ANALYSIS OF MATTE FINISH IMPACT ON COTTON FABRIC MECHANICAL AND COMFORT CHARACTERISTICS

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Abstract - *Printing on textile surfaces is feasible exploitation either direct or transfer technique. Within the direct technique design is transferred to films and then transferred to screens, once then the transfer to textiles is distributed. To use the matte ink to the fabric, heat pressure is employed. Completely different environmental influences will have an effect on such material. A number of them area unit rubbing, washing, heat, tearing, moisture, washing, etc. During this study, associate analysis of the impact that tearing, bursting, stiffness, rubbing and laundry has on the print are done. Within the given analysis, 2 differing types of cotton material were used as a printing medium. Each materials area unit 100% cotton, however, they disagree within the structure of the material. The primary material could be a reactive dyed plain-woven material and therefore the alternative could be a reactive dyed warp knitted fabric.*

KeyWords: *tearing, bursting, rubbing, washing, directprinting, textile, materialstrength*

1. INTRODUCTION

Knit material is made by exploitation one set of yarn by interloping. Knit material is versatile, and may be without delay used for constructing little items, creating it ideal for socks and hats. Knit material is additional sturdy. These materials will be as skinny as mesh or as thick as slipover fleece. Attributable to the symmetry of yarns on either side of knit material, they curl a touch on the sides. It is recommended that the form of the unwoven loop is decided by minimum energy conditions [5]. Knit material is created from single color yarn, however there area unit ways in which to figure in multiple colours; whereby, yarns will be bleached to supply multi color product. Knit material was earlier hand woven; but, currently it's made with textile machine or flat textile machine. T-shirt, polo shirt, inner wear or leggings will be made of knit material.

Textile shaped by weaving could be a plain-woven material. Plain-woven material is usually made on a loom and created on several threads, plain-woven on warp or thread. The kind of weave on plain-woven materials influence their thermal insulation properties[8]. Two or additional threads that interlace at right angles to at least one another; manufacture a plain-woven material. Plain-woven material solely stretches diagonally in bias direction. Plain-woven material will be made from hand loom to loom. Fibres of a plain-woven material area unit wound in such the way that they produce criss- cross patterns. Plain-woven materials area unit typically used for stitching and their edges got to be finished properly, since they unravel simply. Shirt, trousers and jeans will be created from plain-woven material. plain- woven material is relatively thick, attributable to the utilization of 2 or additional yarns. Both the knit and plain- woven materials area unit coated with reactive dye before printing.

Matte finishes have a really rough nonetheless shiny feel. After they area unit used over completely different surface they have an inclination to alter the characteristics of their various. Here we've used the matte end as textile printing material to be told their characteristics over completely different materials thanks to their variations in structure and properties. Print paste containing an artificial material or a pigment emulsion shows smart suitability[9].

1.1 MATERIALS AND METHODOLOGY

In this project work reactive dyes, organic matte ink, knitted and woven fabric are used. The woven and knitted fabrics were first dyed using reactive dye. The recipe used for dyeing is reactive dye-0.5%, Nacl(GPL)-30, Na2Co3(GPL)-10,M:Lratio1:50.

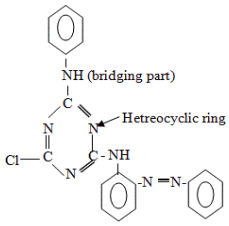

Fig (a): Chemical structure of a reactive dye

Take the specified quantity of chemical and water required and let it boil at a temperature of 120C.Then add the specified quantity of reactive dye to the boiling water so wet the material and place it into boil. Let it boil for ten min. Then add the salt NaCl once ten minutes so let it boil. Nevertheless once ten minutes add Na2Co3 and blend it well and let it boil. Then finally once a complete of forty min check if the material has been equally bleached, if thus take it out build a chilly wash and let it to dry. If not leave it once more to boil till bleached equally. Once the materials area unit bleached they're stirred over for printing functions. Here organic matte end inks are used for getting higher customary and grade. The most necessary auxillaries area unit thickening agents. Printing paste unremarkably contains 40-70% material solution[6,7]. The printing paste is ready exploitationwater, thickener, binder, urea and ammonia. Then the organic matte clear is mixed with the pigment paste. The screen should be created using 100's mesh. Then set the screen on the printer so place the fabric's equally on the palettes. Then begin printing and provide three strokes and a couple of rounds of the PV matt clear then place it underneath the flashing unit for it to dry. Afterward provide three strokes and a couple of rounds of PV matte clear. Then finally cure at the temperature of 180C at a temporal order of ninety seconds.

