



EFFECT OF TM AND LOOP LENGTH ON DRAPE CO-EFFICIENT OF SINGLE JERSEY KNITTED FABRICS

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ABSTRACT

These are the days twist plays vital role in the hosiery yarn. The end applications of the knitted fabric are mainly depend upon the TM of Yarn. In this Research work cotton yarn and polyester cotton Blended (65%+35+) yarn used spun with same count of 30 Ne produced on Ring and compact spinning machines. Three TM levees are selected 3.32, 3.66, 3.94, to produce yarn on both spinning system.

Three different loop lengths like, 0.27, 0.30 and 0.33 are selected produce single jersey plain knitted fabrics. Gamut of properties are studied with respect to geometrical and drape co-efficient of fabrics. The samples are washed for five cycles.

Key words: TM, Drape co-efficient, Compact and Loop length

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1 INTRODUCTION

The term knitting is used to describe the technique of constructing textile structures by forming continuous lengths of yarn in to vertically intermeshed loops. Knitted fabrics constitute horizontal row of loop termed as course and vertical columns of loops

termed as wale. Knitted fabrics are popular for their shape fitting properties. Softer handle, bulkier in nature with high extension.

2 SINGLE JERSEY KNITTED FABRICS

It is plain knit structure with face loop on one side and back loop on other side. The structure is produced when all the needles of single bed machines knit at each feed. This structure can be of technical face or technical back.

Most of the single jersey fabrics are produced on circular knitting machine whose latch needle, cylinder, and sinker ring revolve through the stationary knitting cam systems. The yarn is supplied from baby cones through the suitable tensioners.

Single jersey knitted fabrics provides comfortable wear to almost any style of garment, Most of the knits contour to the body silhouette, without restricting movement. These makes knitted fabrics ideal for underwear body wear and active wear garments.

3 FEATURES OF SINGLE JERSEY FABRICS

Light in weight

- Appearance of face and body are different
- Soft to touch
- Occurrence of curl or roll of fabrics at edges is present
- Extensively used for manufacturing of T. Shirts.
- Unraveling of fabric course from either sides is possible

4 MATERIALS AND METHODOLOGY

For this research work we have used following materials for producing sample

Sl. No	Material	Count	Spinning System	TM Spinning Variables	Loop Length Knitting Variables
1	100% cotton	30 Ne	Ring and compact	3.32, 3.66, 3.39	0.27, 0.30, 0.33
2	Polyester 65% and 35% of Cotton Blend	30 Ne	Ring and compact	3.32, 3.66, 3.39	0.27, 0.30, 0.33

5 DETAILS OF THE FIBER PROPERTIES USED

Type of material	Fibre
Type of cotton	Shankar 6
2.5% span length of cotton	29.5 mm
Type of polyester fiber	33 mm
Micronaire value	3.8
Uniformity	48%
Maturity	0.9
Strength of fiber	22–75 gms / tex

Two yarn samples are spun separately on ring spinning and compact spinning machines.

6 COMPACT SPINNING TECHNOLOGY

This spinning technology mainly aims at the reduction of spinning triangle in order to reduce the yarn hairiness significantly addition to that other properties of yarn such as yarn strength, uniformity, co-efficient of variation have also been improved.

7 OBJECTS OF COMPACT SPINNING

High and effective fiber utilization

- Low hairiness
- Fewer weak points
- High abrasion resistance
- Intensive dye penetration
- No singeing required

8 YARN SAMPLE DEVELOPMENT

Three different twist multipliers were used to spin cotton ring, compact and pc blend. These yarns were used to develop single jersey knitted fabrics using three different loop length then totally 18 samples of single jersey knitted fabrics were produced and tested for various geometrical and dimensional properties.

9 KITTING MACHINE SPECIFICATION

Type of machine	Circular knitting machine
Make	Pailung, Taiwan
Needle	Latch Needle
M/C Dia	24
Gauge	24
No of feeders	72
Feeder type	positive storage feeder
No of Needles	1800

The grey samples were kept for a period of minimum 24 hours at a temp of 25 plus or minus 2 and RH of 65% According to the standard testing procedure the following various tests are carried out for all the samples.

