



Daffodil
International
University

Faculty of Engineering
Department of Textile Engineering

**A Comparative Study on Lab Tests of Various Types of Knit
Garments**

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Advanced in Apparel Manufacturing Technology
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LETTER OF APPROVAL

To,

The Head

Department of Textile Engineering

Daffodil International University

102, Sukrabad, Mirpur Road, Dhaka 1207

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” A Comparative Study on Lab Tests of Various Types of Knit Garments” has been prepared by the students Md. Sohel Rana bearing ID.161-23-4566, Md.Nayem ID:161-23-4656 is completed for final evaluation. The whole report is prepared based on the proper investigation and interruption through critical analysis empirical data with required belongings. The students were directly involved in their project activities and their report become vital to spark of much valuable information for the readers.

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

Yours sincerely

A handwritten signature in black ink, appearing to read 'Md. Mominur Rhaman', with the date '06.12.2019' written below it.

Md.MominurRhaman

Assistant Professor

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Daffodil International University



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At first, we like to express our heart-felt thanks to Almighty Allah for his kind blessing for completion of this Process successfully.

We would like to thank the people, who have made a significant contribution to make this Project. Their guide lines, suggestion & inspiration helped us a lot. We would like to express our deepest appreciation to our respected teacher Md.MominurRahman, Assistant Professor, Dept. of Textile Engineering (DIU). Deep knowledge and keen interest of him helps and assists us much to carry out this project on garments testing. His endless patience, scholar guidance, constant encouragement, energetic supervision, constructive criticism, valuable advice, checking many raw data and correcting them at all stage have made it possible to complete this project.

We would like to express my heartiest gratitude **Prof. Dr. Mahbubul Haque** Head, Dept. of textile engineering for his kind suggestion and also the other faculty members and the staff of TE department of Daffodil International University.

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We would like to thank my entire course mate of Daffodil International University, who took part in effective discussion and suggestion to make this project as well.

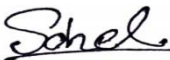

At last but not the least, thanks go to all the worker, supervisor, line chief and floor in charge who have assisted, helped and inspired us to complete this task in various stage.



DECLARATION

We hereby declare that, this project has been done by us under the supervision of Md.Mominur Rahman, Assistant Professor, Department of TE, and Daffodil International University. We also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degree.

Submitted by:

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ABSTRACT

This paper clearly explains different quality test report. This project based on the different types of testing of color fastness, pilling, shrinkage, dimensional stability, spirality and quality variation for different fabrication. In the textile industry, testing is basically done, after making garments. This Project is done by NAZ Bangladesh Limited. In this testing lab, number of M/C 15, number of operator 10. In our study, we focused on important of testing lab, how to testing is done in garment industry and we are trying to identify that problem, reason and their remedies. In our project, we have investigated 10 reports of three kinds of fabric composition from testing lab. From the analysis of the reports, we found different types of quality variation Such as: colorfastness, rubbing, pilling, shrinkage, spirality for different fabric composition.



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CHAPTER 01

INTRODUCTION



1.1 Background of the Study

The main aim of the study is to know what quality variation result would be for different fabrication such as 100% cotton, 60% cotton & 40% polyester, 95% cotton & 5% elastane and basic idea about different kind of test which is most useful. By doing study we have been able testing procedure and treatment process if any test failed. The most important factor of study is to research quality variation compared with different kinds of fabric and what types of fabric for what result would come and to identify why quality variation occurred. This study is very helpful for our job future in textile industry to take a challenge.

1.2 Objectives of the Study

- To compare color fastness for different fabrication.
- To compare dimensional stability & spirality of different fabrication.
- To compare the performance of pilling for different fabrication.
- To compare pH value & print durability for fabric composition.

1.3 Importance of the Study

By this examination we showed quality variation for different fabrication from the test report. As textile students we would be able by doing research to learn introduction of different testing name and their testing procedure, testing parameters, time duration, testing instrument and also learned how to make test report as buyer requirement. We also learned different testing method for different testing specially ISO method. As operators they would be able how to test is done in laboratory and which method they used as buyer satisfaction. They would learn how to make test report and should be understand about test report. As a general people they might be learned garments testing are generally done in testing lab to maintain quality of products.