2. RESULTS AND DISCUSSIONS

Table 1: Shows the variation in the tearing strength of the fabrics before and after printing

Sample particulars	Fabric strength(N)Before printing	Fabric strength(N)After printing
Woven fabric	33	42
Knitted fabric	34	45

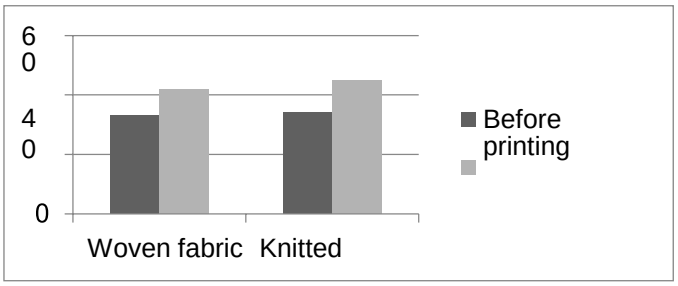

Figure 1: Tearing strength value of before and after samples

From the figure 1 we can see that the tearing strength of both the fabrics increase after printing. The tearing strength of the knitted fabrics is better than the woven in both the times.

Table 2: Shows the variation in bursting strength of the fabrics before and after printing

Sample particulars	Fabric strength(KG)Before printing	Fabric strength(KG)After printing
Woven fabric	5.2	6.5
Knitted fabric	5.63	6.9

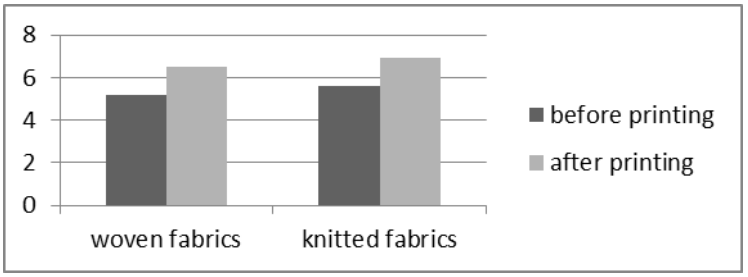

Figure 2: Bursting strength value of before and after samples

From the figure2 we can assume that the bursting strength of both woven and knitted fabrics have increased drastically. However the bursting strength of the knitted fabrics is higher than that of the woven before and after printing.

Table 3: shows the results of dry and wet rubbing on both the fabrics

Sample particulars	Dry rubbing		Wet rubbing	
	CC	CS	CC	CS
Woven fabrics	3	2/3	3	3/4
Knitted fabrics	3	2/3	4	4/5

CC-Colour Change
CS-Colour Staining

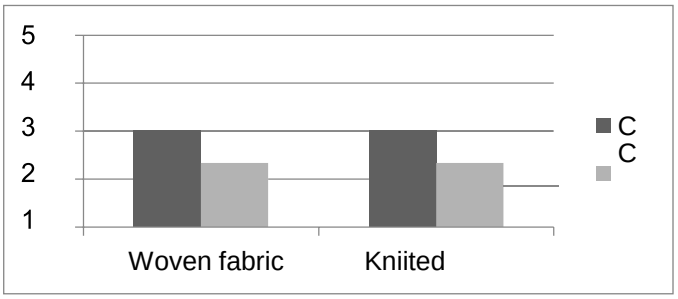

Figure 3.1: Dry rubbing fastness value of before and after samples

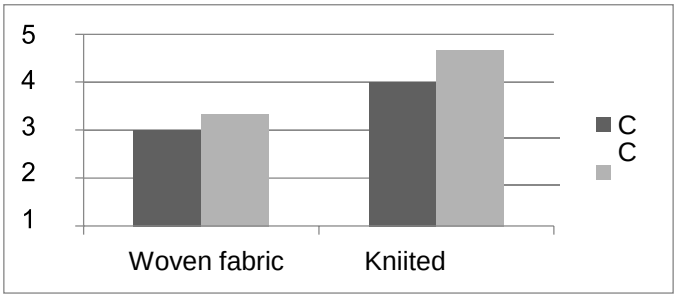

Figure 3.2: Wet rubbing fastness values of before and after samples

From figure3.1 and figure3.2 we can see that both the fabrics provide good rubbing fastness. However it can be seen that a change in colour increases with the number of repitations. Average human eye sees the samples identical, but there is changes on the fabric when we notice it under the fastness scale. By compering these materials ,it has been shown that the material 2(knitted fabric) provides better rubbing fastness than the material 1(woven fabric).Higher fabric weight can help the colour to go deeper into the structure, leaving a smaller layer of paint on the surface that can be damaged.

