



Department of Textile Engineering

Study on Wash Test Report for Knit Garments Production

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Faculty of Engineering

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A thesis submitted in partial fulfillment of the requirements for the degree of
Bachelor of Science in Textile Engineering
Advance in Apparel Manufacturing Technology

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LETTER OF APPROVAL

To
The Head
Department of Textile Engineering
Daffodil Smart City, Birulia 1216

Subject: Approval of Project Report of B.Sc. in TE Program.

Dear Sir,

We are just writing to let you know that this project report titled as Study on Wash Test Report for Knit Garments Production have been prepared by Md. Naim Afzal Chishti, Md. Yeasin Arafat our bearing ID is 151-23-4222,183-23-5460. It is completed for final evaluation. The whole report is prepared based on the proper investigation and interruption through critical analysis of empirical data with required belongings. The student were directly involved in their project activities and the report become vital to spark of many valuable information for the readers.

Therefore it will highly be appreciated if you kindly accept this project report and consider it for final evaluation.

Yours Sincerely



.....
Mr. Md. Mominur Rahman
Assistant Professor
Department of Textile Engineering

ACKNOWLEDGEMENT

We thank almighty Allah, the owner of all sovereignty, the most merciful, and the eternal, for providing us with the strength and ability to conduct this research.

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We would like to express our heartfelt gratitude to our esteemed instructor and guide Assistant Professor Mr. Md. Mominur Rahman for his consistent and unwavering encouragement, insightful advice and constructive criticism, as well as his constant watch and inspiration to complete the work successfully. We would not have been able to advance even a single step forward toward our desired goal in time without his scholarly encouragement, close supervision, and helpful advice. We will be eternally thankful to him.

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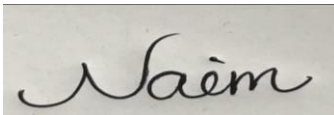
We are also thankful to the autoclave operators and the responsible persons for their unwavering support and technical assistance during the project. We also gather a lot of data in order to visit business and university labs. Finally, we must honor and accept our parents' unwavering love and patients. At the very least, we expressed our gratitude to all of the esteemed individuals who assisted us in properly completing this task.

DECLARATION

We hereby declare that the work which is being presented in this thesis entitled, “**Study on Wash Test Report for Knit Garments Production**” is original work of my own, has not been presented for a degree of any other university and all the resource of materials uses for this thesis have been duly acknowledged.

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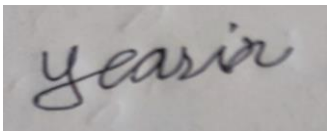
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ABSTRACT

To finish our project job, we are going to of Taqwa Fabrics Ltd. , Lantabur Group it is Knit Composite Factory, They have Big Wash Plant for washing they are doing many type of wash that why we learn from their many types of wash. This observation was about the lab test and wash effects of fabric with different fabric composition and fabric weight. This observation make the differences of different fabric wash by which understood the importance of fabric weight and composition for washes. That's we was known about washing laboratory test which is before and after wash knit garments. About Knit fabric shrinkage and how we will minimize the shrinkage percentage. We have found some laboratory tests data of different fabric and compare among theirs tests.

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CHAPTER 01:
INTRODUCTION

1.1. General Introduction:

Knit garments are the most popular in the world. Day by day its demand is increasing. Last few years knit industry are very much increasing. And the knit market are improved that's why knit production is higher. For this buyers are producing knit garments. Basically, Knit Sports T-shirts are the most popular in the world for a different wash. And Knit garments are very comfort to useable that's why market demand is higher day by day. After Knit washing have a different physical change, given on the buyer requirement. In garments after sewing Knit garments are sending to the wash. In washing, they develop the sample by following the buyer standard (which standard buyers given in R&D section). In this R&D section also take care about the measurement, quality and others requirement. After wash Knit garments measurements change that's why when fabric are in house then we are sending fabric cutting to wash a for shrinkage test. Then we know about fabric shrinkage then we easily make sample for Buyers' requirements. Then sample are approved by Buyer then we are going to bulk production. There testing the sample by the buyer's requirement. Which done by the physical laboratory testing or chemical laboratory testing or both testing. If this lab test report is matched with the buyer requirement then it's approved for bulk production. Otherwise it is rejected and again developing the sample. By this thesis it will help to understand the different required tests for after wash denim garments of different buyers and also see the deference of the buyer's requirements on the laboratory tests.

1.2. Object:

To analysis about laboratory test after knit wash

- To perform about Physical and chemical laboratory tests
- To perform about Physical laboratory tests equipment's and their working procedure
- To accomplish about chemical laboratory tests equipment's and their working procedure
- To assess about how to analysis the tests report data

1.3. Significance of the Study:

As a fresher Textile Engineer it is very important to know about wash and wash test report. And the Fabric behavior of garments before and after wash laboratory test. This knowledge is support us for some time in planning and production for full fill the buyer requirements. Testing is running a system to identify gaps, bugs, or missing requirements as opposed to actual requirements. On the other hand we know about deferent type wash test report some are Fabric weight, Dimensional stability, Spirality Or Twisting etc.

1.4. Limitation of the Study:

This research is carried out in the wash test laboratory of Taqwa Fabrics Ltd. , Lantabur Group it is Knit Composite Factory, and Mila Industrial Ltd. , Seacotex Fabrics Ltd. We focused on different type of washing test on knitted fabric in this study, and we didn't have enough time or resources to complete the project in this segment.

1.5. Organization of the Thesis:

The thesis is formatted in the following thesis format. Chapters are produced to show the many aspects of the investigation, and the order of the chapters corresponds to the flow of the work. The research starts with the first chapter, which is the specific introduction. Included are background information about the subject and the company, as well as the issue statement, research question, objectives, scope, and importance of the study, as well as the research system. The second chapter, on the other hand, compiles the Writing Survey. Counting the number of past research projects on quality-related concerns that have been audited. Technique is frequently followed by this. It covers the methods for gathering data, analyzing it, translating it, and representing the data and its specific findings in general.

At long last, the results of the finding are concluded in chapter five specifically Conclusions and Recommendation summarizing the finding of the case, the recommended guideline to be Connected and future investigate regions to be centered on common.

CHAPTER 02: LITERATURE REVIEW

2.1 Knitting :

A number of technological factors have contributed to making knit the fashion icon that it is today, including vast improvements in spinning, weaving, and finishing. One of the most beautiful parts is we was knowing about knit T-shirt, Sport wear, Knit Trousers. Washing is the most important part of the garment chain. Knit washing is an esthetical finish that improves the softness of garments and different looks such as faded color and brighter looks and increases garments' comfort. It also enhances the appeal and provides strength. Fashion trends favor the broken-in look and worn/faded seams that can only be achieved through garment processing.

2.2 Strength Properties:

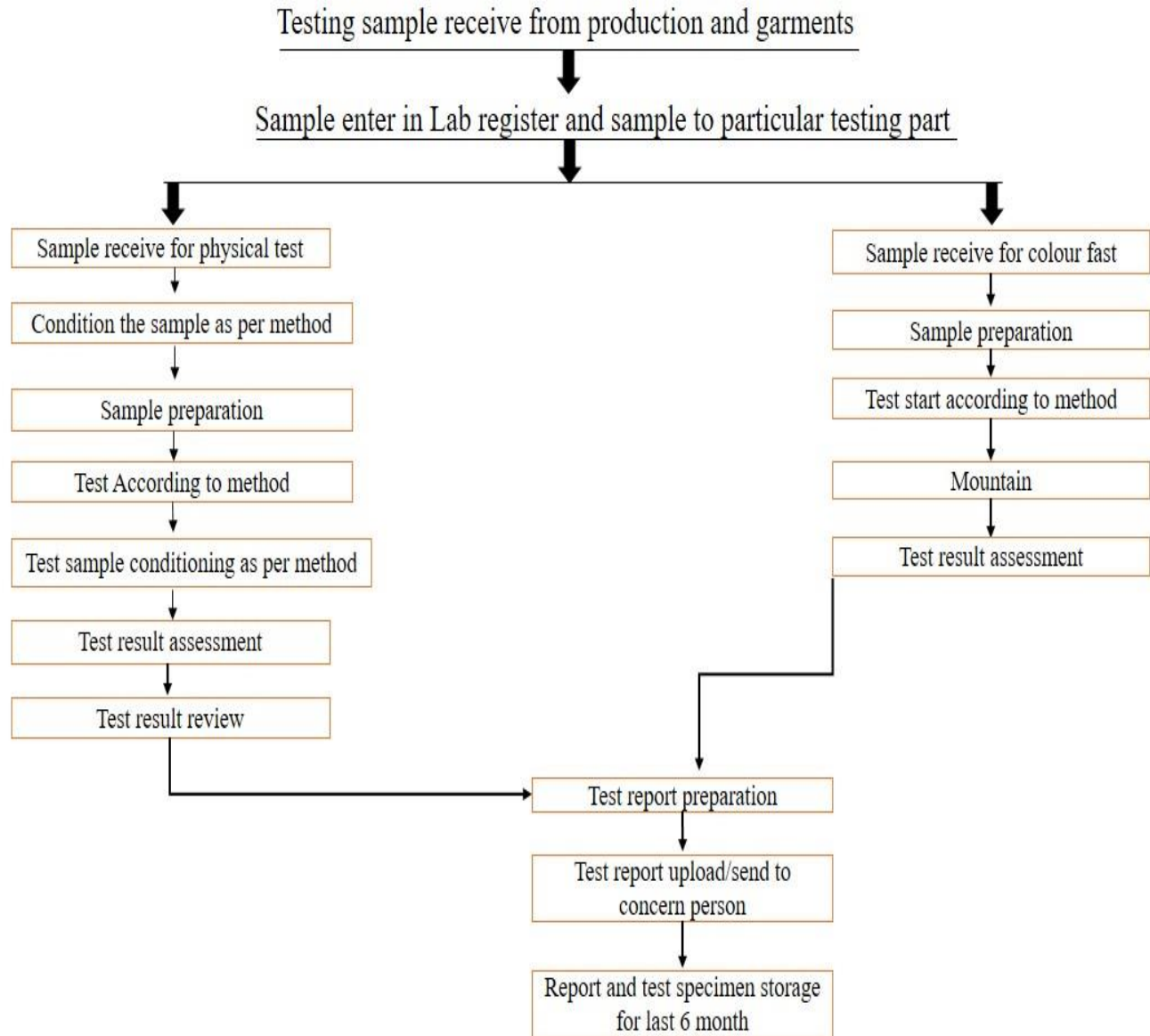
The strength properties of apparel have been considered the most obvious indication of the service life of apparel. The strength of a fabric or garments indicates its ability to resist mechanical damage due to street of normal wear and laundering. The strength properties of apparel can be divided into the following three areas:

- Fabric strength
- Seam strength
- Resistance to yarn slippage

2.3 Reasons for Textile Testing

- Checking Raw Materials
- Monitoring Production
- Assessing the Final Product
- Investigation of Faulty Material
- Product Development and Research

2.4 Testing Lab Work Flow Chart:



2.5 Knitting Washing Test:

There are many types of wash in knit garments, we are study on some of them.

- Fabric weight
- Dimensional stability
- Spirality Or Twisting
- Tearing Strength Test
- Color Fastness to water
- Color Fastness to Acid
- Color Fastness to Alkali
- Color Fastness to Saliva
- Phenolic yellowing
- Formaldehyde test
- Cross staining fabric
- Print Durability
- Pilling Test
- PH level
- Dyna Wash
- Fabric recovery
- Tensile Strength
- Perspiration test

2.5.1 Fabric Weight

Fabric weight unit determine by GSM (Gram per Square Meter). The GSM of fabric is basic requirement of buyer. The weight of fabric can be defined in two way one is “weight per unit area” And the other one is “weight per unit length”. It’s measured by GSM cutter and quadrant balance machine. GSM cutter diameter is 113mm, Round area of GSM cutter is 100 cm sq. A sample fabric is cut by GSM cutter into 8-10 pcs then measure the weight in quadrant balance to ensure the actual weight of fabric.