1.4 Limitations of the Study

- Due to time limitation, operators could not provide different process elaborately.
- Operator's unwillingness to provide required data without permission higher authority.
- Due to some restriction not possible to collect data.
- Lack of time management.
- Lack of sufficient guideline from factory.



CHAPTER 02

LITERATURE REVIEW



2.1 Quality

Quality means the feature of product which satisfy the customer or fitness of product or goodness and badness of product. Quality is an important part of RMG industry because of customer satisfaction, reduce cost and earn higher revenue, improving time management, improving productivity, and to build up better relationship with customer on long term basis. To determine the quality measure such as rubbing, dimensional stability, spirality, pH, print durability of different garments and different fabrication and different GSM and different color. For different test we get different value and decide this quality good or bad.

2.2 Testing

Testing is the important most part of quality. At first, test the garment after get result decide quality. To check the fabrication, color fastness, rubbing, performance of pilling, ph, print durability etc are good or bad. Some testing are done on physical testing lab with method are given below:

1. Color fastness to rubbing (ISO105X12)
2. Dimensional stability (ISO 6330/5077/3759)
3. Color fastness to wash (ISO105C06)
4. Spirality (ISO6330/5077/3759)
5. Colorfastness to water (ISO 105 E01)
6. Color fastness to perspiration (Acid/Alkali ISO 105E04)
7. Pilling (ISO 12945-1/12945-2)
8. pH value (ISO 3071)



2.3 Color Fastness to Rubbing

Color fastness refers resistance to garments against color fading or color transferring. Color fastness test is generally done to determine the quality of colored garments. This test is done to determine the degree of color that may transfer from the colored to the surface by rubbing.

2.3.1 Procedure for Dry Rubbing

- At first 5*5 sample is taken and stitch with mono fiber.
- The fabric is to the flat bed.
- Then swatch attached to the rubbing finger within 10sec 10 times.

2.3.2 Procedure for Wet Rubbing

- In this method swatch is dipped in distilled water having hardness 0.
- Then swatch attached to the rubbing finger within 10sec 10 times.

2.3.3 Grading Table

Dark Shade	Medium Shade	Light Shade
Dry 3-4	4	4-5
Wet 2-2.5	3	3.5-4

2.4 Dimensional Stability & Spirality

Dimensional stability is the characteristics of a fabric and measured dimensional stability of a fabric determines whether a fabric has the potential to retain its original shape and to determine the change in dimension or appearance of a garments.

Spirality is the detwisting tendency of yarn of fabric. It is not possible to remove from the fabric but it can be reduce.

2.4.1 Procedure

- At first 50*50 cm sample is taken for test
- Then put the sample on the table for conditioning for 4 hours before testing garments.
- Then stitch the sample 3 sides by over lock machine.
- Then put the sample on washing machine.
- Finally sample is dried on tumble dryer machine



2.4.2 Shrinkage Test Calculation

Shrinkage (%) = (Before wash-After wash)/before wash

2.4.3 Spirality Calculation

Spirality= (S1+S2*L)/100

Where S1= The right side distance of the specimen from the stitch

S2= The left side distance of the specimen from the stitch

L= Length before wash

2.5 Performance of Pilling

Pilling is formed by little ball of fiber on the surface of fabric which is caused by the abrasion of wear. Pilling is the tendency of fibers to come loose from the fabric surface and formed ball particles of fiber.

2.5.1 Pilling Test Procedure

- At first four Specimens 5”*5” are cut from the fabric.
- Then seam allowance 12mm is marked on the back. In two samples seam is marked parallel to the warp direction and in other two parallel to the weft direction.
- Each specimen turn inside out and 6 mm cut off from each end.
- Fabric tubes made are mounted on rubber.
- Then each of the loose ends is taped with PVC tape.
- Four specimens are placed on pilling box.
- Then at last 500 cycles are done.

