist.Yarn Count is the mathematical articulation of fineness. As per ―Textile Institute the number demonstrating the mass per unit length or length per unit mass of yarn is called count .Generally brushed yarn strength is higher than checked yarn of a similar count. Yarn wind is the twisting goes given to the yarn to hold constituent filaments strings together. An expansion in how much contort produces an expansion in the yarn strength, assuming that yarn strength is increment, the texture strength will be expanded. Ordinarily brushed yarns are more grounded, less bristly, more uniform and more brilliant than checked yarns. There are three standard strategies for precisely maneuvering yarn toward material textures : entwining, interweaving, interloping. Sewing is a course of assembling a texture by interloping of yarns. Weaving is a procedure for creating a two layered texture produced using a one-layered yarn or string. Weaved textures are isolated into two significant gatherings, weft and twist sewed texture.Weft woven textures can be created in a round or level sewing machine. The essential component of a weave texture structure is the circle intermeshed with the circles adjoining it on both side or more and underneath it. Sewing is the second most significant technique for texture development. Sew texture strength relies on yarn strength and join length. Assembling of sewn textures includes intermeshing of yarn circles where one circle is attracted through one more circle to shape a fasten. In view of contrast of the two sides of single shirt weave texture and side (Face or back) of the single pullover generally will in general make twisting.

The essential weaving components of roundabout sewing machines are needle, cam, and sinker. The rising interest on weaved pieces of clothing all around the world persuade the specialist to investigate about different sewed texture, creation processes, growing new designs. Weaving machines contain a needle holder that upholds a majority of needles, which are organized next to each other and can be activated with a rotating movement along their hub concerning the needle holder to shape sewing. There was issue in our businesses to deliver weaved texture of required GSM. In the roundabout weaving machine with an incredible number of sewing needles, when the quantity of needle expands, the distances between the needles or sinkers must be contracted. Different count yarns produce different sew texture. The properties of weave texture are changing with change of count of the yarn by keeping the boundaries of sewing machine (dia, check, join length) same for each situation. Properties of weaved texture like GSM, Stiffness, Tear strength, Tensile strength and so forth are showing different worth in various count yarn .In this paper changing of values with the changing of count of yarn were noticed. Here, two distinct counts of yarns were utilized Fabric quality means various properties of completed texture which relies upon yarn properties and textures development. A weaved texture quality is relied upon the texture properties. The properties which are significant for weaved texture and kept up with in the ventures from dim stage to completed stage are GSM, Stiffness, tearing strength, elasticity and so forth An elevated degree of flexibility and recuperation is being moved by weaved texture for special properties. A decent quality sewed texture has a few decent properties, ex-, tearing strength, solidness and normal rigidity and so forth Furthermore, these properties are fluctuated by various yarn counts and GSM. In this concentrate on variety of three properties of weaved textures because of various yarn count and GSM are considered.[1]

Chapter 2 :

2.1 Literature Survey/Review:

2.1 Yarn count testing methods : [2]

1. Wrap reel method.
2. Skein gauge method.
3. Drying oven method.
4. Analytic balance method.

Yarn count : Yarn numbers is proportions of the coarseness or fineness of a yarn demonstrating the term in sync with unit mass or mass in sync with unit span and the method of computation of count wide assortment is referred to as yarn count numbering framework.

Importance of yarn count numbering system :

The fineness of yarn can not be communicated without trouble as far as breadth as on account of wires and ropes we degree its width through method of method for the utilization of gadget which incorporates micrometer or calipers. However, if there should be an occurrence of yarn we can not degree its measurement through method of method for the utilization of micrometer and caliper because of the reality limit of the yarns are very smooth and compressible, also the move portion of the turned yarn isn't generally totally round and it conveys variants in thickness because of the reality presence of thick and thin areas in the yarn and the relentless fiber yarns moreover be beset by this downside. Consequently yarn numbering frameworks like unique systems are utilized to gauge the fineness and coarseness of yarn.

Types of yarn numbering system :

1. Direct system.
2. Indirect system.

Direct system (Mass/Unit Length) : Direct yarn numbering framework otherwise called mass per unit length of yarn, subsequently in this framework higher the yarn number or count shows the coarser or thicker the yarn size and more modest the yarn number or count demonstrates the better or lighter the yarn size. This framework is for the most part utilized for Tex and Denier. In direct yarn numbering framework the count straightforwardly express the size of the yarn and a coarser yarn will have a bigger number while a better yarn will have a lower number. The resultant count of the collapsed yarn can be not difficult to ascertain even part strings are of

various counts. Fabric setting are relative troublesome in this framework. Also, we can only with significant effort work out the heaviness of the texture and Calculation of how much bend in the yarn.

Formula is used to calculate the direct yarn count :

$$N = \frac{W \times l}{L}$$

Where,

N = Yarn count.

W = Weight of the sample.

L = sample Length.

L = Units of sample length.

Numbering System	Units of length(l)	Units of Weight (w)
Tex	1000 Meters	No. of grams
Denier (D)	9000 Meters	No. of grams
Decitex (dtex)	10000 Meters	No. of grams
Militex (mtex)	1000 Meters	No. of milligrams
Kilotex (ktex)	1000 Meters	No. of kilograms
Jute Count	14400 Yards	No. of pounds
Grex Count	10000 Meters	No. of grams
Linen Count	14400 Yards	No. of pounds

Fig : Table 1

1.Tex (Universal count system) :

Tex arrangement of yarn numbering framework is referred to as widespread yarn numbering framework. This framework comes beneath direct yarn numbering framework and it's far conveyed through International standard association (ISO) and material researchers of different

association, makes and technologists. This contraption is applicable to yarn made from every home grown strands as well as engineered filaments. Subsequently this contraption is valuable for changing the few unique constructions which can be getting utilized in the assorted areas of the texture business from one side of the planet to the other. Tex contraption might be utilized from fiber to yarn process. For fineness of rope, wire, ropes and bit and so on are communicated in expressions of kilotex this is the heaviness of the material in kg in a solitary km span anyway for the fineness of fiber it very well might be communicated as far as millitex this is weight of fiber in mg (milligrams) in a solitary km (kilometer) length. The benefits and disadvantages of direct arrangement of yarn numbering are likewise material to general system.In short, The heaviness of yarn in grams per 1000 meter of yarns or 1 km length is called as Tex.

Formula :

$$\text{Tex} = \frac{1000 \times \text{Weight in gram's}}{\text{Length in meter's}}$$

Denier: In the immediate denier framework, the yarn include number shows the load in grams of 9000 meters of yarn.

Formula :

$$\text{Denier} = \frac{9000 \times \text{Weight in grams}}{\text{Length in meter}}$$

3.Spyndle Count: This framework is by and large utilized for jute, hemp or dry turned cloth yarn. Spyndle include is characterized as weight in pounds per one shaft of 14400 yards.

