

# Periodic Research

## Effect of Detergent on the Strength of Cotton Fabrics



**Neelam Agrawal**

Govt. Women Polytechnic  
Jabalpur (M.P.)



**Maneesha Thakur**

Govt. Women Polytechnic  
Jabalpur (M.P.)

### Abstract

Apparel can enhance or undermine appearance and an immaculately dressed person is appreciated by all. Daily-wear of fabrics involve contact with wind blown particulate and soil.

The measurement of breaking, tearing and abrasion strength given us the idea of the strength as well as durability of the fabrics while unwashed. Washing with detergents brings about changes in these properties of the fabrics. These tests can serve the purpose for evaluation of the efficiency of any detergent or soap for laundering purpose.

The measure of determination of these values pertaining to the strength of fabric after repeated washing with the types of detergents and soaps.

To Study the effect of detergents on the strength of cotton fabric firstly to select the common popular brands of detergent by doing survey of housewives. After analyzing the results of survey 3 brands were selected namely surf, Wheel and Nirma.

Abrasion Tear breaking strength, all are related to the toughness and strength and hence the durability of the fabric. The measurement of these factors gives us the idea of the strength of the fabric while unwashed. Washing with detergents brings about changes in these properties of the fabric.

Effect of various Detergents viz Surf, Wheel and Nirma on various strength after washing the white cotton fabric has been evaluated. It was found that out of three detergents used the maximum abrasive strength.

Tear strength and breaking strength was observed when white cotton fabric was washed with surf and the second more strength was noticed, When washed with wheel. Fabric washed with nirma gave least strength. Similar pattern was observed when Turquoise colour fabric was washed with above three detergents.

**Keyword:** Fabrics, Apparel

### Introduction

Apparel can enhance or undermine appearance and an immaculately dressed person is appreciated by all. Daily-wear of fabrics involve contact with wind blown particulate and soil.

Soap the primitive cleansing agent obtained by the saponification of triglyceride ester present in oils and fats is still used extensively because of its cheapness and is preferred by washer-man and professional launderers. The housewives skill-full management of her finances time and energy has led to the prevalent popularity of synthetic detergents.

The measurement of breaking, tearing and abrasion strength given us the idea of the strength as well as durability of the fabrics while unwashed. Washing with detergents brings about changes in these properties of the fabrics. These tests can serve the purpose for evaluation of the efficiency of any detergent or soap for laundering purpose.

The measure of determination of these values pertaining to the strength of fabric after repeated washing with the types of detergents and soaps.

### Methods and Materials

To Study the effect of detergents on the strength of cotton fabric firstly to select the common popular brands of detergent by doing survey of housewives. After analyzing the results of survey 3 brands were selected namely surf, Wheel and Nirma.

The procedure has been divided into the following subsections.

1. Survey of the housewives
2. Preparation of soil and soil samples
3. Washing of soil samples by washing machine.

# Periodic Research

4. Determination of the strength. Viz. Breaking, Tear and Abrasion Strength.

Two commercially available fabric were used. These were cotton (Poplin) white and coloured (Turquoise).

**Preparation of Soil, and Soiled Sample**

According to Singh O.P. ingredients used for soil are :

1. Floor sweep - Main ingredient of soil
2. Carbon Tetrachloride - used as a solvent
3. Kerosene Oil - For emulsion soiling
4. Ground Nut Oil - Represents general oil contents
5. Animal Charcoal - Grey Coloured pigment

**Determination of Breaking or Tensile Strength**

The breaking strength is a measure of the resistance of the fabric to tensile load or stress in either warp or weft direction as given by P. Angappan and R. Gopal Krishnan. To measure the breaking strength there are three test that may be used.

1. Ravelled Strip Method
2. Cut Strip Method
3. Grab Method

In this study "Ravelled Strip Method" was used

The specimen should be of 2 inches width and 8 inches test length. For this, samples of 12 inches X 2.5 inches are cut and longer side taken in the direction of testing.

The extra length is allowed for gripping in the jaws. From these samples, threads from both the edges are removed until the width is reduced to 2 inches exactly.