Geometrical parameters

- Wales per inch and course per inch
- Loop length
- Stitch density
- Length constant
- Width constant
- Loop shape factor

- Tightness factor

The samples are processed under starfish method for one to four cycles in a standard method suggested by cotton technology international Manchester UK. After the samples tested for drape co-efficient values for the research work average value of five reading used finally first cycle values and last cycle values are used to conclude the results.

10 RESULTS AND DISCUSSIONS

Avg DC values for single jersey knitted fabrics produced form ring spinning with cotton yarn

Table 1

Fiber	Spinning system	TM	Loop length	Washing cycles and DC values		% of Shift value
				I	IV	
Cotton 100% 30 Ne	Ring	3.32	0.27	0.40	0.33	17.5
			0.30	0.42	0.33	21.4
			0.33	0.42	0.31	26.1
Cotton 100% 30 Ne	Ring	3.66	0.27	0.35	0.39	-11.4
			0.30	0.38	0.37	2.6
			0.33	0.35	0.37	-5.7
Cotton 100% 30 Ne	Ring	3.94	0.27	0.36	0.39	-8.3
			0.30	0.36	0.40	-11.1
			0.33	0.33	0.39	-18.1

Avg DC values for single jersey knitted fabrics produced form compact spinning with cotton yarn

Table 2

Fiber	Spinning system	TM	Loop length	Washing cycles and DC values		% of Shift value
				I	IV	
Cotton 100% 30 Ne	compact	3.32	0.27	0.43	0.39	9.3
			0.30	0.46	0.39	15.2
			0.33	0.40	0.39	2.5
Cotton 100% 30 Ne	compact	3.66	0.27	0.46	0.37	19.5
			0.30	0.45	0.43	4.4
			0.33	0.43	0.42	2.3
Cotton 100% 30 Ne	compact	3.94	0.27	0.47	0.42	10.6
			0.30	0.45	0.44	2.2
			0.33	0.45	0.37	17.7

Avg DC values for single jersey knitted fabrics produced form ring spinning with P/C (67% / 33%) yarn

Table 3

Fiber	Spinning system	TM	Loop length	Washing cycles and DC values		% of Shift value
				I	IV	
P/C 67/33 Blend 30 Ne	Ring	3.32	0.27	0.40	0.42	-5
			0.30	0.40	0.39	2.5
			0.33	0.41	0.41	0
P/C 67/33 Blend 30 Ne	Ring	3.66	0.27	0.39	0.41	-5
			0.30	0.41	0.41	0
			0.33	0.42	0.41	2.3
P/C 67/33 Blend 30 Ne	Ring	3.94	0.27	0.40	0.39	2.5
			0.30	0.32	0.34	-6.2
			0.33	0.31	0.32	-3.2

Avg DC values for single jersey knitted fabrics produced from compact spinning with P/C (67% / 33%) yarn

Table 4

Fiber	Spinning system	TM	Loop length	Washing cycles and DC values		% of Shift value
				I	IV	
P/C 67/33 Blend 30 Ne	compact	3.32	0.27	0.32	0.34	-6.2
			0.30	0.31	0.34	9.6
			0.33	0.32	0.32	0
P/C 67/33 Blend 30 Ne	compact	3.66	0.27	0.31	0.37	-19.3
			0.30	0.31	0.31	00
			0.33	0.30	0.30	0
P/C 67/33 Blend30 Ne	compact	3.94	0.27	0.32	0.32	0
			0.30	0.31	0.33	-6.4
			0.33	0.31	0.30	3.2

11 FROM THE ABOVE FOUR TABLES THE FOLLOWING CONCLUSIONS ARE DRAFTED

TM value has significant effect on properties of knitted fabrics in the case of cotton ring and cotton compact yarns the TM 3.32 has much influence the drapé property of the knitted fabric

- In the case of TM 3.66 and 3.94 the D.C value has not been effected
- In the case of P/C Ring TM of 3.94 Ring and compact yarn the TM 3.94 affected but 3.32 and 3.66 not affected because of content of polyester.
- From all the four tables it clears that the trend shows that change in loop length and change in TM changes the D.C values and the construction of the fabrics.
- From the tables it clears that variations in the TM and loop length after subjected to washing fabrics samples are softer.

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