Formula :

$$\text{Spyndle} = \frac{\text{Weight in pound} \times 14400}{\text{Length in yards}}$$

4. Grex Count: It is defined as weight in grams of 10000 meters of yarn.

Formula :

$$\text{Grex count} = \frac{\text{Weight in gram's} \times 10000}{\text{Length in meter's}}$$

Indirect Yarn Count System (Length/Unit Mass) : Backhanded yarn consider framework additionally known length per unit mass of yarn. Subsequently in this framework higher the yarn number or count demonstrates the better or lighter the yarn size and more modest the yarn number or count shows the coarser or thicker the yarn size. This framework is for the most part utilized for English cotton count, Worsted count, Linen count, Woolen count, French cotton count and metric count. When contrasted with direct yarn numbering framework this framework is extremely simple to ascertain weight of the texture, when the count of twist and weft are communicated in this framework. How much contort in the yarn and material setting (strings per inch) are straightforwardly relatively to the square base of yarn count and extremely challenging to compute. The count doesn't communicate the size of the yarn straightforwardly. Also, a coarser or cumbersome yarn will have a little count number than a better or less massive yarn. Also, it is truly challenging to compute the resultant include of the collapsed yarn in this framework, when the part strings are various counts.

The formula is used for calculate indirect yarn count :

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

Where,

N = Yarn count.

W = Sample weight.

L = Sample Length.

L = Units of Sample length.

W = Units of sample weight.

Fabric Type	**Equation**
S/J	(-0.141) GSM + 50.22=Count
Pique	(-0.146) GSM + 57.16=Count
Double Lacoste	(-0.167) GSM + 64.36=Count
1x1 Rib	(-0.123) GSM + 54.57=Count
Lycra Rib 1x1	(-0.119) GSM + 59.12=Count
Lycra Rib 2x2	(-0.108) GSM + 56.62=Count
Interlock	(-0.206) GSM + 80.56=Count

Fig : Table 2

1. English cotton count (Ne) :

This in any other case referred to as British be counted number or English be counted number. This characterised as the amount of hanks each one in all 840 yards displaying up one pound of the yarn.

Formula :

$$\text{English cotton count (Ne)} = \frac{\text{Length (yards)}}{840 \times \text{Weight (lbs)}}$$

2. Worsted count (Nm) : It is characterized as the no. of hanks every one of 560 yards showing up one pound of the yarn..

Formula :

$$\text{Worsted count (Nm)} = \frac{\text{Length in yards}}{560 \times \text{Weight in lbs}}$$

3. Linen count (Wet spun):

Cloth be counted number is the variety that means portions of hank's each one in all three hundred yards making an look pound..

Formula :

$$\text{Linen count} = \frac{\text{Length in yards}}{300 \times \text{Weight in lbs}}$$

4. Woolen Count (Yorkshire count):

Woolen be counted number (Yorkshire be counted number) is the variety indicating variety of hanks each one in all 256 yards making an look one pound (lbs.).

Formula :

$$\text{Woolen count} = \frac{\text{No. of hanks of 256 yards}}{\text{Weight in pound (lbs)}}$$

5. French Cotton Count :

It is characterised as variety of hanks each one in all a thousand meters displaying up ½ kg.

Formula :

$$\text{French count (NF)} = \frac{\text{Length in meter} \times 2}{1000 \times \text{Weight in kg}}$$

6. Metric count (Nm):

It is characterised as variety of hank's each one in all a thousand m displaying up 1 kg.

Formula :

$$\text{Metric count (Nm)} = \frac{\text{Length in meters}}{1000 \times \text{Weight in kg}}$$

Yarn Count Selection in Knitting :

Weaved texture is made with the help of yarn circles. Yarn of various counts is applied to provide texture of numerous grammage. There is moreover a want to compute perfect introduction of weaving machines. It is the project of stitching boss to do fantastic estimation for suitable usage of machines and introduction of texture in sync with the necessities of the client. In this newsletter I will speak for dedication of yarn encompass in sewing. [1]

Fig : Count Selection.

Most Suitable Count for Knitting Machines :

As we probably are aware needle snare needs to take yarn to change over it into a circle and eventually lock needs to close the needle snare so that circle is all around held through method of

method for the needle snare and at last this aides in passing new circle through the previously held circle. It is clear from this legitimization that there should be an appropriate equilibrium among needle snare length and the thickness of the yarn or fiber. On the off chance that the yarn is thicker than needle snare, there'll a gamble that needle snare will now presently not equipped

for keep up with this circle and thusly there could be a little empty in the texture. Assuming the situation is converse, implies yarn is more slender than the components of the needle snare then the texture delivered will seem like a web. The two circumstances aren't needed. This situation needs a soundness among needle snare length and matter of yarn. It is worth to word that needle snare size depends upon the framework guage. Besides for elite articles of clothing, material of different grammage is required. Each time knitter needs to conclude around the yarn count. There are numerous techniques for the decision of right count. In the resulting strains we can talk greatest normal strategies to pick matter for selective machines of different guage. It is similarly imperative to word that decision of yarn counts additionally depends upon the framework

produces and type of machines, similar to, single and twofold weave framework. Anyway a standard rule could be given hereunder.As a thumb rule weaving specialists favor to utilize such sewing framework whose checks is near to matter of yarn (English count) for example for 20-check machines most extreme proper yarn count is 20s. This standard is has positive constraints, as, for 28-check yarn of 26s to 30s is greatest suitable. Be that as it may, for incredibly five star counts this standard isn't generally pertinent and also machines have most measure 32. Typically fine considers aren't utilized such then again they're make twofold, similar to issue 60s twofold, due to this that that web matter is close to 30s. Also, this 60 twofold matter is suitable for 30-measure framework.

To take care of this issue a few creators have recommended following equations :

For single shirt weaving machine,

Appropriate count = G*G/18

For Double shirt weaving machine,

Appropriate count= G*G/8.4

Where G is measure of weaving machine.

Some sewing machine makers recommend a scope of yarn count for their machine. There is one more method for taking care of this issue and that is to take help from old record. Each firm is creating many sorts of textures and based on experience they foster a data set for prepared reference. In the accompanying line we give a table for direction (table is under development). One can prepare a reference from the table to deliver texture of certain grammage. We are additionally giving anticipated width of texture after wet handling. This table can give simply a reference. Knitters need to choose without anyone else in the wake of doing a preliminary creation, since there are a lot more factors, which can influence yarn and check choice interaction.

Knitting Machine Parameters:

Each weaving machine is made to address sure issues of the client. There are number of qualities of machine which may be insinuated through the machine makers while giving over the gadget to clients/clients. It is valuable for the buyer to be pleasantly aware of those boundaries. Besides machine specs are given in various unit. We will give a clarification to those boundaries and

Further more will give the transformation components to change boundaries from one framework to other.

Machine Gauge: It is utilized to degree phase of whatever or for a gadget to degree width, period or pinnacle of whatever. In weaving it's miles used to explicit the assortment of needle in a unit time of the needle bed. This needle sleeping pad can likewise moreover level or round. In twofold weave round gadget it's miles utilized for chamber and notwithstanding dial. For the most part measure is characterized as number of needles in sync with inch. As per German wellknown DIN 60917 (Iyer et al1995) letter set "E" is utilized to demonstrate sewing machine check..