**Determination of Strength**

**I. Abrasion Strength :**

Abrasion is just one aspect of wear and is the rubbing away of the component fibers and yarns of the fabric. This experimental determination is performed in the physical lab. of the Hukum chand mills Ltd. Indore. In this test 'Taber Abrassor' machine was used and percentage weight loss in 1000 cycles was observed.

**II. Determination of Tearing Strength :**

The tearing strength is a measure of the resistance to tearing of either the warp or weft series of yarn in a fabric.

**Preparation of Test Specimens for Tearing Test**

From the fabric sample, warp-wise and weft-wise test specimen of the required size are prepared with the help of a template. The length wise direction shall be parallel to the warp or weft direction for which the tearing strength is required. The specimen are cut so that no two warp way specimens contain the same set of warp yarns and no two weft specimens contain the same set of weft yarns.

**Table - 1**  
**Strength Of White Cotton Fabric Washed With Different Detergents**

Washing	Name of Detergent	Abrasion Strength Fabric wait in gms.	Tear Strength in Kg.		Breaking strength in Kg.	
			Warp	Weft	Warp	Weft
I	Surf	0.021	4.750	2.912	30.09000	18.01932
II	Surf	0.0065	1.320	2.112	29.23900	16.65966
III	Surf	0.005	4.000	1.664	28.66200	16.32000
I	Wheel	0.0085	4.512	2.080	29.74932	17.67966
II	Wheel	0.0065	4.288	1.920	27.64200	15.97932
III	Wheel	0.0065	3.648	1.920	22.09932	11.89932
I	Nirma	0.005	4.096	2.360	28.56000	15.97320
II	Nirma	0.003	3.360	1.400	27.98166	15.97932
III	Nirma	0.003	2.400	1.400	25.32966	11.89932

**Strength of Original Clothe**

Abrasion wt. in gms. 0.030.

Tear strength in Kg.

Warp	Weft
------	------

Washing	Name of Detergent	Abrasion Strength Fabric wait in gms.	Tear Strength in Kg.		Breaking strength in Kg.	
			Warp	Weft	Warp	Weft
I	Surf	0.019	3.808	3.488	38.38	23.01
II	Surf	0.017	3.456	3.072	40.76	19.00
III	Surf	0.016	3.456	2.656	39.16	18.75
I	Wheel	0.008	3.680	3.328	39.78	22.27
II	Wheel	0.009	3.616	2.944	37.80	21.14
III	Wheel	0.008	3.52	2.464	35.36	18.97
I	Nirma	0.001	3.296	2.944	36.38	17.61
II	Nirma	0.005	3.232	2.816	33.21	15.43
III	Nirma	0.014	3.232	2.560	29.56	14.78

4.832	3.008
-------	-------

Breaking strength in Kg

Warp	Weft
30.54	18.007

**Table - 2**

**Strength Of Coloured (Torquoise) Cotton Fabric Washed With Different Detergents**

**Strength of Original Clothe**

Abrasion wt. in gms. 021 gms.

Tear strength in Kg.

Warp	Weft
3.968	3.008

Breaking strength in Kg.

Warp	Weft
41.63	22.130

**Result and Discussion**

Abrasion Tear breaking strength, all are related to the toughness and strength and hence the durability of the fabric. The measurement of these factors gives us the idea of the strength of the fabric

while unwashed. Washing with detergents brings about changes in these properties of the fabric.

Effect of various Detergents viz Surf, Wheel and Nirma on various strength after washing the white cotton fabric has been evaluated. It was found that out of three detergents used the maximum abrasive strength.

Tear strength and breaking strength was observed when white cotton fabric was washed with surf and the second more strength was noticed, When washed with wheel. Fabric washed with nirma gave least strength. Similar pattern was observed when Turquoise colour fabric was washed with above three detergents.

#### **References**

1. Cormany, E. and Ruth, E., 1950. Effect of certain detergent on the service qualities of cotton and spun rayon fabrics. *J. Home Eco.* 42(4):284.
2. Jacob, M., 1990. Care of fabric by consumers. *The Indian Textile Journal*,:150.
3. Kaur, R. *et al.* 1988. Laundry practices of working and non working women. *The Indian Textile Journal*,:250.
4. Shrivastava, M. L., 1989. Soil release finishes for durable press fabric. *The Indian Textile Journal*,:157.