

# WASH TREATMENT EFFECT ON RUBBING FASTNESS PROPERTIES TO POLYESTER COTTON VISCOSE BLEND (52% POLYESTER, 28% COTTON, 20% VISCOSE) FABRICS.

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**Abstract**— Different kinds of dark shade of polyester cotton viscose blend (52% polyester, 28% cotton, 20% viscose) fabric have poor fastness to rubbing. Three different shades as dark colour shade, medium dark colour shade and light colour shade were chosen & all shades were applying with different wash techniques. Fastness to rubbing was tested with and without wash treatment and assessed for fastness rating for using the proper grey scale. Based on outcome of the test data, the aim of the study was to measure the correlation between wash treatment effect and rubbing fastness properties of polyester cotton viscose blend fabrics.

**Index Terms**— Rubbing fastness, Colour shade, Grey scale, Wash treatment, Enzyme wash, Blend fabric, Fastness rating, Crock meter.



## 1. INTRODUCTION

Colour fastness refers to the resistance of colour to fade or bleed of a dyed or printed textile materials to various types of influences e.g. water light, rubbing, washing, perspiration etc. to which they are normally exposed in textile manufacturing and in daily use [1]. For Textile product, the unstable dye particles are held on the fabric surface and these particles are rubbed off easily on the human skin or any other cloth of contact. Rubbing fastness properties belongs to transmission of colour from coloured textile material to other surfaces. The stability of colour or its fastness is one of the most important requirements of valuable customers. During use, a dyed material is exposed to a variety of agencies that can cause its colour fade e.g. the colour decay from deeper to paler shade. These changes occur because of decomposition of the dye molecules in the fibre or because of their removal into the external medium. The coloured textiles show different resistance power to different agencies [2].

Polyester is synthetic textile materials which has high molecule crystallization and deficiency of reactive group on fibre surface, polyester fabric is rather reflective and dye-resistant to some extent, especially not suitable to be dyed in deep colour, and all these affect its common application and appearance[3].

Cotton is a soft, fluffy staple fibre that grows in a boll, or protective case, around the seeds of the

cotton plants of the genus *Gossypium* in the family of *Malvaceae*. The fiber is almost pure cellulose. Under natural conditions, the cotton bolls will tend to increase the dispersal of the seeds [4].

Dark shade of polyester cotton viscose blends fabric frequently struggling with rubbing fastness. To meet the standard of the fastness properties, this paper, describe different wash treatment in variety of shades and then present detailed result of the experiment.

## 2. MATERIALS & METHODS

Three types of shades were selected. 1. Dark shade 2. Medium dark shade & 3. Light Shade with four wash techniques as 1. Rinse wash 2. Garment wash 3. Enzyme wash & 4. Heavy enzyme wash. Every shade had two hundred and fifty samples, two hundred samples (fifty samples for each wash method) tested after different wash treatment process, rest fifty samples tested without treatment. For rinse wash, fabric treated with water, no other chemicals were used. Garment wash process was same as previous technique but time duration was slightly higher. Enzyme wash was a little bit different and costly. Heavy enzyme wash took higher time compare to others.

Table 1: Wash technique.

Sl no:	Wash technique	Time(minutes)	Temp. in Degree	Chemical
1.	Rinse Wash	05-10	30-35	----
2.	Garment Wash	10-15	30-35	Softener, detergent
3.	Enzyme wash	14-18	30-35	Enzyme
4.	Heavy Enzyme Wash	25-32	30-35	Enzyme

### 2.1 Apparatus:

Crock meter, crocking cloth, grey scales [5], colour matching cabinet & distilled water for wet rubbing. Tests were carried out according to ISO 105 X12 method[6]. Colour fastness to rubbing (crocking) is assessed by rubbing a standard white fabric against the dyed sample under a constant pressure for an agreed number of strokes. The test may be conducted under wet and dry conditions, and the machine may be operated by hand, or in the latest machines performed automatically. Assessment of the degree of staining on the white fabric is assessed using the ISO grey scale for staining [7].

Some important parameters of ISO 105 X12 methods.