Fig: Machine gauge selection in knitting

Machine Pitch: According to German DIN 62125 (Iyer et al1995) the documentation "check" is to be stayed away from now on. Maybe they favor to utilize documentation "pitch" for examination reason. Machine Pitch implies the distance between the focuses of adjoining needles. It is indicated with little "t". It is given in mm.

2.2 Knitting Process In Textile Industry :

Knitting is the texture fabricating procedures in which yarn is changed over into endlessly circles are intermeshed to frame texture. The sewed textures are very not the same as woven textures in which yarn lie in straight line bringing about unbending construction and less prolongation. Cotton sewed texture is utilized as unrefined substance for the production of underpants and sew wears. By and large, hosiery yarn of count 20s-40s is being utilized for the production of sewn texture. Since, the apparatus expected to set up this industry are natively accessible, this industry can be effortlessly set up with low speculation and can be controlled by new business visionaries. Principle purchasers of sewn textures are article of clothing fabricating units. Subsequently, weaved textures ought to be produced and provided according to the prerequisite of article of clothing makers. [4]

Fig : Production Floor Of a Knitting Factory

The process sequence of knitting in the textile industry:

Yarn package sourcing

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Placement of Yarn Package in creel

↓

Feeding yarn in the machine

↓

Setting up the machine as per fabric design

↓

Starting knitting machine

↓

Remove the fabric role after knitting

↓

Role Identifying

↓

Inspection

↓

Role Numbering

↓

Dispatching

The production process of knit fabric in the textile industry:

1. First and foremost, sewing supervisor gets an assembling crap from the merchandiser as understanding as benefactor necessities then he illuminates or arranges fabricating official around it.

2. Creation official illuminates specialized in cost and knows about roughly framework wherein the creation may run.

3. Specialized in cost requires head of mechanical fitter soldiers, they take decision around framework for assembling contemplating framework condition, fabricating limit, upkeep intricacy, and so forth

4. Creation official with gifted mechanical fitter changes required sew period and dark GSM for required absolute last GSM.

5. Boss checks everyday assembling routineness and make administrator keenly conscious about finishing tin due time.

6. Administrators perform framework in extreme interest like there have been no deficiencies in the textures. In the event that he thinks or certain roughly any material issue, he requires the mechanical fitters in obligation. Mechanical more fit then, at that point, fixes it assuming he can or he illuminates specialized in cost. Then, at that point, he is accessible in spot.

7. After required assembling and absolute last investigation in 4-point framework, they dispatched in coloring segment.

Weaving is texture development approach wherein the yarn is twisted into circles and individuals circles are interconnected to shape texture. Weaving might be portrayed in simple expressions in light of the fact that the interloping of yarn. The bowing of yarn presents higher stretch capacity, extensibility, relief and structure maintenance properties. Anyway they tend to be substantially less durable than the woven fabric. The creation technique for sew material is less troublesome than woven texture. So cost of weave texture creation is cheap than woven texture.

2.3 Various Types of Knit Fabrics :

Knitting is the development of the elastic, porous cloth, created with the useful resource of the use of interlocking yarns through needles. Knitted cloth can be made a whole lot extra quick and with out problems than woven cloth at substantially a whole lot an lousy lot tons much less cost.Two yarns forming loops in each direction of the fabric knit the fabric. Knitting machines form loops of yarn with many sharp needles or rods. The vertical rows of loops are referred to as ribs or wales, and horizontal rows of loops are referred to as publications. Knitted fabrics are generally lightweight, comfortable even when traveling, but require little care to maintain their neat appearance. The tendency of knits to face as tons as wrinkling is a few one-of-a-type problem to enhance up their popularity. Knitted cloth are used for designing active apparel which consist of sports activities sports sports activities apparel. Their elastic nature allows for enough bodily activity. [3]

Knit Schematics : Weft or filling knits are made from one yarn this is fed into knitting device needles in a horizontal direction.The spherical knitting device creates a spiral effect because it produces a fabric in tabular shape. Because of this spiral characteristic, it's far frequently difficult to have the wales and publications of the knit cloth form a clearly exceptional 90-diploma mind-set match. Knitted cloth are produced with the useful resource of the use of stylish methods – warp knitting, and weft knitting, and each approach produces loads of forms of knitted cloth.

Knitted Fabric Knits :

Weft Single Knits :

1. Single Jersey.

2. Lacoste**.**

Twofold Knits :

1. Rib Knit.

2. Purl Knit.

3. Interlock Knit.

4. Cable Fabric.

5. Bird's Eye.

6. Cardigans.

7. Milano Ribs.

8. Pointelle.

Particular Weft Knits

1. Intarsia.

2. Jacquard Jerseys.

3. Knitted Terry.

4. Knitted Velour.

5. Sliver Knit.

6. Fleece.

7. French Terry.

Twist Knits :

1. Tricot.

2. Raschel.

Either a roundabout or a level bed sewing machine can be utilized to make weft sews. Four fundamental lines are utilized in the weft of filling weaves.

1.Jersey fasten/plain sew.

2.Purl fasten.

3.Rib fasten.

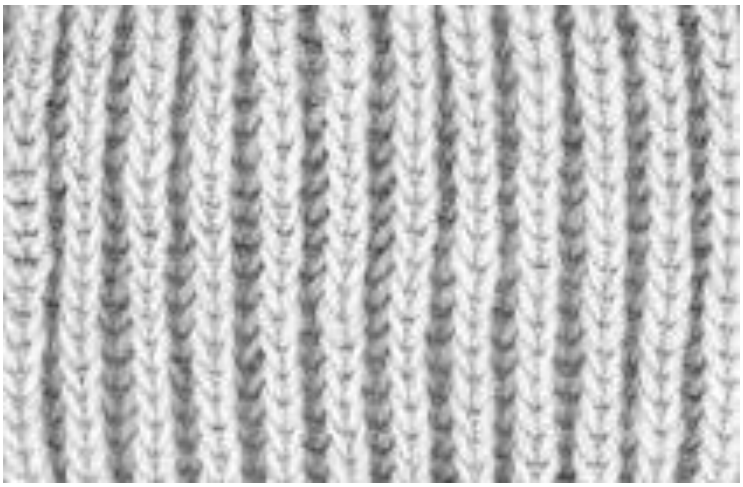
4.Interlock fasten (both for single and twofold sews).

Flat or Jersey Knit : Level shirt weave Flat or Jersey Knit texture have seen level vertical lines on the front and predominant even ribs on the rear of the texture. The level or shirt weave sew is

utilized regularly, it's far quick, economical, and can be different to give extravagant designed texture. An overwhelming disadvantage of regular level sews is their propensity to "run" in the event that a yarn is broken. The level or shirt sew might be different through utilizing exceptional yarns or twofold circled join of different lengths to make terry, velour, and extravagant textures. This sew is additionally utilized in making nylon hosiery, men's clothing, and shirts**.**

Purl Knit : Purl-knit Purl Knit Fabrics look the equivalent on each sides of the texture. Many engaging styles and plans might be made with the purl sew. It is consistently utilized in the assembling of lumbering sweaters and kids' clothing. The creation speed is ordinarily slow with Purl knits.Purl Knit is made through sewing yarn as trade sew and purl sew in a solitary ridge of the texture. The texture has trade guides of weave sew and purl sew. The material is reversible and equivalent on every parts of the texture. The fabric in all actuality does now never again twist and lies level. It is extra stretchable long heading.