Figure 01: GSM Cutter



Figure 02: GSM Count m/c

2.5.2 Dimensional stability:

Dimensional stability means the change of dimension in garments and when fabrics are washed then one of the two things will happen one are shrinkage and another one is elongation of fabric. After garments wash body length sometimes shrink before its previous size. And some time will be elongate. Shrinkage is most important part of buying fabric for production. Because when fabric shrinkage is higher than more fabric are needed for production. 5% to 7% is good shrinkage percentage for knit fabric. So when sample is coming for development then we will measure the shrinkage of fabric. Polyester fiber has the better dimensional stability than cotton because the degree of yarn twist has a great impact on changing the dimensional stability. High twist yarn is the reason of shrink and low twist yarn is the reason of elongation. Also there are some more factors that affects the fabric dimensional stability those are pointed out below:

- Yarn count and construction
- Type of material used
- Degree of yarn twist
- Weave of fabric
- GSM

By the use of relaxation dryers, compactors or some cross linking agents can reduce the fabric shrinkage without these processes it is not possible to reduce any shrinkage

2.5.3 Twisting:

Due to after sewing many T-shirts have the same stitching on the bottom two sides, But it is seen to increase after washing , this is basically twisting.

$$\text{Formula} = \frac{\text{Increased width} + \text{Increased width}}{2}$$

Then, Result X Length%

2.5.4 Tearing Strength Test

Done this test for determine the fabric tear strength

Method: ISO13937-1 & 2 or (ASTM D 1424)

Machine Name: ELMENDROF TEARING TESTER 1653 / Titan 5 m/c

Brand: James Heal

PURPOSE:

To determine tearing strength of fabric.

Equipment:

Scissor.

Specimen preparation Templates.

Collaboration Scale

Mesh tray

Specimen Preparation:

Cut at least 3 specimen of each sample both warp and weft direction by using template.



Figure 03: Tear strength testing machine

2.5.5 Color Fastness to water:

This test is done by attaching the fabric to the multifiber and immersing it in distilled water for 30 min.

Time: 30 min

Temperature: 37 Degree Celsius

Incubator M/C



Figure 04: Light Box

2.5.6 Color Fastness to Acid:

The color fastness to perspiration (acid and alkaline) refers to the ability not to fade and not to stain when the dyed fabric is perspired, and it is one of the main color fastness testing items of textiles.

Nacl – 5 gm. /l, sodium DIY dragon, L-Histamine Mon hydrochloride, Mono hydrate 0.5 gm. /l

2.5.7 Color Fastness to Alkali:

The color fastness to perspiration (acid and alkaline) refers to the ability not to fade and not to stain when the dyed fabric is perspired, and it is one of the main color fastness testing items of textiles.

- Sodium chloride (Nacl) – 5.0 gm./lt
- Disodium hydrogen or two phosphate – 2.59 gm./lt
- L-histamine mono hydrochloride monohydrate – 0.5 gm./lt

2.5.8 Color Fastness to Saliva:

Determine the resistance of the color of textiles regarding influence of saliva. This test must be done for fabrics used for baby / infant garments only.

- Calcium chloride – 0.15 gm. /lt.
- Potassium chloride – 0.53 gm. /lt.
- Magnesium chloride – 0.17 gm. /lt.
- Potassium carbonate – 0.73 gm. /lt.
- Sodium chloride – 0.33 gm. /lt.
- Potassium hydrogen hydro – 70.76 gm. /lt.

2.5.9 Phonic Yellowing:

After wearing clothes for a long time, then seen this type of yellowness on the fabric. This is done for this. Only light color fabric does this test.



Figure 05: Phonic Yellowing Tester

2.5.10 Pilling Test

Pilling Template: 125X125 mm.

Distance between 2 to 15 cm diagonally set the template and then cut this fabric. Along with fabric warp and fabric, weft adjust the Template and cut the sample fabric. Make template mark is inside the fabric.

Machine Name: Martindale Abrasion & pilling Tester

Brand: James Heal

Purpose: Pilling Resistance & Abrasion Resistance Test.

Method: Pilling test: ISO 12945-2 & abrasion Test ISO 12947-2 (Martindale)

Abrasion Resistance: - Abrasive resistance of solid materials.

Equipment:

Martindale abrasion & Pilling Resistance testing machine,

Collaboration Scale

Mesh tray

Circular fabric sample cutter: specimen diameter 38 mm & 140 mm cutting

Mat

Specimen holders for pilling or Pilling Resistance



Figure 06: Pilling Tester

2.5.11 Formaldehyde test:

The formaldehyde test method is applicable to textile fabrics that contain formaldehyde, particularly fabrics finished with formaldehyde-containing chemicals. The skin will be harmed if the fabric contains formaldehyde.

2.5.12 PH Level:

A measure of how acidic or basic a substance or solution is. PH is measured on a scale of 0 to 14. On this scale, a pH value of 7 is neutral, which means it is neither acidic nor basic. A pH value of less than 7 means it is more acidic, and a pH value of more than 7 means it is more basic



Figure 07: PH Level Test m/c

CHAPTER 03:
EXPERIMENTAL DETAILS

We have experienced the changing happened in wash test during washing the garments. There are various type of fabric composition has been taken for the observation. The main purpose of this observation was the changes is dimensional stability (shrinkage/elongation), fabric weight, spirality (twisting), print durability, color fastness to rubbing dry and color fastness to rubbing wet etc. All the attached data was collected from the buyer LPP. They recommend one time wash to testify there ordered garments for the judgment of garments quality also meet their requirements. Buyer accept 5% difference of garments measurement to fulfill their requirement. With this process just follow up the changes and different criteria of garments before wash and after wash. To complete the process firstly we had taken a knit garments then measure its dimensional stability, fabric weight spirality, rubbing fastness and others test criteria of garments before wash then put the clothes in the washing machine. After one wash pulling out the garments from the machine and measure dimensional stability, fabric weight, spirality, print durability, rubbing fastness of the garments after wash. Then justify the data we found during testing. After pass the test result then the tested sample had sent to buyer location and buyer gave the approval for final production

3.1 100% cotton single jersey:

Had taken three garments which fabric composition was 100 % cotton single jersey and GSM 160 g/m2.

These garments wash tests result are given below.

WASH TEST REPORT													
Factory		Seacotex fabric Ltd						Labtest Ref: Naf-Lab-06-G000021586					
Buyer		LPP						Date: November 7, 2022					
Wash instruction		1 Time wash											
SI	Style No	Order No	Batch No/ Size	Color	Fabric Description	Item	Test Property	Measured points	Before wash	After wash	Differ (cm)	Differ (%)	Result
01	6097T		152	85X	100% Cotton S/J	Garment	Fabric Weight (GSM)	Requested	160		-1.00	-0.63%	PASS
								Checked	159				
							Dimensional Stability (Shrinkage/Extension)	Length	57.5 cm	55.5 cm	-2.00	-3.48%	PASS
								Chest	42.5 cm	41.0 cm	-1.50	-3.53%	PASS
								Bottom	42.5 cm	40.5 cm	-2.00	-4.71%	PASS
								S/L	15.8 cm	15.2 cm	-0.60	-3.80%	PASS
							Spirality (Twisting)	Side length		36.0 cm		0.00%	PASS
								Biased		0.0 cm			
							Print Durability					Print is ok	PASS
02	6102T		134	01X Aop	100% Cotton S/J	Garment	Fabric Weight (GSM)	Requested	160		-4.00	-2.50%	PASS
								Checked	156				
							Dimensional Stability (Shrinkage/Extension)	Length	78.0 cm	75.0 cm	-3.00	-3.85%	PASS
								Waist	30.2 cm	30.0 cm	-0.20	-0.66%	PASS
								Hip	42.0 cm	41.0 cm	-1.00	-2.38%	PASS
								Bottom	15.8 cm	15.3 cm	-0.50	-3.16%	PASS
							Spirality (Twisting)	Side length		50.0 cm		0.00%	PASS
								Biased		0.0 cm			
							Print Durability					Print is ok	PASS
03	6106T		152	01X	100% Cotton S/J	Garment	Fabric Weight (GSM)	Requested	160		1.00	0.63%	PASS
								Checked	161				
							Dimensional Stability (Shrinkage/Extension)	Length	57.0 cm	55.0 cm	-2.00	-3.51%	PASS
								Chest	41.0 cm	39.5 cm	-1.50	-3.66%	PASS
								Bottom	41.5 cm	40.5 cm	-1.00	-2.41%	PASS
								S/L	14.5 cm	14.0 cm	-0.50	-3.45%	PASS
							Spirality (Twisting)	Side length		37.0 cm		3.51%	PASS
								Biased		1.3 cm			

Figure 08: 100 % cotton single jersey

Figure 08

Shows the comparison of garments before wash and after wash of three different styles of same composition fabric. Observe the changes For style no: 6097T which color was 85X Batch no= 152 and this observation shows some changes in fabric weight before wash which was requested 160 g/m² and after checking it was 159 g/m². So converting it as percentage shows the difference of -0.63% reduction than before wash requested to check. Dimensional stability before wash was (L= 57.5 cm, C=42.5 cm, Bottom= 42.5 cm, S/L= 15.8 cm) and after wash it was (L= 55.5 cm, C=41.0 cm, Bottom= 40.5 cm, S/L= 15.2 cm) which show the difference of respectively (-3.48%, -3.53%, -4.71%, -3.80%) reduction happens in garments shape. Twisting after wash was (side length= 36 cm, biased= 0.0 cm) and print durability is 100% ok.

Now Observe the changes For style no: 6102T which color was 01x AOP batch no: 134 and this observation shows some changes in fabric weight before wash which was requested 160 g/m² and after checking it was 156 g/m². So converting it as percentage shows the difference of -2.50% reduction than before wash requested to check. Dimensional stability before wash was (L= 78.0 cm, W=30.2 cm, hip= 42.0 cm, bottom= 15.8 cm) and after wash it was (L=75.0 cm, W=30.0 cm, hip=41.0 cm, bottom= 15.3 cm) which show the difference of respectively (-3.85%, -0.66%, -2.38%, -3.16%) reduction happens in garments shape. Twisting after wash was (side length= 50.0 cm, biased= 0.0 cm) and print durability is 100% ok.

Again Observe the changes For style no: 6106T which color was 01X and batch no: 152. This observation shows some changes in fabric weight before wash which was requested 160 g/m² and after checking it was found 161 g/m². So converting it as percentage shows the difference of 0.63% increasing than before wash requested to check. Dimensional stability before wash was (L= 57.0 cm, C=41.0 cm, Bottom= 41.5 cm, S/L= 14.5 cm) and after wash it was (L= 55.0 cm, C=39.5 cm, Bottom= 40.5 cm, S/L= 14.0 cm) which show the difference of respectively (-3.51%, -3.66%, -2.41%, -3.45%) reduction happens in garments shape. Twisting after wash was (side length= 37.0 cm, biased= 1.3 cm) which show the 3.51% increasing in twisting.

3.2 60% cotton 40% polyester French terry:

Had taken three garments which fabric composition was 60% cotton 40% polyester French terry and GSM 240 g/m2. These garments wash tests result are given below.