- Wet pick-up : 95 - 100%
- Specimen size at least 50 x 140 mm
- Vertical Load - 9 +/- 0.2 N ,Finger Diameter - 16 mm
- Position warp parallel to long dimension for one specimen and weft parallel to long dimension for other specimen or diagonally.
- Rubbing distance: 104 +/- 3mm

### 3. RESULT & DISCUSSION

Treated and untreated samples were tested by crocking meter. The statistical average mode

values were taken from the tests. The changes of the values were listed in below.

### 3.1 Dark Shade:

#### Dry rubbing:

Table 2 : Dry rubbing fastness grading of dark shade.

Wash Technique	Rubbing fastness rating
Non Wash	3
Rinse Wash	3-4
Garment Wash	3-4
Enzyme Wash	4
Heavy Enzyme Wash	4

#### Wet rubbing:

Table 3 : Wet rubbing fastness grading of dark shade.

Wash Technique	Rubbing fastness rating
Non Wash	2
Rinse Wash	2-3
Garment Wash	3
Enzyme Wash	3
Heavy Enzyme Wash	3-4

### 3.2 Medium Dark Shade:

#### Dry rubbing:

Table 4 : Dry rubbing fastness grading of medium dark shade.

Wash Technique	Rubbing fastness rating
Non Wash	3-4
Rinse Wash	3-4
Garment Wash	4
Enzyme Wash	4-5
Heavy Enzyme Wash	4-5

### Wet rubbing:

Table 5 : Wet rubbing fastness grading of medium dark shade.

Wash Technique	Rubbing fastness rating
Non Wash	3
Rinse Wash	3
Garment Wash	3-4
Enzyme Wash	4
Heavy Enzyme Wash	4-5

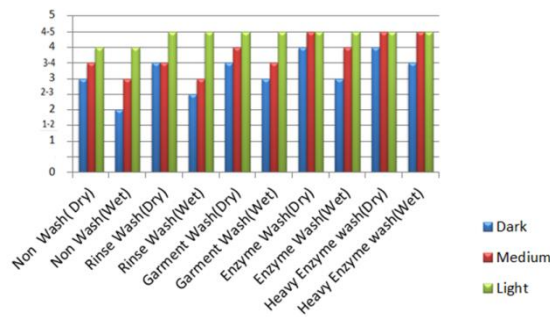


Fig 1: Rubbing fastness properties in different wash methods.

### 3.3 Light Shade:

#### Dry rubbing:

Table 6 : Dry rubbing fastness grading of light shade.

Wash Technique	Rubbing fastness rating
Non Wash	4
Rinse Wash	4-5
Garment Wash	4-5
Enzyme Wash	4-5
Heavy Enzyme Wash	4-5

Figure 1 shows the evolution of both dry and wet rubbing properties during the treated and untreated phase of a typical experiment. The application of wash techniques permits to utilization of rubbing fastness to be optimized. Rinse wash as well as garment wash properties had slightly improved after treatment; however enzyme wash & heavy enzyme wash result were significant. Fastness rating increased for dry rubbing was minimum half grade to maximum one grade and for wet rubbing, minimum half grade to maximum one and half grade. The trend can be seen for better result in both dry & wet rubbing though wet rubbing result sometimes poor. It occurred due to higher coefficient of friction in wet rubbing and presence of water & loose fibre.

#### Wet rubbing:

Table 7 : Wet rubbing fastness grading of light shade.

Wash Technique	Rubbing fastness rating
Non Wash	4
Rinse Wash	4-5
Garment Wash	4-5
Enzyme Wash	4-5
Heavy Enzyme Wash	4-5

### 4. CONCLUSION

Wash treatment allows rubbing fastness performance to be improved. Different wash methods were applied to fabric and compared with rubbing fastness with non-wash product; fastness rating was increased in treated product. However, all of the methods were not revealed the same & effective result though enzyme & heavy enzyme wash performance were really good. The whole process was slight costly and time consuming, nevertheless for better product and customer satisfaction; wash treatment may be the good option for increasing rubbing fastness to polyester cotton viscose blend fabrics.

## 5. REFERENCES

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