Rib knit: Rib knit tops fasten on either side of the fabricmaterial, which produces sections of ribs on each the back and front of the fabric. Rib sew produces textures which have brilliant versatility. Rib sews are utilized for the "ribbing" that is typically situated on the lower edges of sweaters, on sleeve sleeves, and at neck areas. The Rib-weave texture is made through sewing yarn as trade sew and purl sew in a solitary way of the texture. The fabric has trade ribs of sew and purl join. It is reversible material, as they appearance equivalent on every parts of the texture. They can be made with every level and round weaving machines.



Sweatshirts : Cardigans are a variation of Rib Knit with 1/2 of Cardigan and Full Cardigan assortments. The fabric has specific styles of fold join. These produce a raised effect and henceforth, pullovers are a thicker texture.

Half Cardigan : The Half Cardigan is manufactured from one way of all weave on each needle beds and 2d way of all sew on the front needles and all fold on lower back needles. The fold circles gift with inside the fabric reduce the stretch in width heading. It isn't generally reversible texture. They are typically coarsely sewn and utilized for making sweatshirts and sweaters.

Full Cardigan : The Full Cardigan is made of a rehash of 1 way of all sew on the front needles and all fold on lower back needles, the second one way of all fold on the front needles and all weave on lower back needles. Full Cardigan seems equivalent on every angles. Over the top fold circles make the fabric awkward and thick. It is regularly weaved in coarser check and extensively used in making sweaters and style pieces of clothing. Sweatshirts are regularly created from Wool or Acrylic.

Milano Ribs : Milano Ribs are a variation of Rib Knit with 1/2 of Milano and complete Milano forms. The material has specific styles of weaving and misses.

Half Milano : Half Milano is fabricated from a rehash of 1 bearing of all weave on each needle beds and 2d heading of all sew on the front needles best. It has an uneven shape. It is normally sewn coarse measure and extensively utilized for making sweaters.

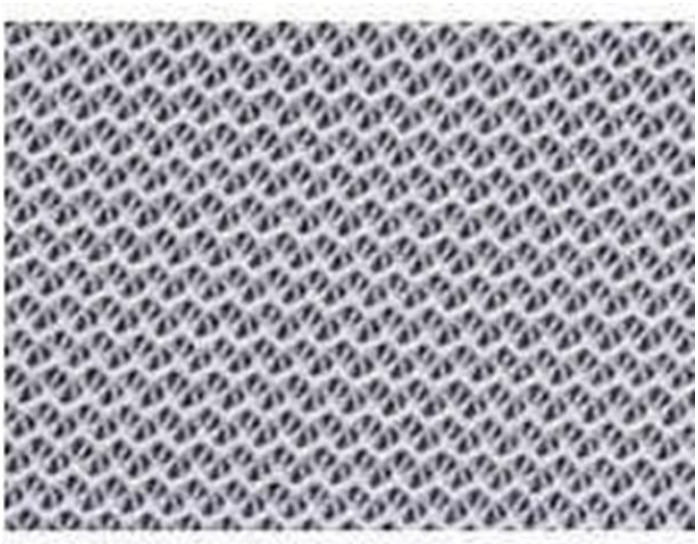
Full Milano : Full Milano is produced from a rehash of 1 bearing of all weave on each needle beds, the second one course of all sew on the front needles best and the 1/3 heading of all sew on lower back needles best. Full Milano is finely weaved material and has higher inclusion. It has more layered balance than 1/2 of Milano rib. It is comprehensively utilized as fitting texture.

Interlock Stitch Knit Fabric: Interlocking-sew Interlock sew Knits are variants of rib sew sews. The back and front of interlocks are the equivalent. These texture are for the most part heavier and thicker than ordinary rib weave texture aside from utilized with better yarns. The interlocking of join forestalls runs and delivers clothing texture that don't ravel or twist at the edges.

Twofold Knit Fabric: Double-weave Double Knits are created from the interlock join and its variants. The system involves the use of sets of needles set at a demeanor to each unique. Strands that the typically used to make twofold sews are polyester and fleece. Twofold weaves are weft sewn texture made with units of needle beds. The material shape is more prominent strong and minimized. The texture really do now never again twist at the edges and do now never again ravel. They can be made with exciting plans and surfaces. One or yarns are utilized to weave one course with inside the material

Twist Knitted Fabric : Warp-weave Warp sewed texture are made in an interesting sewing contraption with yarns from twist pillar. Not at all like weft sews, they're sewn from several yarns, with yarns framing circles in abutting grains. The material can be perceived with a select out glass. The face part of the material has scarcely willing vertical sewing circles while the lower part of the material has willing level floats. They really do now never again ravel. Twist weave texture are worked with yarn circles formed in a vertical or twist course. Every one of the yarns utilized for a width of a twist sew are situated corresponding to each divergent in a manner very much like the area of yarns in winding around. The texture which are produced from outstanding incredible with the methodology are regularly made with Tricot and Raschel sews.

Tricot Knit Fabric : Tricot-weave Tricot sews are made almost totally from fiber yarns because of the reality uniform measurement and unreasonable extraordinary are pivotal yarn characteristics to be utilized with the exceptionally exorbitant speed tricot sewing machines. Textures worked with the guide of utilizing the tricot weaving contraption are by and large straightforward or have a simple mathematical plan. The front floor of the material has truly portrayed vertical ridges, and the lower back floor has across courses.



Raschel Knit Fabric : Raschel-weave Raschel sews are involved turned or fiber yarns of different loads and sorts. Most raschel weaves might be perceived with the guide of utilizing

their precarious plans, the open-region appearance of sew or bind, and an almost third-layered floor sway plan.

Link Knit Fabric : Cable-sew Cable material is a twofold sew material made with the guide of utilizing the exceptional circle switch approach. The ridges with inside the material have a rope-like an appearance, wherein plaits are essentially based absolutely at the switch of circles with abutting ribs. The material has an absolutely exhilarating floor surface like meshes on the grounds that the circles pass each unique. It is comprehensively utilized as sweater material.

Elevated Knit Fabric : Birds-eye-sew Bird's eye is a twofold weave material with a total of wrap lines up combination with sewing lines. The fold sew makes exciting eyelet or empty effect at the material floor like a higher. Fab The material by and large made from multi-shaded strings creating scrambling sway. The material can be made with plans having eyelets. They are a popular attire material, mostly ladies' wear.

Pointelle Knit Fabric : Point Elle-sew Point Elle is a sort of twofold sew material. The material has designed leave out fastens. The material has gave the impression of ribbon, with openings made with the guide of utilizing those moved fastens. The female appearance of the material makes it best for ladies' tops and youngsters wear.

Intarsia Knit Fabric : Intarsia-Knit Intarsia is designed unmarried sew material. It is made from sewing multi hued yarns. The material has the equivalent bearing sewed in selective hues with restrictive yarns. It has shaded plans as squares apportioned in restrictive satiation foundations. The styles appearance same on each the face and lower part of the material. There aren't not set

in stone at the lower part of the material. It is for the most part used to make shirts, pullovers, and sweaters.