WASH TEST REPORT													
Factory		Seacotex fabrics Ltd						Labtest Ref: Naf-Lab-06-G000020337					
Buyer		LPP						Date: June 26, 2022					
Wash instruction		1 Time wash											
Sl	Style No	Order No	Batch No/ Size	Color	Fabric Description	Item	Test Property	Measured points	Before wash	After wash	Differ (cm)	Differ (%)	Result
01	8521M		116	53X	60% Cotton 40% Polyester French terry	Garment	Fabric Weight (GSM)	Requested	240		1.00	0.42%	PASS
								Checked	241				
							Dimensional Stability (Shrinkage/Extension)	Length	36.3 cm	34.5 cm	-1.80	-4.96%	PASS
								Chest	39.0 cm	38.5 cm	-0.50	-1.28%	PASS
								Bottom	33.0 cm	32.7 cm	-0.30	-0.91%	PASS
								S/L	35.3 cm	34.7 cm	-0.60	-1.70%	PASS
							Spirality (Twisting)	Side length		17.0 cm		0.00%	PASS
								Biased		0.0 cm			PASS
							Colorfastness to Wet Rubbing					Grade-2	FAIL
							Print durability					Print is ok	PASS
2	3654J		122	00X	60% Cotton 40% Polyester French terry	Garment	Fabric Weight (GSM)	Requested	240		1.00	0.42%	PASS
								Checked	241				
							Dimensional Stability (Shrinkage/Extension)	Length	48.0 cm	46.5 cm	-1.50	-3.13%	PASS
								Chest	38.0 cm	37.5 cm	-0.50	-1.32%	PASS
								Bottom	38.0 cm	36.8 cm	-1.20	-3.16%	PASS
								S/L	46.0 cm	45.0 cm	-1.00	-2.17%	PASS
							Spirality (Twisting)	Side length		30.0 cm		0.00%	PASS
								Biased		0.0 cm			PASS
							Colorfastness to Wet Rubbing					Grade-2/3	FAIL
							Print durability					Print is ok	PASS
3	4604 Q		128	99X	60% Cotton 40% Polyester French terry	Garment	Fabric Weight (GSM)	Requested	240		10.00	-4.17%	PASS
								Checked	250				
							Dimensional Stability (Shrinkage/Extension)	Length	49.0 cm	47.5 cm	-1.50	-3.06%	PASS
								Chest	39.0 cm	38.0 cm	-1.00	-2.56%	PASS
								Bottom	38.5 cm	37.0 cm	-1.50	-3.90%	PASS
								S/L	47.0 cm	45.0 cm	-2.00	-4.26%	PASS
							Spirality (Twisting)	Side length		30.0 cm		0.00%	PASS
								Biased		0.0 cm			PASS
							Colorfastness to Wet Rubbing					Grade-2/3	FAIL
							Print durability					Print is ok	PASS

Figure 09: 60% cotton 40% polyester French terry

Figure 09

Shows the comparison of garments before wash and after wash of three different styles of same composition fabric. Observe the changes For style no: 8521M which color was 53X Batch no= 116 and this observation shows some changes in fabric weight before wash which requested weight was 240 g/m² and after checking it was 241 g/m². So converting it as percentage shows the difference 0.42% of increased than before wash requested to checked weight. Dimensional stability before wash was (L= 36.3 cm, C=39.0 cm, Bottom= 33.0 cm, S/L= 35.3 cm) and after wash it was (L= 34.5 cm, C= 38.5 cm, Bottom= 32.7cm, S/L= 34.7 cm) which show the difference of respectively (-4.96%, -1.28%, -0.91%, -1.70%) reduction happens in garments shape. Twisting after wash was (side length= 17.0 cm, biased= 0.0 cm) and there is no differ percentage. Colorfastness to wet rubbing grade 2 has been founded and Print durability is 100% ok

Now Observe the changes For style no: 3654J which color was 00x batch no: 122 and this observation shows some changes in fabric weight before wash which requested weight was 240 g/m² and after checking it was 241 g/m². So converting it as percentage shows the difference 0.42 % of increased than before wash requested to checked weight. Dimensional stability before wash was (L= 48.0 cm, W=38.0 cm, Bottom= 38.0 cm, S/L= 46.0 cm) and after wash it was (L=46.5 cm, W=37.5 cm, bottom= 36.8 cm, S/L= 45.0 cm) which show the difference of respectively (-3.13%, -1.32%, -3.16%, -2.17%) reduction happens in garments shape. Twisting after wash was (side length= 30.0 cm, biased= 0.0 cm) and there is no differ percentage. Color fastness to wet rubbing grade-2/3 has been founded and print durability is 100% ok.

Again Observe the changes For style no: 4604Q which color was 99X and batch no: 128. This observation shows some changes in fabric weight before wash which requested was weight 240 g/m² and after checking it was found 250 g/m². So converting it as percentage shows the difference of 4.17% increasing than before wash requested to checked weight. Dimensional stability before wash was (L= 49.0 cm, C=39.0 cm, Bottom= 38.5 cm, S/L= 47.0 cm) and after wash it was (L= 47.5 cm, C=38.0 cm, Bottom= 37.0 cm, S/L= 45.0 cm) which show the difference of respectively (-3.06%, -2.56%, -3.90%, -4.26%) reduction happens in garments shape. Twisting after wash was (side length= 30.0 cm, biased= 0.0 cm) and there is no differ percentage happened. Color fastness to rubbing wet grade 2/3 has been found and print durability is 100% ok.

3.3 100% cotton French terry:

Had taken three garments which fabric composition was 100% cotton French terry and GSM 240 g/m².

These garments wash tests result are given below.

WASH TEST REPORT													
Factory		Seacotext fabrics Ltd					Labtest Ref: Naf-Lab-06-G000019439						
Buyer		LPP					Date: March 14, 2022						
Wash instruction		1 Time wash											
Sl	Style No	Order No	Batch No/ Size	Color	Fabric Description	Item	Test Property	Measured points	Before wash	After wash	Differ (cm)	Differ (%)	Result
1	3566J		62	48X	100% Cotton French terry	Garment	Fabric Weight (GSM)	Requested	240		-6.00	-2.50%	PASS
								Checked	234				
							Dimensional Stability (Shrinkage/Extension)	Length	27.5 cm	26.5 cm	-1.00	-3.64%	PASS
								Chest	27.0 cm	26.5 cm	-0.50	-1.85%	PASS
								Bottom	26.0 cm	24.5 cm	-1.50	-5.77%	FAIL
								S/L	23.0 cm	22.5 cm	-0.50	-2.17%	PASS
							Spirality (Twisting)	Side length		49.0 cm		0.00%	PASS
								Biased		0.0 cm			
							Colorfastness to Rubbing Wet					Grade-4	PASS
							Print durability					Print is ok	PASS
2	1244M		92	05X	100% Cotton French terry	Garment	Fabric Weight (GSM)	Requested	240		9.00	3.75%	PASS
								Checked	249				
							Dimensional Stability (Shrinkage/Extension)	Length	38.5 cm	37.0 cm	-1.50	-3.90%	PASS
								Chest	33.0 cm	32.0 cm	-1.00	-3.03%	PASS
								Bottom	31.5 cm	29.0 cm	-2.50	-7.94%	FAIL
								S/L	33.0 cm	31.0 cm	-2.00	-6.06%	PASS
							Spirality (Twisting)	Side length		23.0 cm		0.00%	PASS
								Biased		0.0 cm			
							Colorfastness to Rubbing Wet					Grade-3/4	PASS
							Print durability					Print is ok	PASS
3	6773M		122	54X	100% Cotton French terry	Garment	Fabric Weight (GSM)	Requested	240		-9.00	-3.75%	PASS
								Checked	231				
							Dimensional Stability (Shrinkage/Extension)	Length	50.0 cm	48.0 cm	-2.00	-4.00%	PASS
								Chest	40.5 cm	40.0 cm	-0.50	-1.23%	PASS
								Bottom	39.5 cm	37.5 cm	-2.00	-5.06%	FAIL
								S/L	36.0 cm	35.0 cm	-1.00	-2.78%	PASS
							Spirality (Twisting)	Side length		30.0 cm		0.00%	PASS
								Biased		0.0 cm			
							Colorfastness to Wet Rubbing					Grade-3	FAIL
							Print durability					Print is ok	PASS

Figure 10: 100% cotton French terry

Figure 10

Shows the comparison of garments before wash and after wash of three different styles of same composition fabric. Observe the changes For style no: 3566j which color was 48X Batch no= 62 and this observation shows some changes in fabric weight before wash which requested weight was 240 g/m² and after checking it was 234 g/m². So converting it as percentage shows the difference -2.50% of increased than before wash requested to checked weight. Dimensional stability before wash was (L= 27.5 cm, C=27.0 cm, Bottom= 26.0 cm, S/L= 23.0 cm) and after wash it was (L= 26.5 cm, C= 26.5 cm, Bottom= 24.5 cm, S/L= 22.5 cm) which show the difference of respectively (-3.64%, -1.85%, -5.77%, -2.17%) reduction happens in garments shape. Twisting after wash was (side length= 49.0 cm, biased= 0.0 cm) and there is no differ percentage. Colorfastness to wet rubbing grade 4 has been founded and Print durability is 100% ok.

Now observe the changes For style no: 1244M which color was 05X and batch no: 92. This observation shows some changes in fabric weight before wash which requested was weight 240 g/m² and after checking it was found 249 g/m². So converting it as percentage shows the difference of 3.75% increasing than before wash requested to checked weight. Dimensional stability before wash was (L= 38.5 cm, C=33.0 cm, Bottom= 31.5 cm, S/L= 33.0 cm) and after wash it was (L= 37.0 cm, C=32.0 cm, Bottom= 29.0 cm, S/L= 31.0 cm) which show the difference of respectively (-3.90%, -3.03%, -7.94%, -6.06%) reduction happens in garments shape. Twisting after wash was (side length= 23.0 cm, biased= 0.0 cm) and there is no differ percentage happened. Color fastness to rubbing wet grade 3/4 has been found and print durability is 100% ok.

Again observe the changes For style no: 6773M which color was 54x batch no: 122 and this observation shows some changes in fabric weight before wash which requested weight was 240 g/m² and after checking it was 231 g/m². So converting it as percentage shows the difference of -3.75 % reduced than before wash requested to checked weight. Dimensional stability before wash was (L= 50.0 cm, W=40.5 cm, Bottom= 39.5 cm, S/L= 36.0 cm) and after wash it was (L=48.0 cm, W=40.0 cm, bottom= 37.5 cm, S/L= 35.0 cm) which show the difference of respectively (-4.00%, -1.23%, -5.06%, -2.78%) reduction happens in garments shape. Twisting after wash was (side length= 30.0 cm, biased= 0.0 cm) and there is no differ percentage. Color fastness to wet rubbing grade-3 has been founded and print durability is 100% ok.

3.4 98% cotton 2% viscose French terry:

Had taken three garments which fabric composition was 98% cotton 2% viscose French terry and GSM 240 g/m². These garments wash tests result are given below

WASH TEST REPORT													
Factory		Seacotext fabrics Ltd						Labtest Ref: Naf-Lab-06-G000019439					
Buyer		LPP						Date: March 14, 2022					
Wash instruction		1 Time wash											
SI	Style No	Order No	Batch No/ Size	Color	Fabric Description	Item	Test Property	Measured points	Before wash	After wash	Differ (cm)	Differ (%)	Result
1	3100M		128	09M	98% Cotton 2% Viscose French terry	Garment	Fabric Weight (GSM)	Requested	240		-1.00	-0.42%	PASS
								Checked	239				
							Dimensional Stability (Shrinkage/Extension)	Length	48.5 cm	47.0 cm	-1.50	-3.09%	PASS
								Chest	38.5 cm	37.5 cm	-1.00	-2.60%	PASS
								Bottom	38.0 cm	36.3 cm	-1.70	-4.47%	PASS
								S/L	47.0 cm	46.0 cm	-1.00	-2.13%	PASS
							Spirality (Twisting)	Side length		37.0 cm		0.00%	PASS
								Biased		0.0 cm			
Print durability					print is ok	PASS							
2	4495R	10094778	110	Grey melange	98% Cotton 2% Viscose French terry	Garment	Fabric Weight (GSM)	Requested	240		-11.00	-4.58%	PASS
								Checked	229				
							Dimensional Stability (Shrinkage/Extension)	Length	42.0 cm	41.0 cm	-1.00	-2.38%	PASS
								Chest	35.7 cm	36.3 cm	0.60	1.68%	PASS
								Bottom	34.0 cm	32.8 cm	-1.20	-3.53%	PASS
								S/L	36.0 cm	35.2 cm	-0.80	-2.22%	PASS
							Spirality (Twisting)	Side length		24.5 cm		0.00%	PASS
								Biased		0.0 cm			
3	1245M		62	9M	98% Cotton 2% Viscose French terry	Garment	Fabric Weight (GSM)	Requested	240		4.00	1.67%	PASS
								Checked	244				
							Dimensional Stability (Shrinkage/Extension)	Length	27.5 cm	26.0 cm	-1.50	-5.45%	FAIL
								Chest	27.5 cm	27.0 cm	-0.50	-1.82%	PASS
								Bottom	25.0 cm	24.5 cm	-0.50	-2.00%	PASS
								S/L	23.5 cm	22.5 cm	-1.00	-4.26%	PASS
							Spirality (Twisting)	Side length		13.0 cm		0.00%	PASS
								Biased		0.0 cm			
Print durability					Print is ok	PASS							

Figure 11: 98% cotton 2% viscose French terry

Figure 11

Shows the comparison of garments before wash and after wash of three different styles of same composition fabric. Observe the changes For style no: 3100M which color was 09M Batch no= 128 and this observation shows some changes in fabric weight before wash which requested weight was 240 g/m² and after checking it was 239 g/m². So converting it as percentage shows the difference of -0.42% reduced than before wash requested to checked weight. Dimensional stability before wash was (L= 48.5 cm, C=38.5 cm, Bottom= 38.0 cm, S/L= 47.0 cm) and after wash it was (L= 47.0 cm, C= 37.5 cm, Bottom= 36.3 cm, S/L= 46.0 cm) which show the difference of respectively (-3.90%, -2.60%, -4.47%, -2.13%) reduction happens in garments shape. Twisting after wash was (side length= 37.0 cm, biased= 0.0 cm) and there is no differ percentage and Print durability is 100% ok.

