

New Dimension to Denim with Lycra Yarn

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Abstract—The denim fabric manufacturing is the most prominent and developing technology in the textiles. There are many innovations in the field of denim fabric manufacturing which opens the new application areas with improved performance. Also denim is first choice of youngsters in their garment as fashion is concerned. Now a days as a fashion industry demanding for more fashionable garments with aesthetic as well as durability and economically affordability with quality of a fabric which can be well satisfied by denim fabric. This can be achieved by modifying construction detail of a denim fabric by certain experimentation methods. This work is mainly focused on the use of lycra yarn in weft direction to study the drape and stiffness properties of a denim fabric which plays important role in fabric handle. Test results gives most suitable use of denim fabric in garment designing and construction for fashion industries. It also establishes co-relation with drape and stiffness properties of a denim fabric with lycra yarn filling.

Keywords: Lycra; Drape; Stiffness; Denim

INTRODUCTION

Now a days as the denim fabric is mostly utilized in garment designing due to its durability as well as its appeal towards the fashion industry in youngsters. Also it requires less care during its use. Generally selection of a fabric for garment designing depends upon final aesthetics as well as handle properties. So the modifications and innovations are turn towards denim manufacturing. There are many innovations in the field on denim fabric manufacturing which opens the new application areas with improved performance. Stretch denim usually incorporates an elastic component (such as Elastane) into the fabric to allow a degree of stretchability in garments. The stretchable denim fabrics give the elasticity to fabric so that it closely fit to body without restricting the body movement, hence providing comfort to the wearer. Lycra yarn is added to denim which increase its stretch and recovery properties. Generally, adding 2 -3% of Lycra with cotton will stretch the fabric over the body providing a more comfortable fit. Stretch denims are usually of the 3/1-twill structure with the warp yarn floating on the fabric surface of weft. Weft supply package must be uniformly wound [1].

There are many ways to estimate fabric handle by various properties. Fabric handle as its name implies is concerned with the feel of the material and so depends on the sense of touch. When the handle of fabric is judged the sensation of stiffness or limpness, hardness or softness and roughness or smoothness, are all made use of fabric by certain experimentation method in constructional details of fabric. Drape has a rather different

meaning and very broadly is the ability of a fabric to assume a graceful appearance in use. Stiffness of fabric is a key factor in the study of handle and drape. One of the recent developments of denim fabric use of lycra yarn during its construction, which will provide perfect stretchability during the body movement. Generally the lycra yarn added denim fabric to increase stretchability. Use of lycra yarn in filling increase its stretchability and comfort property. One study specifies lycra having a coil like structure and its tendency to recover to its initial dimension.[1] Generally if we add more lycra % during yarn formation it will decrease comfort level of fabric. So it is preferred only required amount of lycra should be used in yarn to achieve final objective i.e. Required stretch % for comfort.

The main purpose of this study is to observe changes occurred in denim fabric by changing number of lycra yarn fillings in construction. The type of changes appeared in drape and stiffness behavior of a fabric is studied and results are analyzed. These results are useful in designing of various garments with denim fabric for fashion industry.

Drape is one of the most important fabric properties and plays an important role in garment appearance. It is “the extent to which a fabric will deform when it is allowed to hang under its own weight.” Fabric drape is a qualitative term because normally human eyes assess it. This subjective evaluation of fabric drape can provide an understanding of human perception and fashion trend to some extent, but the results are inconsistent because of personnel preference, taste, and various fashion trend changes. It is essential to have an effective objective for evaluations of fabric drape. Drape is one of the main factors that influence the aesthetic, appearance of a fabric and has an outstanding effect on the formal beauty of the fabric. For this reason, the measurement and understanding of drape are required to specify the performance of fabric, used to cloths the human body [2].

I. MATERIALS AND METODOLOG

In this study denim 3/1Twill weave fabric samples with 16 Ne warp yarn count and 14 Ne weft yarn count are prepared. Prepared fabric samples are given proper code. Fabric coding is done such as 14 Ne weft yarn without lycra as D1 with number of weft yarn fillings 40, and fabric sample with 2 % lycra content in weft yarn of 14 Ne count as D2, D3, D4, and D5 by varying number of weft yarn filling 40, 45, 50, and 55 respectively.

In all prepared fabric sample the warp and weft count maintained constant only pick density was changed.

TABLE I. VARIOUS PARAMETER OF PREPARED FABRIC SAMPLE

Fabric	Fabric Code	Lycra %	PPI
Denim (3/1)	D1	0	40
Denim (3/1)	D2	2	40
Denim (3/1)	D3	2	45
Denim (3/1)	D4	2	50
Denim (3/1)	D5	2	55

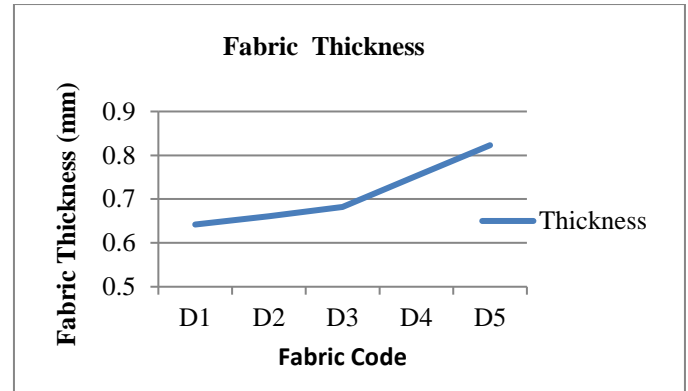
II. TESTING OF FABRIC SAMPLES

Testing of fabric sample is made in standard atmospheric condition. Fabric stiffness is tested according to ASTM D 1388 – 96 (Reapproved 2002) with Shirley stiffness testing instruments. [3] Stiffness of fabric plays important role in draping behavior of fabric. Also Draping property of a fabric is tested with drape meter at standard testing condition.

III. RESULTS AND DISCUSSION

TABLE II. TEST RESULTS OBSERVED FOR VARIOUS PARAMETERS

Fabric Code	Thickness	Flexural Rigidity (mg/cm)		Drape Coeff. %
		Warp	Weft	
D1	0.642	2037.96	644.08	35.08016
D2	0.661	2262.328	1186.2	32.13687
D3	0.682	3045.766	2067.7	29.24145
D4	0.753	4030.6135	2628.8	28.76286
D5	0.823	4726.1395	3365.2	28.23642



From the graphical analysis of readings it is observed that the fabric drape coefficient decrease with increase in flexural rigidity and thickness with increase lycra weft yarn fillings.

CONCLUSION

- With use of lycra fillings results show that the constructional detail of fabric can alter the fabric behavior as well as its effect in final fabric appearance.
- The fabric thickness goes on increasing as density of lycra fillings increase which also improve fabric bulk due to contraction of fabric in warp direction.
- Though increase in flexural rigidity of fabric is observed on the basis of test results but as the lycra yarn is used in weft direction which shows reduction in drape coefficient this increase fabric comfort.

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