Jacquard Knit Fabric : Jacquard-Kni Jacquard Jerseys are unmarried shirt texture fabricated from Circular Knitting machines the utilization of Jacquard system. They are the handiest strategy of making designed texture. They are created with exciting styles, which may likewise have any of the following:Combinations of lines, or Combinations of yarn sorts in expressions of shadeation surfaces and so forth.

The jacquard weave features restrictive shaded circles formed by different yarns in the equivalent course. Floats are an innate trait of unmarried shirt jacquards. They are comprehensively utilized withinside the sweater business.

Weaved Terry Fabric : Knitted-terry Knitted Terry is heap pullover material made with an exceptional connection in typical round sewing machines very much like woven texture. The material has circles at the material floor. The material is fabricated from units of yarns, where in one bunch of yarn makes the heap, simultaneously as the elective arrangement of yarn makes the base material. Weave terry is milder, more prominent bendy and is more noteworthy cushty than woven terry texture. Nonetheless, they're currently never again organization and durable as woven terry. Inferable from its delicateness and receptiveness, it's far comprehensively used in beachwear, towels, shower robes and so forth

French Terry Fabric : French Terry It is a sort of Weft Insertion Jersey. The heaps at the material aren't snoozed and the specialized lower back of the material is utilized as face angle. French Terry has circles or heaps on one angle best. The heaps of the French Terry are parcels more limited while in contrast with standard Terry. The material has gigantic stretch and offers wool like a handle. These capacities make the material more noteworthy cushty subsequently, they're famously used in clothing, mostly infants and youngsters. French Terry is extensively used in athletic apparel, taking strolls fits and exercise fits because of its receptiveness and stretch.

Sewn Velour Fabric : Knitted-Velour-sew Knitted Velour are Pile shirt texture having delicate standing out filaments at the material floor. Like weave terry, they're also fabricated from an additional an arrangement of yarns making heap circles at the material floor. Nonetheless, in Velour, those heap circles are sheared softly and brushed. It tends to be colored and regularly to

be had with solid hues. They are used in steeply-evaluated clothes like coats, shirts, clothing and so on

Fragment Knit Fabric: Sliversew Sliver Knit is a fleece shirting material. Dissimilar to Velour material, Sliver sew material is described with the guide of utilizing a drawn out heap at the material floor. It is made from one of a kind round sewing machines wherein the floor filaments impersonating fur are associated with the material, via weaving bit related to base yarn making the material. Fragment sew texture have longer and denser heaps at the material floor than various heap pullovers. Creature uncovered bit weave texture are famously utilized as

impersonation fur texture. They are more prominent popular than fur as they're light, more noteworthy stretchable and do now never again require remarkable deal with capacity. They are comprehensively used in making coats and covers.

Downy Knit Fabric : Fleece-sew Fleece is a sort of weft inclusion shirt. Weft inclusion texture are weft sewn texture wherein an additional a yarn is embedded for each course. These additional yarns aren't sew, as an elective they're held with the guide of involving the circles toward each path of the material. The embedded yarn can be fancy or helpful like stretch yarn. It gives equilibrium, cover, and solace. The inclusion yarn is by and large coarser than the base yarn. At the point when the addition yarn shaping heaps are sheared and rested, it's far known as Fleece. They are for the most part produced from Cotton, Cotton/Polyester, Wool, and Acrylic. End Uses comprise of coats, clothing, athletic apparel, and sweaters.

Chapter 3 :
Methodology:

3.1 Materials :

Data Collected From : Orion Knit Textiles Ltd.

Machines :

Machine	Brand	Origin	Machine Dia
Knitting	Pai Lung	Taiwan	28
Knitting	Pai Lung	Taiwan	26
Knitting	Pai Lung	Taiwan	36
Knitting	Pai Lung	Taiwan	36

Fig : Table 3

Yarn Used :

Yarn Type	Brand	Count
100% Cotton	Malek	24
100% Cotton	Kewalram	26
100% Cotton	Hif	30
100% Cotton	Badsha	32

Fig : Table 4

Fabric :

Structure	Finished GSM	Finished Dia (Inch)
F/Terry	260	62
S/Lacost	200	Any (OP)
S/J	140	60
Waffle 2 Tuck	120	64

Fig : Table 5

3.2 Methods :

1.Selecting Machine Gauge on the basis of Yarn Count:

Determination of machine check relies on yarn measurement .Yarn distance across also relies upon a few components including yarn count, fiber type, yarn turn, yarn completing and so on The yarn build up to be utilized on a round weaving machine depends to a great extent at the pitch, and henceforth at the machine measure. For some random machine measure it could lie inside a greater reach, on the grounds that at a similar framework different yarn count test be utilized, depending at the weaved structure, the ideal optics (texture appearance) and the texture properties. There is a connection between yarn in tex and machine check is given by a situation,

For single-pullover, $G = \sqrt{(1650/Tex)}$ and

For twofold pullover, $G = \sqrt{(1400/Tex)}$.

Where, G is estimated in needles per cm.

Nonetheless, there is no substantial equation appropriate for working out the yarn count of a machine measure. This is on the grounds that a scope of yarn counts can be utilized on a similar weaving machine check, and the 'knittability' additionally relies upon the sewed design, the ideal texture appearance and the texture properties. For a specific machine measure, a scope of yarn counts can be weaved with various circle lengths. The most effective way to figure out the reach is by experimenting.[5**]**

Some data collected from the Orion Knit Textile Ltd. is mentioned in table given below :

Yarn Count	Machine Gauge
24	24
26	24
30	24
30	24
30	24
30	24
30	24
30	24
30	24
32	18

Fig : Table 6

2.Yarn count and Stitch length used for produce Single Jersey Knitted Fabric for this study :

The length of yarn expected to deliver a total sewed circle is known as join length or circle length. Line length is a length of yarn which incorporates the needle circle and a large portion of the sinker circle on one or the other side of it.

Yarn Count	Stitch Length
24	2.80
26	2.80
30	2.88
30	2.88
30	2.80
30	2.86
30	2.80
30	2.75
30	2.80
32	2.80