Now observe the changes For style no: 4495R which color was Grey mélangé and batch no: 110. This observation shows some changes in fabric weight before wash which requested was weight 240 g/m² and after checking it was found 229 g/m². So converting it as percentage shows the difference of -4.58% reduced than before wash requested to checked weight. Dimensional stability before wash was (L= 42.0 cm, C= 35.7 cm, Bottom= 34.0 cm, S/L= 36.0 cm) and after wash it was (L= 41.0 cm, C=36.3 cm, Bottom= 32.8 cm, S/L= 35.2 cm) which show the difference of respectively (-2.38%, 1.68%, -3.53%, -2.22%) reduction happens in garments shape and followed that chest measurement increases after garments wash. Twisting after wash was (side length= 24.5 cm, biased= 0.0 cm) and there is no differ percentage happened.

Again observe the changes For style no: 1245M which color was 9M batch no: 62 and this observation shows some changes in fabric weight before wash which requested weight was 240 g/m² and after checking it was 244 g/m². So converting it as percentage shows the difference of 1.67% increased than before wash requested to checked weight. Dimensional stability before wash was (L= 27.5 cm, C= 27.5 cm, Bottom= 25.0 cm, S/L= 23.5 cm) and after wash it was (L=26.0 cm, C=24.5 cm, bottom= 24.5 cm, S/L= 22.5 cm) which show the difference of respectively (-5.45%, -1.82%, -2.00%, -4.26%) reduction happens in garments shape. Twisting after wash was (side length= 13.0 cm, biased= 0.0 cm) and there is no differ percentage and print durability is 100% ok.

3.5 95% cotton 5% viscose French terry:

Had taken three garments which fabric composition was 95% cotton 5% viscose French terry and GSM 240 g/m2. These garments wash tests result are given below.

WASH TEST REPORT														
Factory		Seacotex fabric Ltd						Labtest Ref: Naf-Lab-06-G000019032						
Buyer		LPP						Date: February 1, 2022						
Wash instruction		1 Time wash												
Sl	Style No	Order No	Batch No/ Size	Color	Fabric Description	Item	Test Property	Measured points	Before wash	After wash	Differ (cm)	Differ (%)	Result	
01	3602J		2750	9MM	95% Cotton 5% Viscose Terry	Fabric	Fabric Weight (GSM)	Requested	240		-4.00	-1.67%	PASS	
								Checked	236					
							Dimensional Stability (Shrinkage/Extension)	Length	35.0 cm	33.8 cm	-1.20	-3.43%		PASS
								Width	35.0 cm	34.8 cm	-0.20	-0.57%		PASS
							Spirality (Twisting)	Side length		50.0 cm		0.00%		PASS
								Biased		0.0 cm				
							Print durability					Print is ok		PASS
02	3581J		140	9MM	95% Cotton 5% Viscose Terry	Garment	Fabric Weight (GSM)	Requested	240		4.00	1.67%	PASS	
								Checked	244					
							Dimensional Stability (Shrinkage/Extension)	Length	53.0 cm	50.4 cm	-2.60	-4.91%		PASS
								Chest	42.0 cm	41.0 cm	-1.00	-2.38%		PASS
								Bottom	41.0 cm	38.5 cm	-2.50	-6.10%		FAIL
								S/L	51.5 cm	48.7 cm	-2.80	-5.44%		FAIL
							Spirality (Twisting)	Side length		34.0 cm		0.00%		PASS
Biased		0.0 cm												
03	6872D		XL	9MM	95% Cotton 5% Viscose Terry	Garment	Fabric Weight (GSM)	Requested	240		-15.00	-6.25%	FAIL	
								Checked	225					
							Dimensional Stability (Shrinkage/Extension)	Length	76.0 cm	74.5 cm	-1.50	-1.97%		PASS
								Chest	64.5 cm	65.0 cm	0.50	0.78%		PASS
								Bottom	57.0 cm	56.5 cm	-0.50	-0.88%		PASS
								S/L	59.0 cm	57.0 cm	-2.00	-3.39%		PASS
							Spirality (Twisting)	Side length		43.0 cm		0.00%		PASS
Biased		0.0 cm												

Figure 12: 60% cotton 40% Polyester Fleece

Figure 12

Shows the comparison of garments before wash and after wash of three different styles of same composition fabric. Observe the changes For style no: 3602J which color was 9Mm Batch no= 2750 and this observation shows some changes in fabric weight before wash which requested weight was 240 g/m² and after checking it was 236 g/m². So converting it as percentage shows the difference of -1.67% reduced than before wash requested to checked weight. Dimensional stability before wash was (Length= 35.0 cm, Width=35.0 cm) and after wash it was (L= 33.8 cm, C= 34.8 cm) which show the difference of respectively (-3.43 %, -0.57%) reduction happens in fabric shape. Twisting after wash was (side length= 50.0 cm, biased= 0.0 cm) and there is no differ percentage and Print durability is 100% ok.

Now observe the changes For style no: 3581J which color was 9MM and batch no: 140. This observation shows some changes in fabric weight before wash which requested was weight 240 g/m² and after checking it was found 244 g/m². So converting it as percentage shows the difference of 1.67 increased than before wash requested to checked weight. Dimensional stability before wash was (L= 53.0 cm, C= 42.0 cm, Bottom= 41.0 cm, S/L= 51.5 cm) and after wash it was (L= 50.4 cm, C=41.0 cm, Bottom= 38.5 cm, S/L= 48.7 cm) which show the difference of respectively (-4.91%, -2.38%, -6.10%, -5.44%) reduction happens in garments shape.

Again observe the changes For style no: 6872D which color was 9MM batch no: XL and this observation shows some changes in fabric weight before wash which requested weight was 240 g/m² and after checking it was 225 g/m². So converting it as percentage shows the difference of -6.25% reduced than before wash requested to checked weight. Dimensional stability before wash was (L= 76.0 cm, C= 64.5 cm, Bottom= 57.0 cm, S/L= 59.0 cm) and after wash it was (L=74.5cm, C=65.0 cm, bottom= 56.5 cm, S/L= 57.0 cm) which show the difference of respectively (-1.97% , -0.78%, -0.88%, -3.39%) reduction happens in garments shape and also followed that chest measurement had increased after garments wash. Twisting after wash was (side length= 43.0 cm, biased= 0.0 cm) and there is differ percentage shown.

3.6 60% cotton 40% polyester Fleece:

Had taken three garments which fabric composition was 60% cotton 40% Polyester Fleece and GSM 240 g/m2. These garments wash tests result are given below.

WASH TEST REPORT													
Factory		Seacotex fabric Ltd						Labtest Ref: Naf-Lab-06-G00020030					
Buyer		LPP						Date: May 29, 2022					
Wash instruction		1 Time wash											
Sl	Style No	Order No	Batch No/ Size	Color	Fabric Description	Item	Test Property	Measured points	Before wash	After wash	Differ (cm)	Differ (%)	Result
01	8510M		134	30X	60% Cotton 40% Polyester Fleece	Garment	Fabric Weight (GSM)	Requested	240		-25.00	-10.42%	FAIL
								Checked	215				
							Dimensional Stability (Shrinkage/Extension)	Length	50.2 cm	48.0 cm	-2.20	-4.38%	PASS
								Chest	39.0 cm	39.5 cm	0.50	1.28%	PASS
								Bottom	38.0 cm	37.3 cm	-0.70	-1.84%	PASS
								S/L	48.5 cm	46.8 cm	-1.70	-3.51%	PASS
							Spirality (Twisting)	Side length		32.0 cm		0.00%	PASS
Biased		0.0 cm											
02	8510M		98	59X	60% Cotton 40% Polyester Fleece	garment	Fabric Weight (GSM)	Requested	240		-21.00	-8.75%	FAIL
								Checked	219				
							Dimensional Stability (Shrinkage/Extension)	Length	40.0 cm	39.0 cm	-1.00	-2.50%	PASS
								Chest	33.3 cm	33.0 cm	-0.30	-0.90%	PASS
								Bottom	32.0 cm	30.9 cm	-1.10	-3.44%	PASS
								S/L	35.2 cm	35.0 cm	-0.20	-0.57%	PASS
							Spirality (Twisting)	Side length		24.0 cm		0.00%	PASS
Biased		0.0 cm											
Colorfastness to Wet Rubbing					Grade-3	FAIL							
03	4506 O		110	01X	60% Cotton 40% Polyester Fleece	Garment	Fabric Weight (GSM)	Requested	240		-6.00	-2.50%	PASS
								Checked	234				
							Dimensional Stability (Shrinkage/Extension)	Length	37.0 cm	35.5 cm	-1.50	-4.05%	PASS
								Chest	40.0 cm	39.5 cm	-0.50	-1.25%	PASS
								Bottom	34.0 cm	33.0 cm	-1.00	-2.94%	PASS
								S/L	29.5 cm	29.0 cm	-0.50	-1.69%	PASS
							Spirality (Twisting)	Side length		17.0 cm		0.00%	PASS
Biased		0.0 cm											

Figure 13: 60% cotton 40% Polyester Fleece

Figure 13

Shows the comparison of garments before wash and after wash of three different styles of same composition fabric. Observe the changes For style no: 8510M which color was 30X Batch no= 134 and this observation shows some changes in fabric weight before wash which requested weight was 240 g/m² and after checking it was 215 g/m². So converting it as percentage shows the difference of -10.42% reduced than before wash requested to checked weight. Dimensional stability before wash was (L= 50.2 cm, C=39.0 cm, Bottom= 38.0 cm, S/L= 48.5 cm) and after wash it was (L= 48.0 cm, C= 39.5 cm, Bottom= 37.3 cm, S/L= 46.8 cm) which show the difference of respectively (-4.38%, 1.28%, -1.84%, -3.51%) reduction happens in garments shape and followed that chest measurement increases after garments wash. Twisting after wash was (side length= 32.0 cm, biased= 0.0 cm) and there is no differ percentage.

Now observe the changes For style no: 8510M which color was 59X and batch no: 98. This observation shows some changes in fabric weight before wash which requested was weight 240 g/m² and after checking it was found 219 g/m². So converting it as percentage shows the difference of -8.79% reduced than before wash requested to checked weight. Dimensional stability before wash was (L= 40.0 cm, C= 33.3 cm, Bottom= 32.0 cm, S/L= 35.2 cm) and after wash it was (L= 39.0 cm, C=33.0 cm, Bottom= 30.9 cm, S/L= 35.0 cm) which show the difference of respectively (-2.50%, -0.90%, -3.44%, -0.57%) reduction happens in garments shape. Twisting after wash was (side length= 24.0 cm, biased= 0.0 cm) and there is no differ percentage happened. Colorfastness to rubbing wet grade 3 has been founded.

Again observe the changes For style no: 4506O which color was 01X batch no: 110 and this observation shows some changes in fabric weight before wash which requested weight was 240 g/m² and after checking it was 234 g/m². So converting it as percentage shows the difference of -2.50% reduced than before wash requested to checked weight. Dimensional stability before wash was (L= 37.0 cm, C= 40.0 cm, Bottom= 34.0 cm, S/L= 29.5 cm) and after wash it was (L=35.5 cm, C=39.5 cm, bottom= 33.0 cm, S/L= 29.0 cm) which show the difference of respectively (-4.05%, -1.25%, -2.94%, -1.69%) reduction happens in garments shape. Twisting after wash was (side length= 17.0 cm, biased= 0.0 cm) and there is no differ percentage found.

3.7 98% cotton 2% viscose Fleece:

Had taken three garments which fabric composition was 98% cotton 2% viscose French terry and GSM 240 g/m2. These garments wash tests result are given below.

