Available online at **www.joac.info**

ISSN: 2278-1862

Journal of Applicable Chemistry

2019, 8 (4): 1771-1775

(International Peer Reviewed Journal)

Effect of Weaves on Properties of Fabrics Made with Texturised Weft Yarn

Rajendra Singh*

Government Women's Polytechnic College, Kota-324007, Rajasthan, **INDIA**

E-mail: rajsingh3026@gmail.com

Accepted on 29th May, 2019

ABSTRACT

The aim of this work is to investigate effect of weaves on the properties of fabrics made with texturised weft yarn .In this work, Plain and twill woven fabrics made with texturised weft yarn have been under gone by crease recovery test, drape test and stiffness test. The results indicate that crease recovery and drape effect of twill fabrics is better than plain woven fabrics. This is because twill weave do not interlace as many times as they do in a plain weave and have more space for close packing of yarns. But stiffness of plain fabric is better than twill woven fabric.

Graphical Abstract

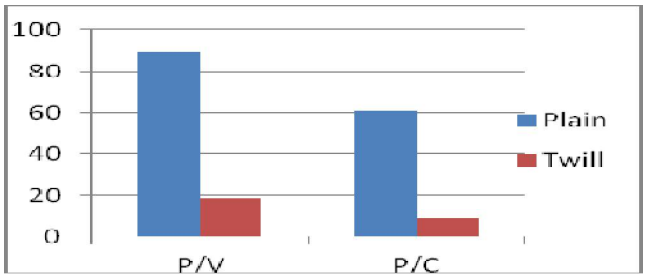

Figure 4. Effect of the weave and weft yarn on bending modulus.

Keywords: Crease recovery test, Drape test, Stiffness test, Texturised weft yarn.

INTRODUCTION

It is well known that interlacement of warp and weft is called weaving while the placement of warp and in fabric is called weave. It is the fundamental construction unit of a fabric and weave is a constructional unit, therefore it responsible for the structural properties of a fabric. Since, the different weaves have different float length so, weave structure have substantial effect on the yarn consumption and fabric properties like crimp and load elongation characteristics of woven fabric which leads which contributes to Geometrical and mechanical properties of the fabric.

Here it has done on the fabric with plain weave and twill weave. In this weave structure, weft yarn passes through the warp yarn alternatively. Twill weave is created by passing the weft thread

over two or more warp threads and then repeating that pattern one warp thread over, so that a diagonal line is formed.

Plain weave: Plain weave is the simplest weave structure among all of the design of woven fabric. Most of the woven fabrics are manufactured by this weave. Very tight fabric is formed by this plain weave. In this weave structure, weft yarn alternately passes over and under warpyarn. We can find the many plain cloth in the market namely Muslin, Linen, Alpaca, Taweta, Calico, Long cloth etc., [**1**].

Texturizing: Texturizing processes were originally applied to man-made fibers to reduce such characteristic as transparency, slipperiness, and the possibility of pilling (formation of small fiber tangles on a fabric surface). Texturizing processes make yams opaquer improve appearance and texture, and increase warmth and absorbency. Textured yams are man-made continuous filaments, modified to impart special texture and appearance. In the production of abraded yams, the surfaces are roughened or cut at various intervals and given added twist, producing a hairy effect. Bulking creates air spaces in the yams, imparting absorbency and improving ventilation. Bulk is frequently introduced by crimping, imparting waviness similar to the natural crimp of wool fiber: by curling, producing curls or loops at various intervals; or by coiling, imparting stretch. Such changes are usually set by heat application, although chemical treatments are sometimes [**2-4**].

MATERIALS AND METHODS

Materials: All the yarns were procured from open market with a condition that all yarns are of same count, same fiber specifications so that there is no major variation in the yarns.

P**reparation of fabric samples:** Four different samples were prepared for the current studies. All the samples were prepared on the same loom under same conditions. Both plain and twill weave samples were prepared on Cimcool Auto loom having reed 68" and the speed of the loom is 125-140 RPM with Weft insertion system (Automatic cop change). The wave details have been given in table 1 [**5, 6**].