Fig : Table 7

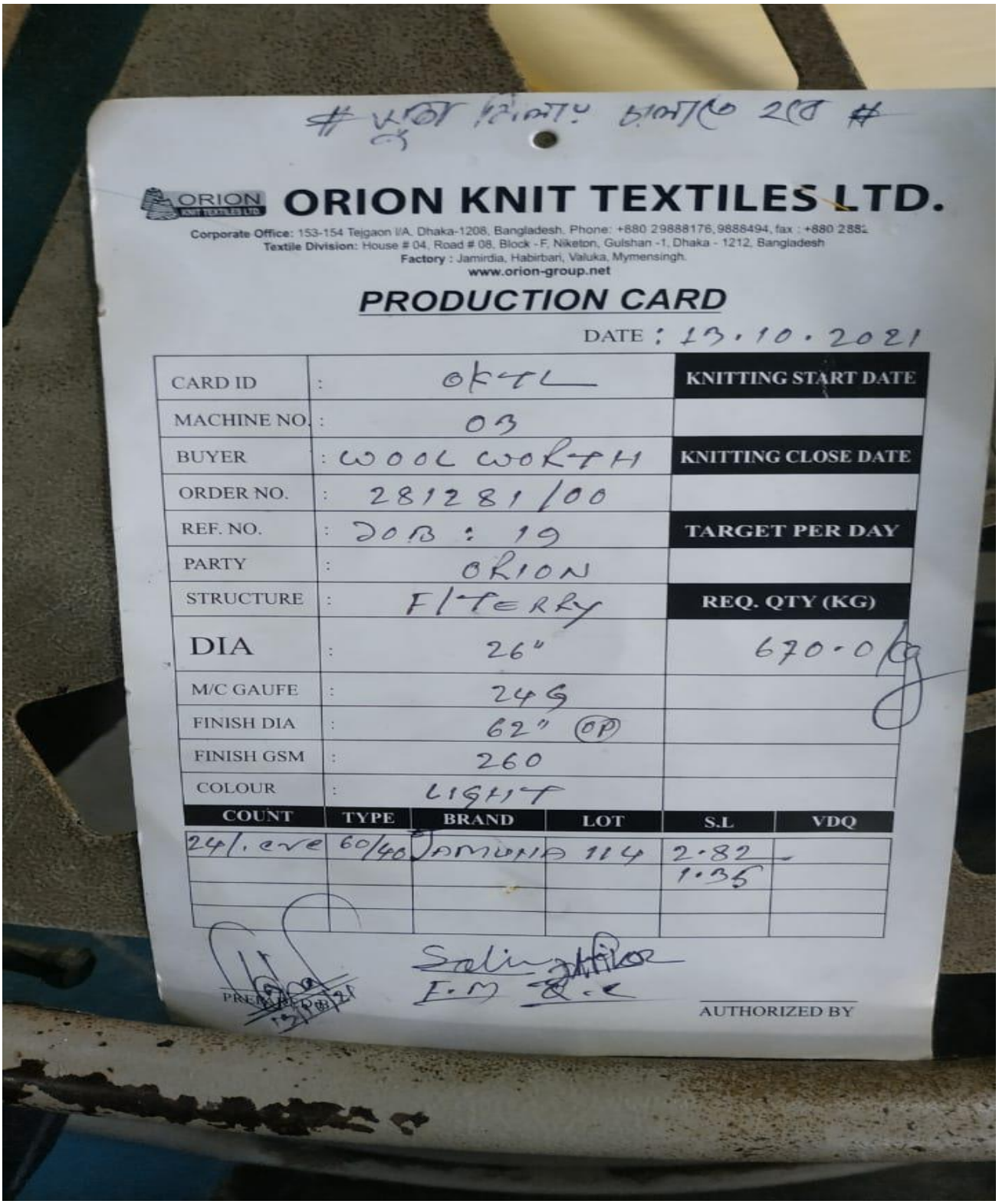
3.Yarn count affecting finished GSM of Single Jersey Knitted Fabric :

GSM' signifies 'Gram per square meter' that is the heaviness of texture in gram per one square meter. The GSM of texture is one sort of determination of texture which is vital for a material architect for understanding and creation of texture. It is fundamental for know the heaviness of the texture prior to assembling and in the wake of getting the completed texture.

Some data collected from the Orion Knit Textile Ltd. is mentioned in table given below :

Yarn Count	Finished GSM	Fabric Tightness
24	260	22.78
26	200	19.48
30	140	10.97
30	140	10.95
30	140	10.94
30	140	10.92
30	140	10.91
30	140	10.90
30	140	10.97
32	120	06.87

Fig : Table 8



ORION KNIT TEXTILES LTD.

Corporate Office: 153-154 Tejgaon I/A, Dhaka-1208, Bangladesh. Phone: +880 29888176, 9888494, fax : +880 2882
Textile Division: House # 04, Road # 08, Block - F, Niketon, Gulshan -1, Dhaka - 1212, Bangladesh
Factory : Jamirdia, Habirbari, Valuka, Mymensingh.
www.orion-group.net

PRODUCTION CARD

DATE : 13.10.2021

CARD ID	: OKTL	KNITTING START DATE	
MACHINE NO.	: 03		
BUYER	: WOOL WORTH	KNITTING CLOSE DATE	
ORDER NO.	: 281281/00		
REF. NO.	: JOB : 19	TARGET PER DAY	
PARTY	: ORION		
STRUCTURE	: F/TERRY	REQ. QTY (KG)	
DIA	: 26"	670.0 Kg	
M/C GAUFE	: 24G		
FINISH DIA	: 62" (OP)		
FINISH GSM	: 260		
COLOUR	: LIGHT		

COUNT	TYPE	BRAND	LOT	S.L	VDQ
24/1 ere	60/40	AMUHA	114	2.82	
				1.35	

PREPARED 13/10/21

Salim
E.M

AUTHORIZED BY

Fig : Production Card-1

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Factory : Jamirdia, Habirbari, Valuka, Mymensingh
www.orion-group.net