WASH TEST REPORT																				
Factory		Seacotext fabrics Ltd						Labtest Ref: Naf-Lab-06-G000019439												
Buyer		LPP						Date: March 14, 2022												
Wash instruction		1 Time wash																		
SI	Style No	Order No	Batch No/ Size	Color	Fabric Description	Item	Test Property	Measured points	Before wash	After wash	Differ (cm)	Differ (%)	Result							
1	3100M		128	09M	98% Cotton 2% Viscose French terry	Garment	Fabric Weight (GSM)	Requested	240		-1.00	-0.42%	PASS							
								Checked	239											
							Dimensional Stability (Shrinkage/Extension)	Length	48.5 cm	47.0 cm	-1.50	-3.09%	PASS							
								Chest	38.5 cm	37.5 cm	-1.00	-2.60%	PASS							
								Bottom	38.0 cm	36.3 cm	-1.70	-4.47%	PASS							
								S/L	47.0 cm	46.0 cm	-1.00	-2.13%	PASS							
							Spirality (Twisting)	Side length		37.0 cm		0.00%	PASS							
								Biased		0.0 cm										
							Print durability					print is ok	PASS							
2	4495R	10094778	110	Grey melange	98% Cotton 2% Viscose French terry	Garment	Fabric Weight (GSM)	Requested	240		-11.00	-4.58%	PASS							
								Checked	229											
							Dimensional Stability (Shrinkage/Extension)	Length	42.0 cm	41.0 cm	-1.00	-2.38%	PASS							
								Chest	35.7 cm	36.3 cm	0.60	1.68%	PASS							
								Bottom	34.0 cm	32.8 cm	-1.20	-3.53%	PASS							
								S/L	36.0 cm	35.2 cm	-0.80	-2.22%	PASS							
							Spirality (Twisting)	Side length		24.5 cm		0.00%	PASS							
								Biased		0.0 cm										
							3	1245M		62	9M	98% Cotton 2% Viscose French terry	Garment	Fabric Weight (GSM)	Requested	240		4.00	1.67%	PASS
															Checked	244				
Dimensional Stability (Shrinkage/Extension)	Length	27.5 cm	26.0 cm	-1.50	-5.45%	FAIL														
	Chest	27.5 cm	27.0 cm	-0.50	-1.82%	PASS														
	Bottom	25.0 cm	24.5 cm	-0.50	-2.00%	PASS														
	S/L	23.5 cm	22.5 cm	-1.00	-4.26%	PASS														
Spirality (Twisting)	Side length		13.0 cm		0.00%	PASS														
	Biased		0.0 cm																	
Print durability					Print is ok	PASS														

Figure 14: 98% cotton 2% viscose French terry

Figure 14

Shows the comparison of garments before wash and after wash of three different styles of same composition fabric. Observe the changes For style no: 9753E which color was 09M Batch no= 193 and this observation shows some changes in fabric weight before wash which requested weight was 240 g/m² and after checking it was 225 g/m². So converting it as percentage shows the difference of -6.25% reduced than before wash requested to checked weight. Dimensional stability before wash was (Length= 35.0 cm, Width=35.0 cm,) and after wash it was (Length= 33.3 cm, Width=35.3 cm) which show the difference of respectively (-4.86% , 0.86%) so observed that reduction happens in lengthwise of garments shape and followed that Width measurement increases after garments wash . Twisting after wash was (side length= 47.0 cm, biased= 0.0 cm) and there is no differ percentage.

Now observe the changes for style no: 6970D which color was 9MM and batch no: XL. This observation shows some changes in fabric weight before wash which requested was weight 240 g/m² and after checking it was found 227 g/m². So converting it as percentage shows the difference of -5.41% reduced than before wash requested to checked weight. Dimensional stability before wash was (L= 76.0 cm, C= 64.5 cm, Bottom= 57.0 cm, S/L= 59.0 cm) and after wash it was (L= 74.5 cm, C=65.0 cm, Bottom= 56.5 cm, S/L= 57.0 cm) which show the difference of respectively (-1.97%, -0.78%, -0.88%, -3.39%) reduction happens in garments shape and observed that chest measurement has been increased. Twisting after wash was (side length= 43.0 cm, biased= 0.0 cm) and there is no differ percentage shown.

Again observe the changes For style no: 3583J which color was 09M batch no: 122 and this observation shows some changes in fabric weight before wash which requested weight was 240 g/m² and after checking it was 223 g/m². So converting it as percentage shows the difference of -7.08% reduced than before wash requested to checked weight. Dimensional stability before wash was (L= 48.0 cm, C= 37.0 cm, Bottom= 36.0 cm, S/L= 44.5 cm) and after wash it was (L=45.3 cm, C=36.8 cm, bottom= 34.5cm, S/L= 42.3 cm) which show the difference of respectively (-5.63%, -0.54%, -4.17%, -4.94%) reduction happens in garments shape. Twisting after wash was (side length= 30.0 cm, biased= 0.0 cm) and there is no differ percentage shown. Colorfastness to rubbing wet grade $\frac{3}{4}$ had found and print durability is 100% ok.

3.8 100% cotton Fleece:

Had taken two garments and one fabric which composition was 100% Cotton Fleece and GSM 240 g/m².

These garments wash tests result are given below.

Factory		Seacotex fabrics Ltd					Labtest Ref: Naf-Lab-06-G000016977						
Buyer		LPP					Date: May 11, 2021						
Wash instruction		1 Time wash											
Sl	Style No	Order No	Batch No/ Size	Color	Fabric Description	Item	Test Property	Measured points	Before wash	After wash	Differ (cm)	Differ (%)	Result
01	1989M		158	76X	100% Cotton Fleece	Garment	Fabric Weight (gsm)	Requested	240		-23.00	-9.58%	FAIL
								Checked	217				
							Dimensional Stability (Shrinkage/Extension)	Length	53.5 cm	51.2 cm	-2.30	-4.30%	PASS
								Chest	48.0 cm	49.2 cm	1.20	2.50%	PASS
								Bottom	46.5 cm	46.0 cm	-0.50	-1.08%	PASS
								S/L	60.0 cm	56.8 cm	-3.20	-5.33%	FAIL
							Spirality (Twisting)	Side length		32.0 cm		0.00%	PASS
								Biased		0.0 cm			
							Colofastness to Rubbing Wet					Grade-3/4	PASS
2	9624E		140	59X	100% Cotton Fleece	Garment	Fabric Weight (gsm)	Requested	240		1.00	0.42%	PASS
								Checked	241				
							Dimensional Stability (Shrinkage/Extension)	Length	52.5 cm	48.5 cm	-4.00	-7.62%	FAIL
								Chest width	41.0 cm	39.5 cm	-1.50	-3.66%	PASS
								Bottom	40.0 cm	38.0 cm	-2.00	-5.00%	PASS
								S/L	52.0 cm	48.0 cm	-4.00	-7.69%	FAIL
							Spirality (Twisting)	Side length		32.0 cm		0.00%	PASS
								Biased		0.0 cm			
							Colorfastness to Rubbing Wet					Grade-2/3	FAIL
3	ZF604		232	59X	100% Cotton Fleece	Fabric	Fabric Weight (gsm)	Requested	240		-4.00	-1.67%	PASS
								Checked	236				
							Dimensional Stability (Shrinkage/Extension)	Length	35.0 cm	33.2 cm	-1.80	-5.14%	FAIL
								Width	35.0 cm	35.0 cm	0	-0.09%	PASS
							Spirality (Twisting)	Side length		47.0 cm		3.19%	PASS
								Biased		1.5 cm			
							Colorfastness to Rubbing Wet					Grade-2/3	FAIL

Figure 15: 100% Cotton Fleece

Figure 15

Shows the comparison of garments before wash and after wash of three different styles of same composition fabric. Observe the changes For style no: 1989M which color was 76X Batch no= 158 and this observation shows some changes in fabric weight before wash which requested weight was 240 g/m² and after checking it was found 217 g/m². So converting it as percentage shows the difference of -9.58% reduced than before wash requested to checked weight. Dimensional stability before wash was (L= 53.5 cm, C=48.0 cm, Bottom= 46.5 cm, S/L= 60.0 cm) and after wash it was (L= 51.2 cm, C=49.2cm, Bottom= 46.0, S/L= 56.8) which show the difference of respectively (-4.30%, 2.50%, -1.08%, -5.33%) reduction happens in garments shape and observed that chest measurement increases after garments wash. Twisting after wash was (side length= 32.0 cm, biased= 0.0 cm) and there is no differ percentage. Colorfastness to rubbing wet grade 3 /4 had been found.

Now observe the changes For style no: 9624E which color was 59X and batch no: 140. This observation shows some changes in fabric weight before wash which requested was weight 240 g/m² and after checking it was found 241 g/m². So converting it as percentage shows the difference of 0.42% increased than before wash requested to checked weight. Dimensional stability before wash was (L= 52.5 cm, C=41.0cm, Bottom= 40.0 cm, S/L= 52.0 cm) and after wash it was (L= 48.5 cm, C=39.5 cm, Bottom= 38.0 cm, S/L= 48.0 cm) which show the difference of respectively (-7.62%, -3.66%, -5.00%, -7.69%) reduction happens in garments shape. Twisting after wash was (side length= 32.0 cm, biased= 0.0 cm) and there is no differ percentage shown. Colorfastness to rubbing wet grade 2/3 has been founded.

Again observe the changes For style no: ZF604 which color was 59X batch no: 232 and this observation shows some changes in fabric weight before wash which requested weight was 240 g/m² and after checking it was 236 g/m². So converting it as percentage shows the difference of -1.67% reduced than before wash requested to checked weight. Dimensional stability before wash was (Length= 35.0 cm, Width= 35.0 cm) and after wash it was (Length=33.2 cm, Width=35.0 cm) which show the difference of respectively (-5.14%, -0.09%) reduction happens in fabrics shape. Twisting after wash was (side length= 47.0 cm, biased= 1.5 cm) which shows the 3.19% increasing in twisting. Colorfastness to rubbing wet grade 2/3 had been founded.

CHAPTER 4:

DISCUSSION OF RESULTS

4.1 : 100% Cotton Single Jersey:

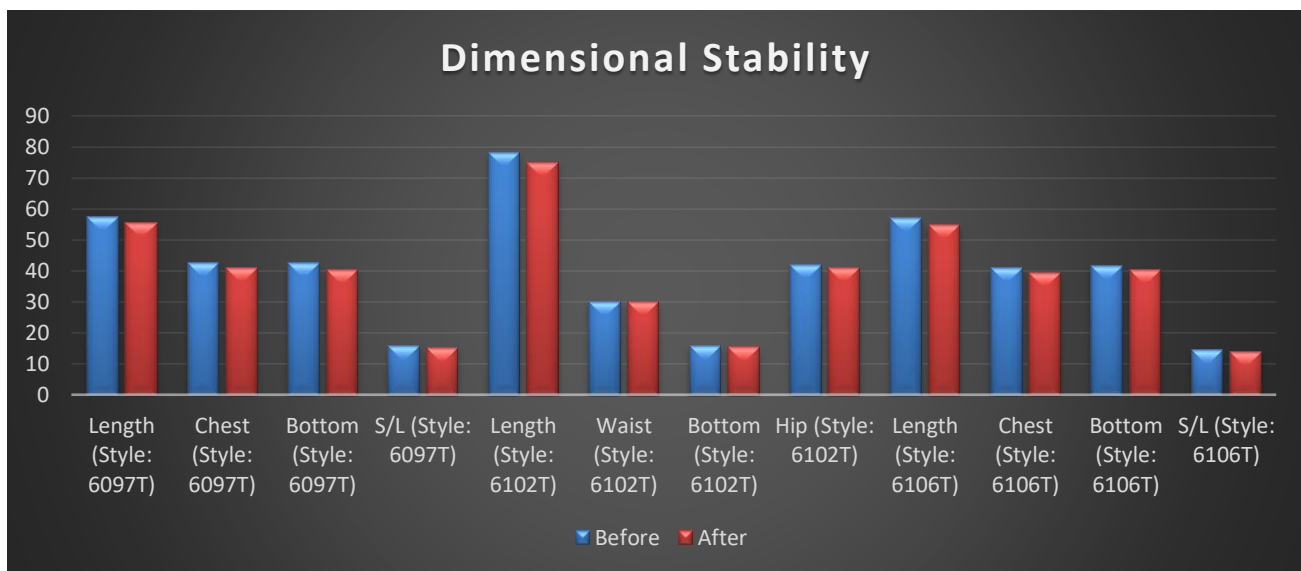
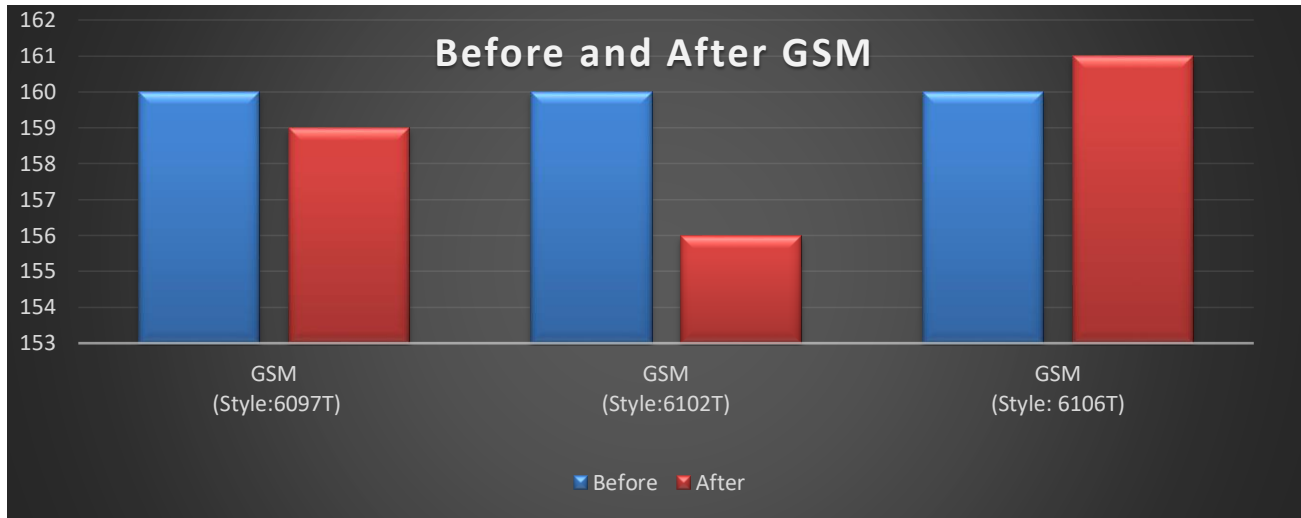


Table No: 4.1

Table 4.1 states that style no: 6097T, 6102T, 6106T these three fabric had the same composition and also same weight but after wash test it was found lots of changes in their GSM. From observation found that 6106T had an increase in GSM and rest of two resulted decreasing in GSM. Observed that spirality of garments had no difference for 6097T and 6102T and also found that little variation occurred in spirality of 6106T shown in (Fig: 09) that can be one of the reason of variation in GSM for same composition fabric and also observed that little shrinkage occurred garments after wash which is one of the main factor for changing GSM.

4.2 : 60% Cotton 40% Polyester French Terry:

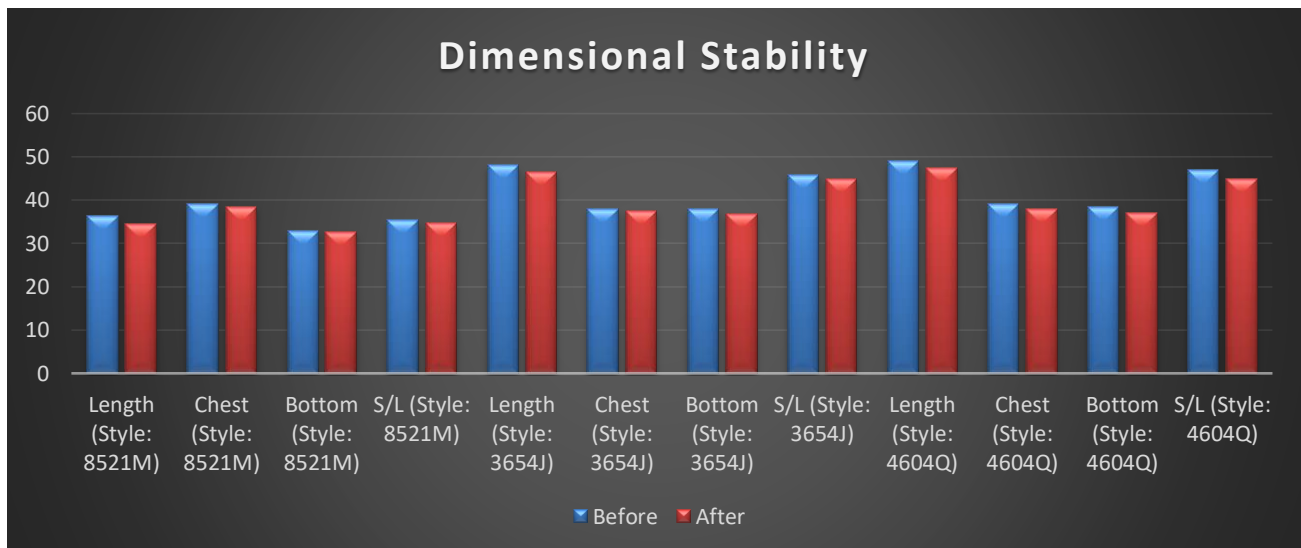
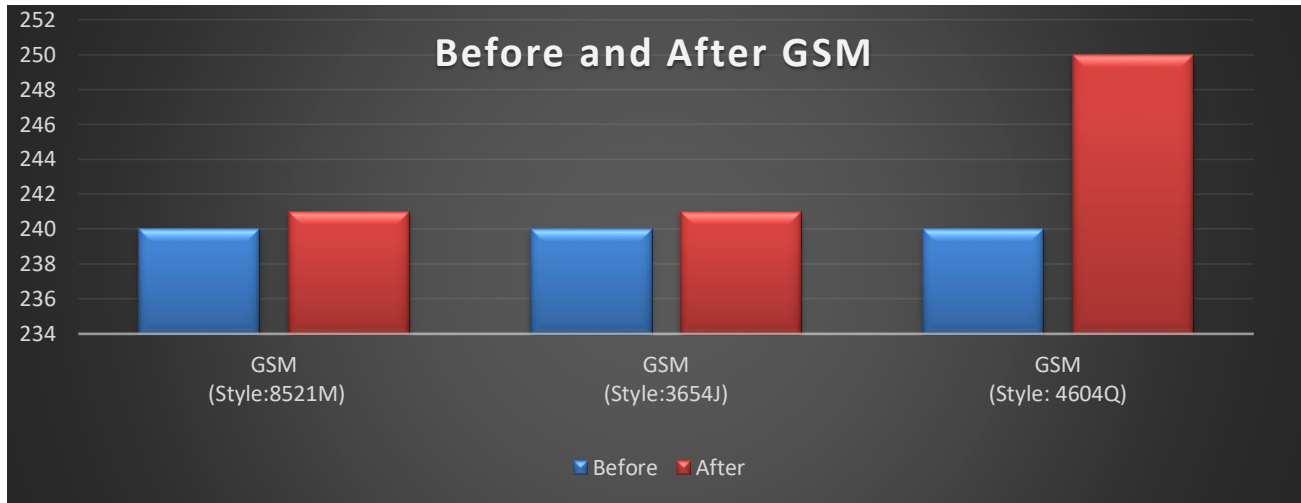


Table 4.2

Table 4.2 states that style no: 8521M, 3654J, 4604Q these three fabric had the same composition and also same weight but after wash test it was found lots of change in their GSM. From observation found that GSM increase all three garments. Observed that 8521M and 3654J had a little increment in GSM after wash. Shrinkage found relatively less of both styles. Also shows that 4604Q had a great increment in GSM and shrinkage percentage is relatively high than rest of two styles. So the result can be described that shrinkage and GSM is proportional to each other an increase in shrink percentage result increase in GSM.

4.3 : 100% Cotton French Terry

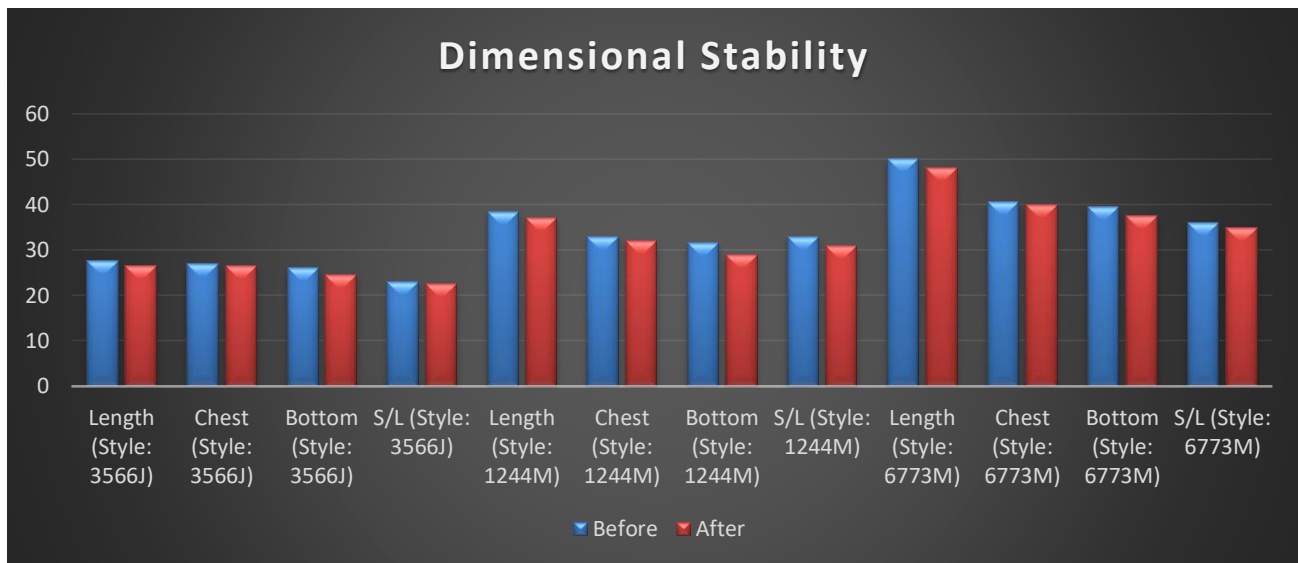
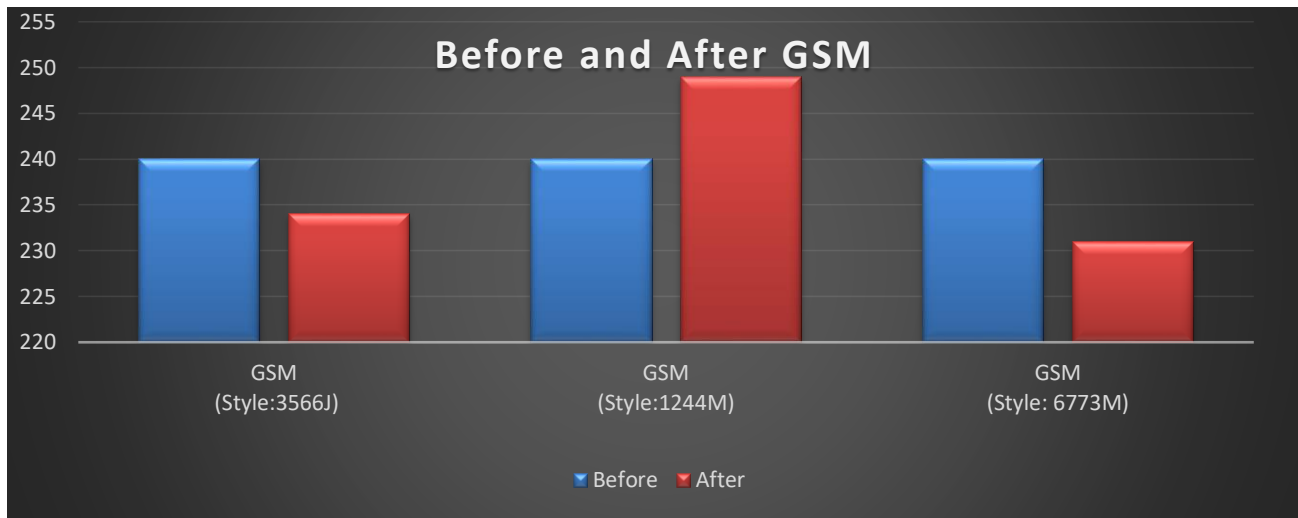


Table 4.3

Table 4.3 states that style no: 3566J, 1244M, 6773M these three fabric had the same composition and also same weight but after wash test it was found lots of change in their GSM and shrinkage percentage. Observed that 3566J and 6773M had a decrement in GSM and also shows changes in dimensional stability on the other hand 1244M shows increase in GSM also comparatively high shrinkage percentage. So shrinkage percentage can be the reason of change in GSM and also varieties in garments color is one of the reason to changes in GSM and shrinkage because GSM varies amount of dyes are used depending on light, medium and dark shades.