Table 1. Weave details of current experiment

Plain		Twill	
$2/30^{s}$ P/V 65/35 Warp	**$2/30^{s}$ P/C 65/35 Warp**	**$2/30^{s}$ P/V 65/35 Warp**	**$2/30^{s}$ P/C 65/35 Warp**
300 D Texturised Weft	300 D Texturised Weft	300 D Texturised Weft	300 D Texturised Weft

Measurement mechanical properties of fabric: Mechanical properties including tensile, stiffness, crease recovery, drape and thickness were measured on different testers. All the fabrics were tested for mass per unit area, thickness, tensile properties using instruments according to the normally accepted test namely crease recovery, stiffness and drape Test.

RESULTS AND DISCUSSION

Mechanical Properties: The mechanical properties of a fabric mainly depend on the fiber type, shape and structure as well as on fiber mix used in manufacturing the fabric. The spinning system and the conditions used for manufacturing the yam also significantly influence yam structure and its properties, filch, in turn affect the fabric handle. The other factors which contribute to fabric handle are fabric construction parameters (weave structure, fabric sett and areal density) and wet processing conditions used during the finishing of the fabric.

Influence of weave and weft yarn on crease recovery properties of the fabric: The crease recovery properties of plain and twill weave fabric samples are shown in table 2 and 3.While effect of the waves and weft yarn on crease recovery angle are reported in figure 1 and 2.

Table 2. Influence of weave and weft yarns on crease recovery properties of the fabric (face to face).

Face to Face			
P/V		P/C	
WARP WISE	WEFT WISE	WARP WISE	WEFT WISE
107.64	106.98	106.33	106.72
108.00	107.42	107.22	107.25

Table 3. Influence of weave and weft yarns on crease recovery properties of the fabric (Back to Back).

Back to Back			
P/V		P/C	
WARPWISE	WAFTWISE	WARP WISE	WAFT WISE
107.95	107	107.12	106.58
108.23	107.55	108	107.62

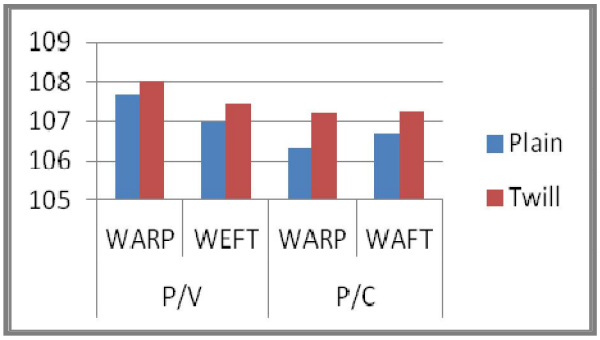

Figure 1. Effect of the waves and weft yarn on crease recovery angle (face to face)

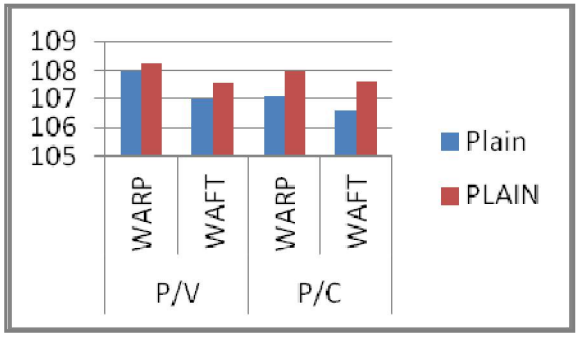

Figure 2. Effect of the weave and weft yarn on crease recovery angle (Back to back).

The crease recovery is one of the elementary properties of fabrics which affect product performance. Crease recovery is ability of the fabric to return to its original shape after removing the folding deformations. The crease recovery of fabrics is determined by measuring crease recovery angle. As crease recovery angle is increases the fabric crease recovery is increases. Crease recovery angle and bending length are inversely proportionate to each other. It is observed from the table 2 and 3 that the crease recovery angle of twill fabric is increases as compare to plain fabric. Twill fabric exhibited higher crease recovery than plain fabric due to its structure and weave.

Influence of weave and weft yarn on drape properties of the fabric: The drape properties of plain and twill fabric samples are shown in table 4.

Effect of the weave and weft yarn on drape: Drape the ability of fabric to fall into graceful folds. It is a term used to describe the way fabric hangs under its own weight. It has an important effect on how garments look during wearing. The drape quality require for a fabric will differ completely depending on its end use.