PRODUCTION CARD

DATE 17-10-21

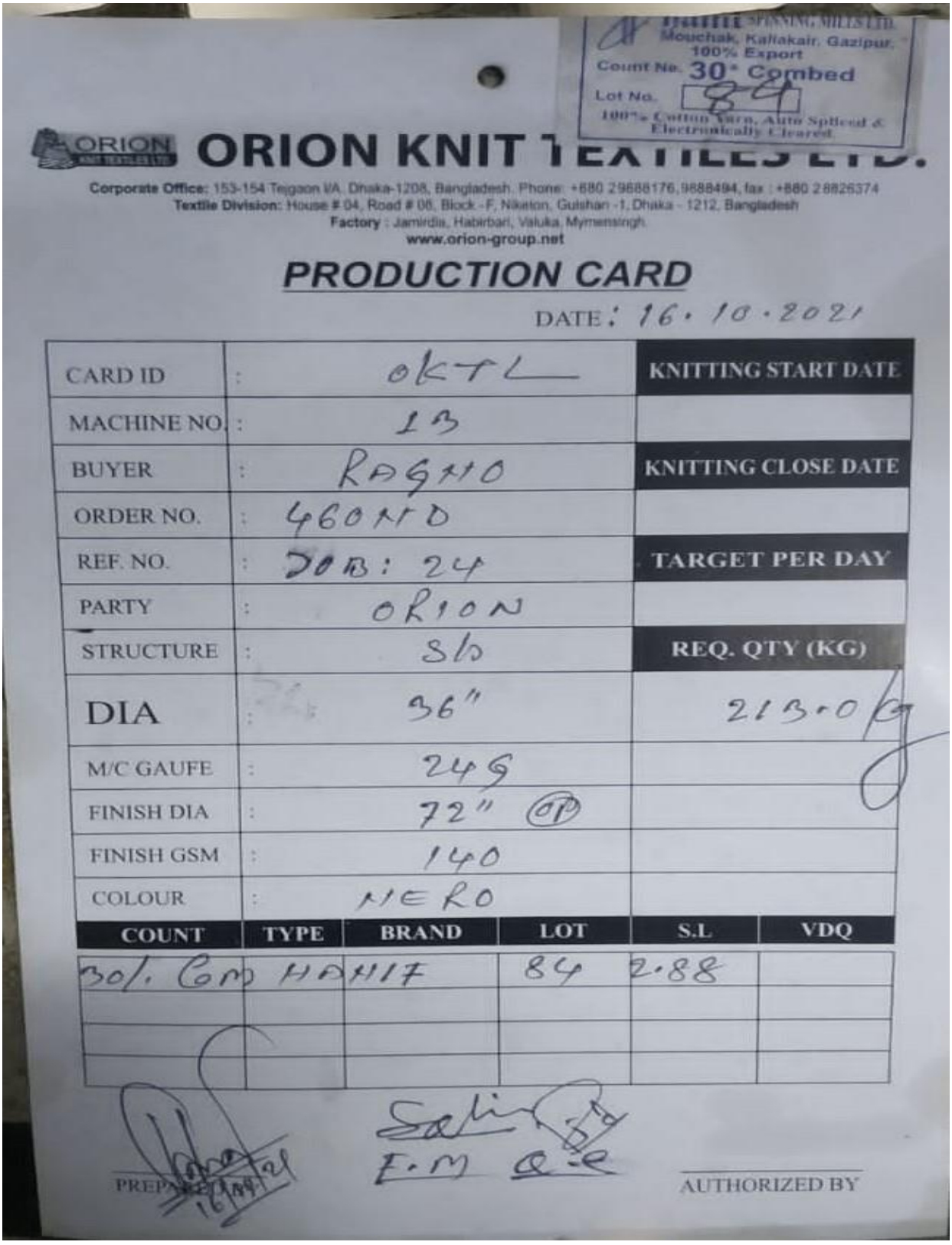
CARD ID	:		KNITTING START DATE
MACHINE NO.	:	01	
BUYER	:	Oxbow	KNITTING CLOSE DATE
ORDER NO.	:	Ecl-243	
REF. NO.	:		TARGET PER DAY
PARTY	:	Ecl-	
STRUCTURE	:	S/Lacost	REQ. QTY (KG)
DIA	:	26	20-Kg
M/C GAUFE	:	24" G	
FINISH DIA	:	Any (OP)	
FINISH GSM	:	200	
COLOUR	:	R.F.D	

COUNT	TYPE	BRAND	LOT	S.L	VDQ
26/1 Com		Kewalram	5040	2.65	

PREPARED BY 17/10/21

AUTHORIZED BY

Fig : Production Card-2



Mouchak, Kaliakair, Gazipur.
100% Export
Count No. 30* Combed
Lot No. 84
100% Cotton Yarn, Auto Spliced & Electronically Cleared.

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Factory : Jamirdia, Habirbari, Valuka, Mymensingh.
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PRODUCTION CARD

DATE: 16.10.2021

CARD ID	:	OKTL	KNITTING START DATE
MACHINE NO.	:	13	
BUYER	:	RAGNO	KNITTING CLOSE DATE
ORDER NO.	:	460ND	
REF. NO.	:	JOB: 24	TARGET PER DAY
PARTY	:	ORION	
STRUCTURE	:	S/J	REQ. QTY (KG)
DIA	:	36"	213.0 Kg
M/C GAUFE	:	24G	
FINISH DIA	:	72" (OP)	
FINISH GSM	:	140	
COLOUR	:	NERO	

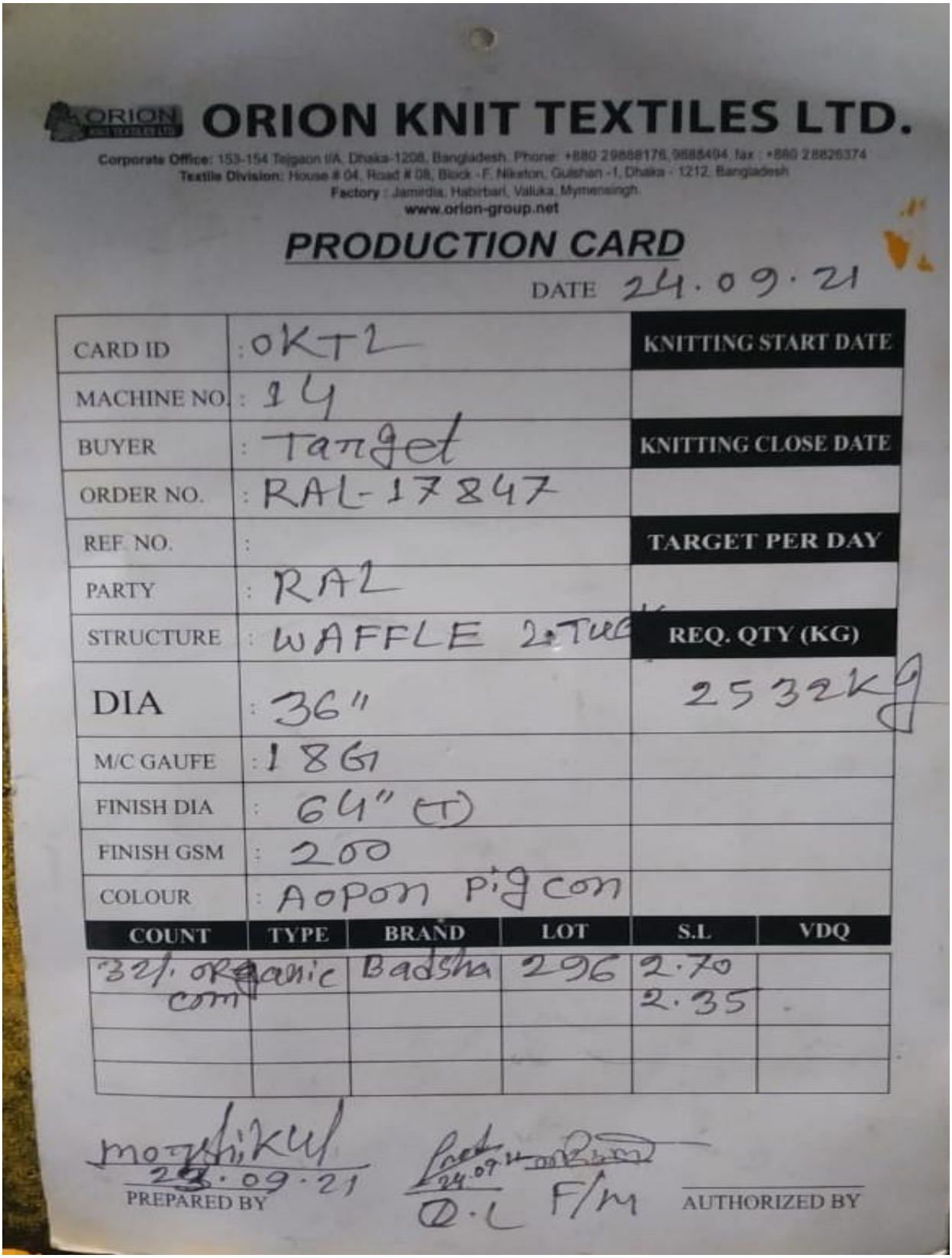
COUNT	TYPE	BRAND	LOT	S.L	VDQ
30/1 Cm		HAH17	84	2.88	