4.4 : 98% Cotton 2% Viscose French Terry

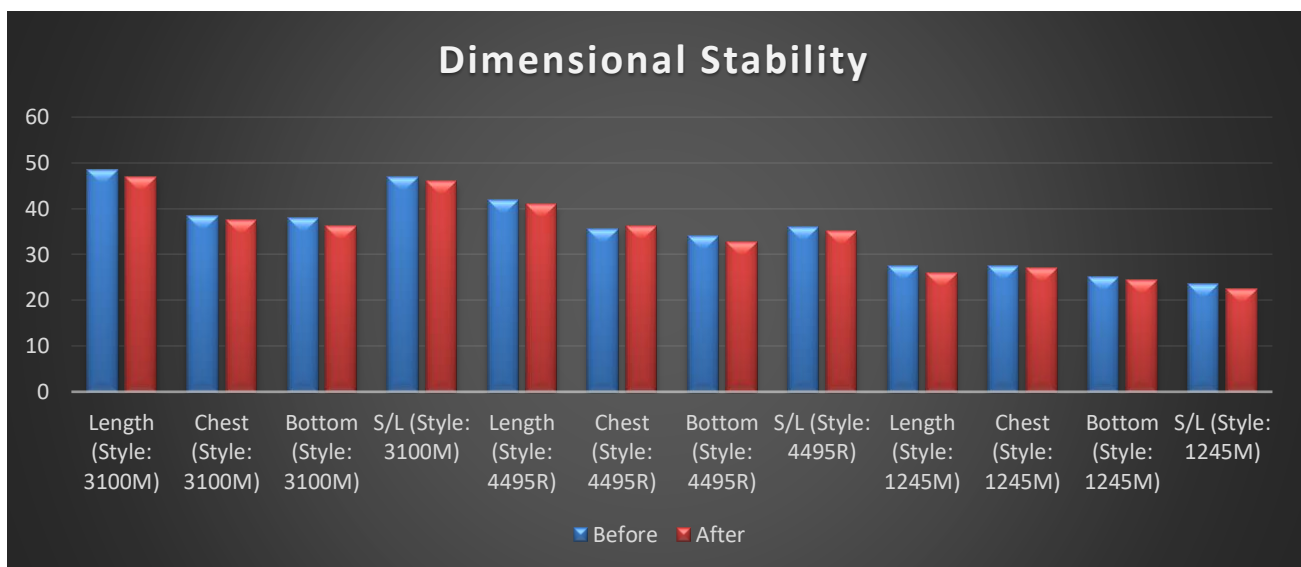
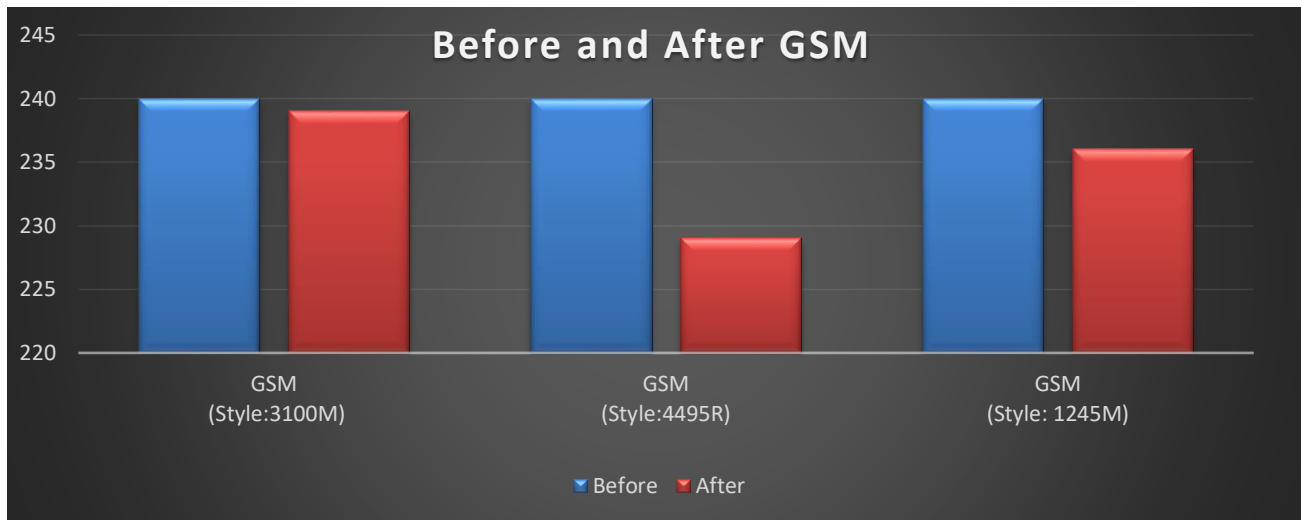


Table 4.4

Table 4.4 shows that 3100M, 4495R, 1245M had a lot of changes in their GSM and shrinkage percentage though the composition of three fabric is same GSM is also same. Found that 3100M had a little decrement in GSM and shrinkage percentage is normal, 4495R which color was grey mélange (Fig-11) had occurred decreasing in GSM relatively high and its shrinkage percentage is relatively lower than 3100M and 1245M had an increase in GSM and followed that its shrinkage percentage is relatively high than rest of two styles so shrinkage percentage is the reason. And also shade percentage is one of the reason changing GSM.

4.5 : 95% Cotton 5% Viscose French Terry

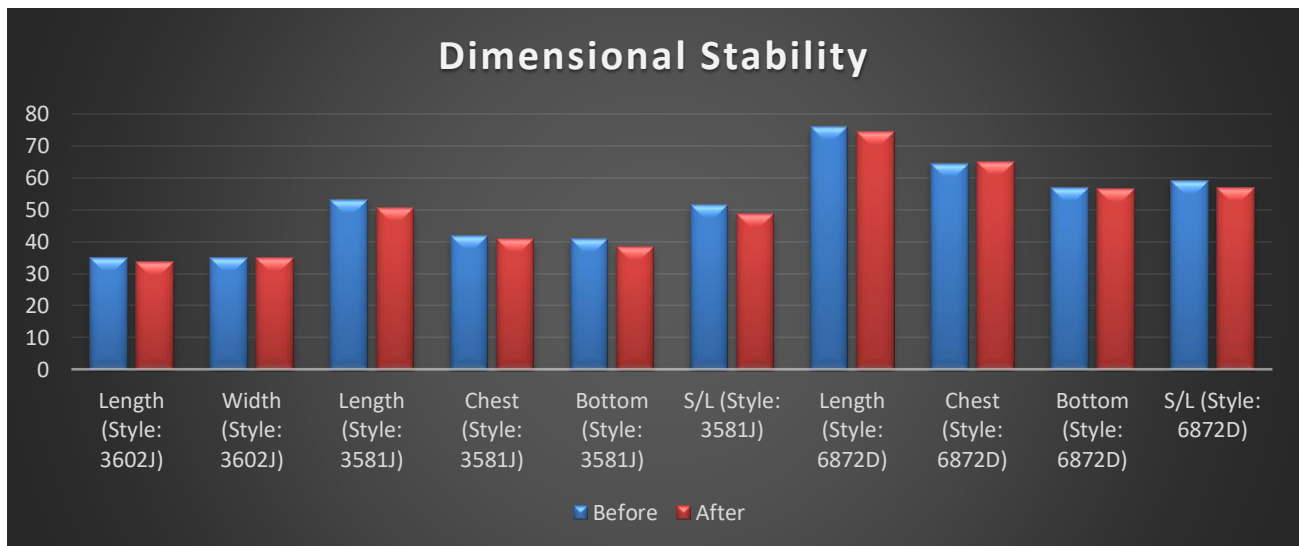
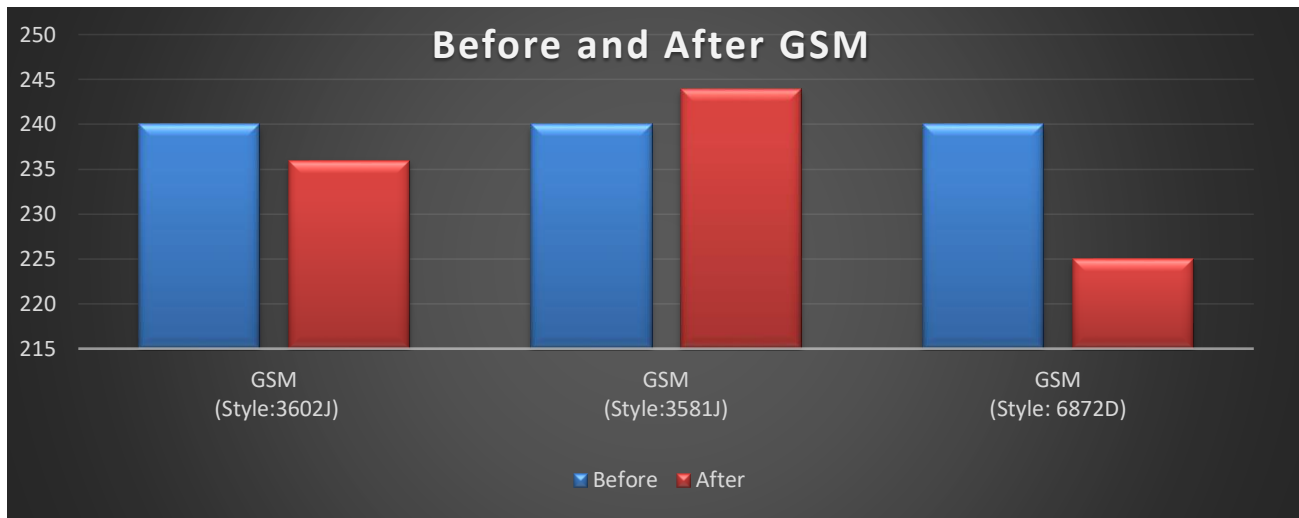


Table 4.5

Table 4.5 shows that 3602J, 3581J, 6872D these three style had same fabric composition same fabric weight also their fabric colors are same despite there are lots of changes shown in their GSM and dimensional stability after wash test. Found that 3602J had a result of decrease in GSM and little shrinkage happens. 3581J results an increase in GSM and also shrinkage percentage is so higher which is considered as failed according to requirement. 6872D results too much decrease in GSM which is considered as fail according to requirement and also found that extension happens in chest measurement. So extension is the reason here to decrease GSM and shrinkage percentage is the reason to increase in GSM.