Table 4. Influence of wave and weft yarns on drape properties of fabric

Weave	P/V		P/C	
	Face	Back	Face	Back
Plain	0.672	0.648	0.660	0.698
Twill	0.700	0.728	0.761	0.784

It is observed from the table 4 that drape of twill weave is better than plain weave, the yarn can be packed tightly together. This makes the fabric stronger, thicker and better able to drape a plain weave made from the same materials.

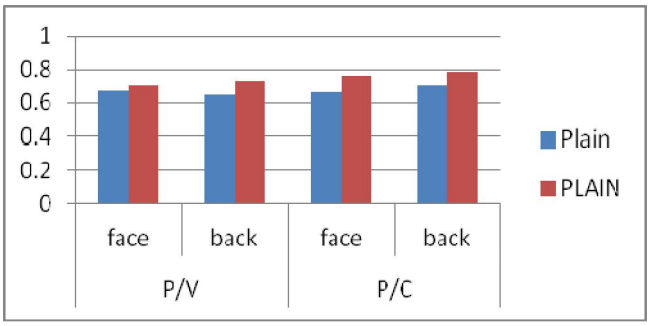

Figure 3. Effect of the weave and weft yarn on drape co-efficient.

Influence of weave and weft yarn on stiffness properties of the fabric: The stiffness properties of plain and twill fabric samples are shown in table 5.

Table 5. Influence of wave and weft yarns on stiffness properties of fabric

Weave	P/V	P/C
Plain	89.42	60.81
Twill	18.71	8.57

Stiffness is one of the most widely used parameter to measure bending rigidity, fabric handling and drape. Fabric stiffness and handling is an important factor the end product. Fabric stiffness in related to its properties such as fiber material, yarn count, yarn sett and fabric structure. Crease recovery angle and bending length are inversely proportionate to each other.

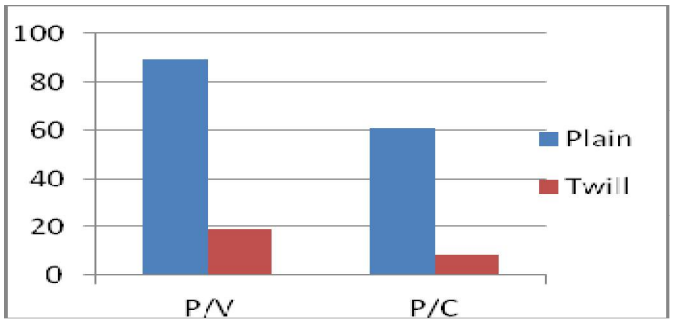

Figure 4. Effect of the weave and weft yarn on bending modulus.

APPLICATION

These results useful for making good fabric

CONCLUSION

In the present work, effect of different weave (Plain and Twill) and weft yarn on the comfort properties have been studied. In this study $2/30^{S}$ polyester/viscose (65/35), has been used in the warp and 300D weft yam is being used in the weft with two weaves. The crease recovery angle of twill

fabric is increases as compare to plain fabric: Twill fabric exhibited higher crease recovery than plain fabric due to its structure and weave: Drape of twill weave is better than plain weave because twill weave do not interlace as many times as they do in a plain weave, the yarns can be packed tightly together. This makes the fabric stronger, thicker, and better able to drape than a plain weave made from the same materials: Bending length and bending modulus of plain is higher than twill.

ACKNOWLEDGEMENTS

RS is thankful to the Ravindra Meena and Department of Textile Technology, Career Point University, Kota for giving the opportunity to undertake M. Tech course.

REFERENCES

[1]. Textile Design and Colour, W. Watson, Newnes-Butterwortgs, **1975**.
[2]. M. Bhatia, A. Thakkar, V.D. Shah,Studies of Stretchable Airjet Textured Yarn – A Experimental Review, *Inter. J. Sci. Res. Dev.*,**2015**, 3, 83-86.
[3]. A. Mukhopadhyay, V.K. Kothari, Crease Recovery of Fabrics with Air-jet Textured Weft Yarns, *Indian J. Fib. Text. Res.* **2002**, 27, 393-396.
[4]. Textiles-Fiber to Fabric, B. P. Corbman, The Gregg/McGraw-Hill marketing series, New York, **1983**.
[5]. Principles of Textile Testing, J. E. Booth, Chemical Publishing, New York, **1970**.
[6]. Handbook of Textile Testing and Quality Control, E.B. Grover and D.S. Hamby, Textile Book Publishers (Inter science), New York, **1960**