PREPARED BY

E.M Q.C

AUTHORIZED BY

Fig : Production Card-3



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Corporate Office: 153-154 Tejgaon I/A, Dhaka-1208, Bangladesh. Phone: +880 29888176, 9888494, fax : +880 28826374
Textile Division: House # 04, Road # 08, Block - F, Niketon, Gulshan -1, Dhaka - 1212, Bangladesh
Factory : Jamirdia, Habirbari, Valuka, Mymensingh.
www.orion-group.net

PRODUCTION CARD

DATE 24.09.21

CARD ID	: OKT2	KNITTING START DATE
MACHINE NO.	: 14	
BUYER	: Target	KNITTING CLOSE DATE
ORDER NO.	: RAL-17847	
REF. NO.	:	TARGET PER DAY
PARTY	: RAL	
STRUCTURE	: WAFFLE 2 TUC	REQ. QTY (KG)
DIA	: 36"	2532Kg
M/C GAUFE	: 18G	
FINISH DIA	: 64" (T)	
FINISH GSM	: 200	
COLOUR	: Aopon Pigeon	

COUNT	TYPE	BRAND	LOT	S.L	VDQ
32/1 Organic Com		Badsha	296	2.70 2.35	

Mozahidul
25.09.21
PREPARED BY

Load 24.09.21
O.L F/M

AUTHORIZED BY

Fig : Production Card-4

Chapter 4

Results Discussion :

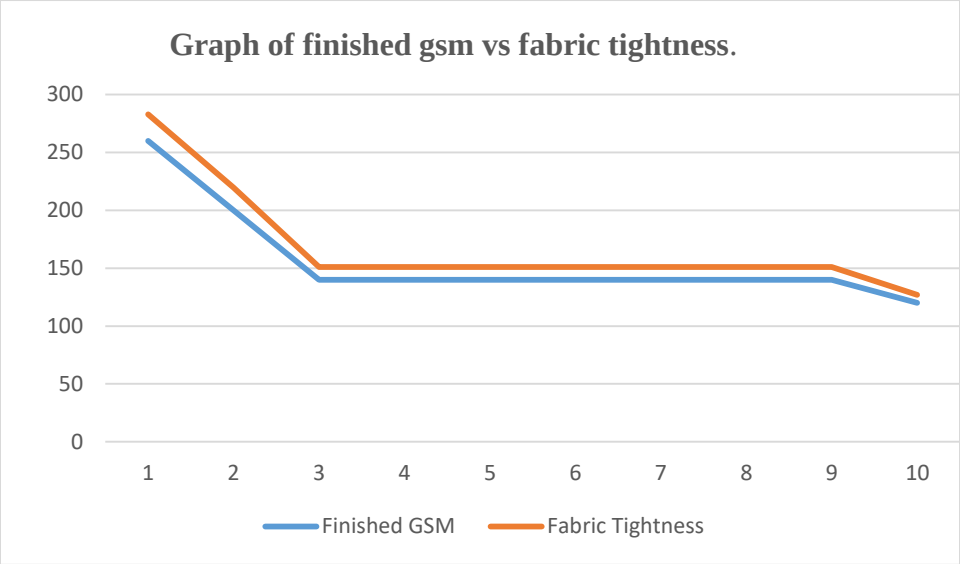

Fig : Graph of finished gsm vs fabric tightness.

We have got some test results of fabric tightness from Orion Knit Textile ltd.with finished GSM, we analyzed the data and observed a common relation between finished GSM and Fabric tightness. We noticed previously that the finished GSM decrease gradually with increasing yarn count.From this graph we can see the relation between finished gsm and fabric tightness.As we can see here for gradually decreasing the finished gsm, the fabric tightness is also decreasing gradually.That means the relation between finished gsm and fabric tightness are proportional to each other here.

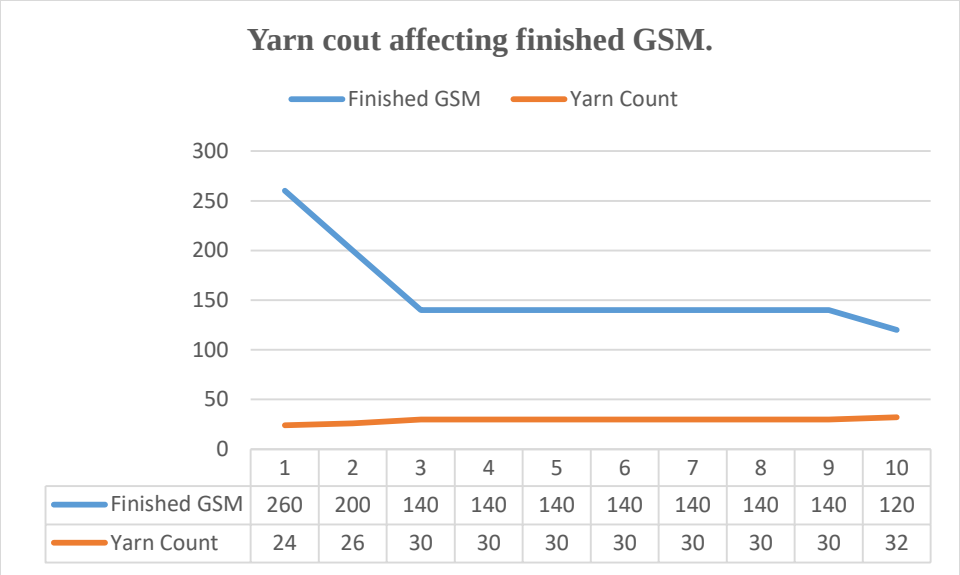

Fig : Graph of Yarn count vs finished GSM.

After analyzing all our data collected from orion knit textile ltd. we can see that during knit fabric production there is a huge connection between the yarn count and finished GSM. Even with the changes of stitch length there is no difference in the finished GSM if we keep the yarn count same. During out observation we noticed that the stitch length were almost same or some fractional differences for the all machines but there was'nt any differences for the value of the finished GSM. As we can see that for increasing yarn count , the finished gsm gradually decreased. If we notice the graph and data table we can see that there are seven observations for yarn count value 30 Ne with some fractional variations of stitch length but all the results are same for finished GSM. On the other hand whenever we increase the yarn count value from 30Ne to 32 NE the finished GSM falls at 120 GSM. That means here the relation between yarn count and finished GSM is showing completely opposite.

Chapter 5.

Conclusion :

Conclusion : Count is the core parameters of yarn which controls various properties of knitted fabric. The purpose of the study is to show how count affecting knitted fabric properties yarn. In this whole study we increased the value of yarn count and shown that while increasing the value of yarn count the finished GSM decreased gradually while we kept the Stitch Length same for all observations. Finally we reached to an conclusion that if we keep the stitch length same and increase the yarn count gradually ,the value of finished GSM will decrease gradually in Single Jersey circular knitting machine.

References:

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