Table 4: shows the variation in washing fastness between the knitted and woven fabrics after printing

Sample particulars	**CC**	**CS**
Woven fabrics	3/4	4
Knitted fabrics	3/4	4

CC-Colour change
CS-Colour staining

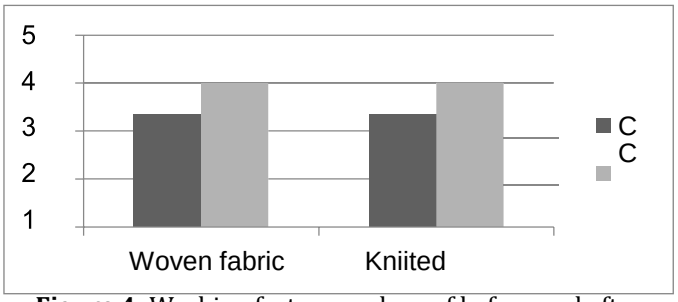

Figure 4: Washing fastness values of before and after samples

From figure 4 it is shown that the washing fastness of the knitted fabric is higher than that of the woven fabric. This is due to the structural characteristics of the knitted fabrics. As we had discussed before due to the higher weight of the knitted fabric it provides higher penetration of the ink into the fabric. Due to this greater part of the ink remains still during the washing process.

Table 5: Shows the variation in air permeability of the fabrics before and after printing

Sample particulars	Fabric air permeability(lpm) befrore printing	Fabric air permeability(lpm)After printing
Woven fabric	395	52
Knitted fabric	380	48

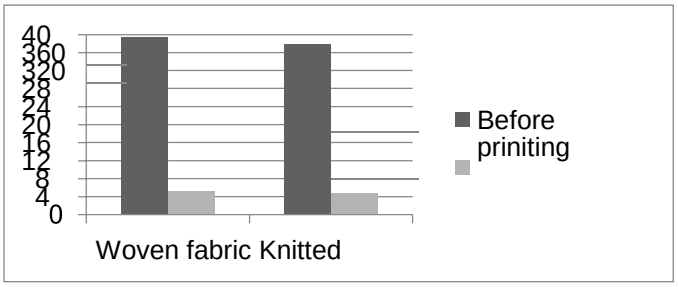

Figure 5: Air permeability values of before and after samples

From Figure 5 we can notice that the air permeability of both the fabrics decrease drastically after the printing process. This is caused due to the peneteration of the inks into the pores of the fabric, the inks fill up the air gaps of the fabric and form a compact structure allowing them to stay on the fabric firmly. As the number of printing strokes is increased more amount of ink enters the fabric , leading to the decrease in air permeability of the fabric.

Table 6: Shows the variation in stiffness of the fabrics before and after printing

Sample particulars	Fabric stiffness(cms) befrore printing	Fabric stiffness(cms)After printing
Woven fabric	2.3	2.9
Knitted fabric	1.9	2.1

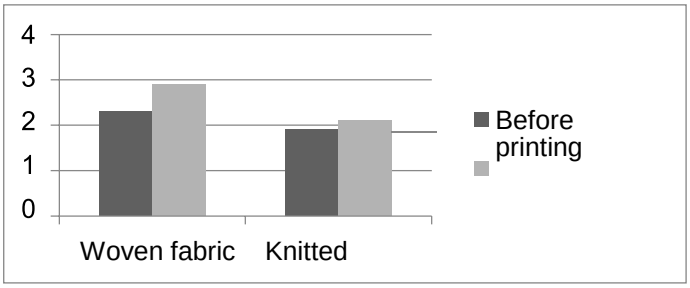

Figure 6: Stiffness values of before and after samples

From Figure 6 it is seen that that the stiffness of both the fabrics increase after the printing process. This increase in stiffness is caused due to the bounding of the ink to the fabric making it rigid in structure. More the ink entering into the fabric stiffer will be the fabrics.

3. CONCLUSION

We have compared the results of all tests of samples consisting of the matte finish print. The results indicate the varying properties of the matte finish print over the dyed knitted and woven fabrics .It is proven that the matte finish prints provide good washing fastness and acceptable rubbing fastness. The matte finish prints even provide good strength to the fabric by increasing its tearing strength, bursting strength and stiffness. However they tend to decrease the air permeability of the fabric by filling up the air gaps with its dyes and gel. These prints can be used over wide range of applications.

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