4.6 : 60% Cotton 40% Polyester Fleece

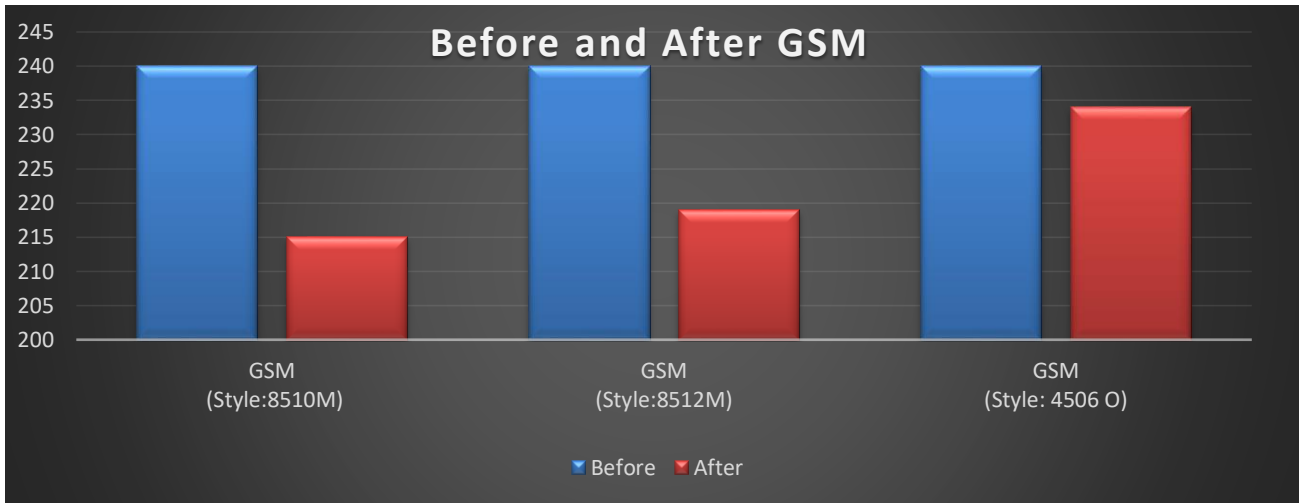


Table 4.6

Table 4.6 shows that 8510M, 8512M, 4506O these three style had same fabric composition also their weight is same but different shade percentage. But there are lots of changes observed after wash test. Three of the styles shows a results is decreasing in GSM and shrinkage happens with all three and shrinkage percentage is comparatively average which is a good reason for result variation so shade percentage can be a good reason to changes in GSM and shrinkage of these three garments

4.7 : 98% Cotton 2% Viscose Fleece

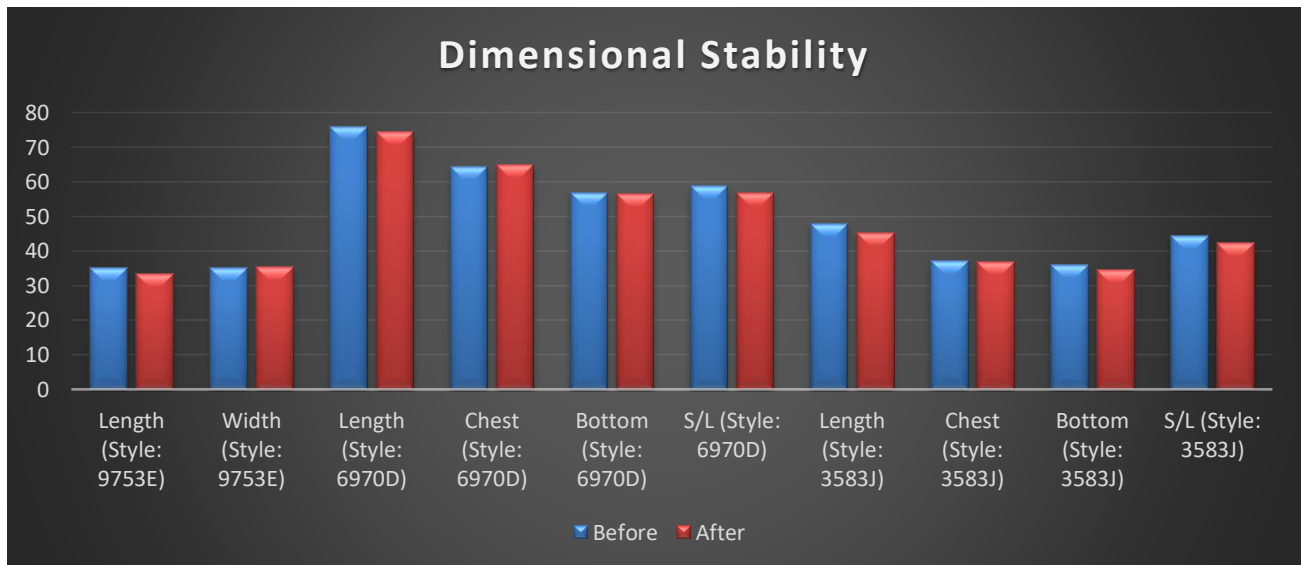
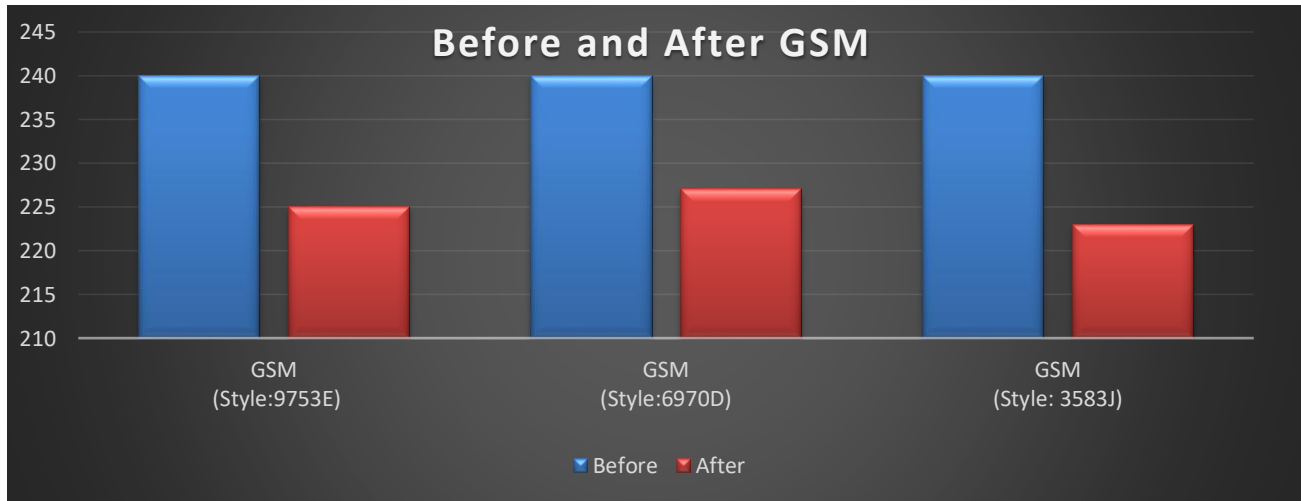


Table 4.7

Table 4.7 shows that 9753E, 6970D, 3583J these three style had same fabric weight with same fabric composition and also their shade percentage is same. Observed that there are something changing happens in dimensional stability and GSM after wash. Found that these three styles had too much variation in GSM. Which is respectively lower than requested. Also found that shrinkage percentage is average but for style 6970D extension happens is garments chest measurement. Since these three fabric had same shade percentage and GSM variation almost same so shade percentage can be the reason of changes in GSM and Shrinkage.

4.8 : 100% Cotton Fleece

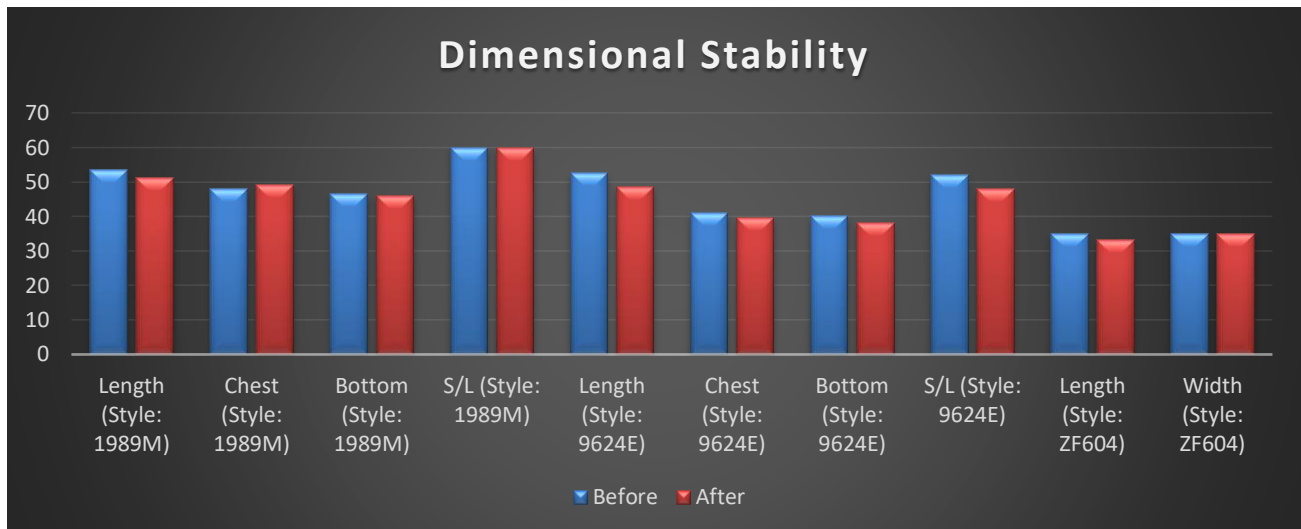
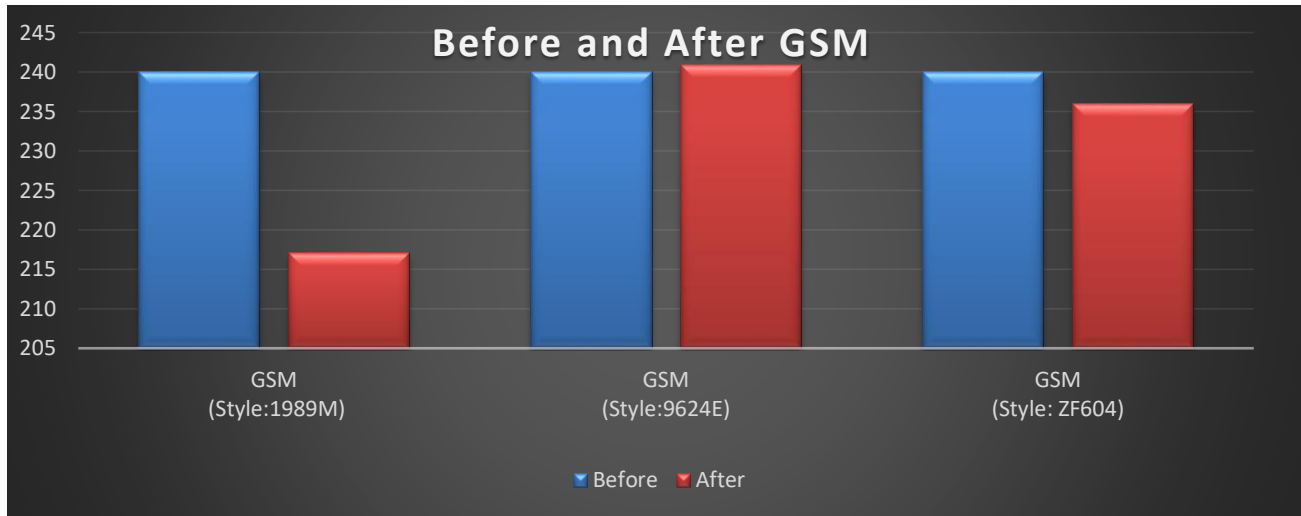


Table 4.8

Table 4.8 shows that Style: 1989M, 9624E, ZF604 these three fabric had the same composition and also same weight but after wash test it was found lots of changes in their GSM. They had different shade percentage. 1989M had the noticeable change is GSM and shrinkage percentage is higher also extension happens in chest measurement. 9624E had the noticeable change in shrinkage, ZF604 had an increase in twisting (Fig- 15) so comparing these data 9624E and ZF604 had the same shade percentage and their GSM change is average but changing in shrinkage is noticeable so shade percentage can be a reason of changing in shrinkage for 1989M extension and shade percentage is a good reason for changes in GSM.

CHAPTER 5: CONCLUSION

Conclusion:

In this report showed some data for Fabric weight, Dimensional stability, Spirality or Twisting Tearing Strength Test, Color Fastness to wash.

- Single jersey cotton garments found less GSM variation than French terry and fleece garments.
- Shrinkage occurred (2-4) % for single jersey cotton and (2-7) for French terry and fleece garments.
- Colorfastness to rubbing wet is not so good for terry and fleece fabric
- Fleece fabric shrinkage is more than terry and single jersey
- No twisting found on terry garments in different composition fabrics.
- Shrinkage% and twisting are the reason for changing GSM after garments wash
- Fleece fabrics GSM variation results so poor after garments wash on different garments with same composition.

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