2.5.2 Rating Table

Rating	Description
5	No change
4	Slight change
3	Moderate change
2	Significant change
1	Severe change



2.6 pH Test

pH value is to test the acid and alkali consist in garments which can directly contact with the skin has a relatively higher requirements of pH value. Natural and synthetic products should be tested by pH value.

2.6.1 Garments pH Testing Procedure

- Extraction of potassium chloride
- Extraction of water

2.6.2 Range of pH Scale

- $\text{pH}=7$ equates pure water or neutral solution
- $\text{pH}>7$ equates a solution with acid impacts
- $\text{pH}<7$ equates a solution with alkali impacts

2.7 Print Durability

Print durability tester determines of durability garments and garments component.

2.7.1 Procedure

Making a solution by mixing detergent with water and pouring it into the bucket of the tester but we cannot place the specimen until the solution reaches specified temperature. We can take out the specimen and gain the result after the tester run for specified time.



CHAPTER 03

EXPERIMENTAL DETAILS



3.1 For 100% Cotton Fabric

3.1.1 Fabric Details

Here is given the fabric details of 100% cotton samples.

Table 3.1: Fabric details of different samples

Sample No	Buyer	PO	Fabric Composition	Fabric Type	Color	GSM
01	Peacocks	132857	100% Cotton	S/J	Khaki	150
02		132771			Brick	160
03		132858			Red	150
04		131926			White	160
05		131323			Red	160
06		132305			Khaki	160
07		133415			White Stripe	160
08		132296			Brick	160
09		132770			Mineral Yellow	160
10		132900			Red	160

Table 3.1 Shows the Fabric details of different samples, Where it was 10 sample peacocks buyer and different order number, same fabric composition and same fabric type and different color sample such as two sample are khaki color and three sample are red color and two sample are brick color and two sample are white and white stripe and one sample are mineral yellow. And it was different GSM such as there are two samples 150 GSM, Eight samples are 160 GSM.

Here is given below the image of samples:



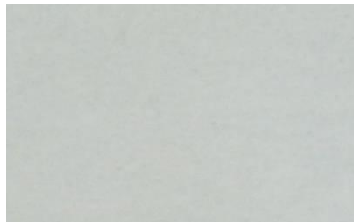
Sample 01



Sample 02



Sample 03



Sample 04



Sample 05



Samples 06



Sample 07



Sample 08



Samples09



Sample 10

Figure 3.1: Different type of fabric sample.

3.1.2 Quality Test Reports of Garments

Here is shown the different test and their result for quality of garments.

Table 3.2: Different quality tests

Sample No	Different quality test							Print Durability
	Rubbing		Dimensional Stability		Spirality (%)	Pilling	PH	
	Wet	Dry	Length (%)	Width (%)				
01	2-3	3	-0.1	-2.77	1.0	3	6.75	P=4-5,B=4-5
02	4	2	-2.1	-1.7	1.0	2-3	6.72	P=4-5,B=4-5
03	3	4-5	-0.6	-3.5	1.0	2-3	6.66	P=4-5,B=4-5
04	1	1	+0.5	+6.2	0.0	3	6.68	P=4
05	3-4	4	-3.4	-5.4	0.5	3-4	6.72	P=4-5,B=4-5
06	4	2	-3.4	+0.4	1.0	3-4	6.80	P=4-5,B=4
07	5	4	-2.5	-0.6	0.0	4	6.76	P=3,B=2
08	3	2-3	+0.5	+6.2	0.0	3	6.68	P=4-5,B=4
09	1	3	-2.0	+2.0	0.0	3	6.72	P=4-5,B=4
10	2	3-4	-3.9	-5.0	0.5	3	6.66	N/A

Table 3.2 shows garment test result, where there is some test such as rubbing, dimensional stability, Spirality, pilling, PH, Print durability. See the table, for 100% cotton highest wet value 5 and lowest value 1 and highest dry value 4-5, lowest dry value 1. Dimensional stability for length increase +0.5% and decrease -3.9% and width increase+6.2% and width decrease -5.4%. For spirality highest value is 1.0% and lowest value is 0.5%. For pilling highest value 4 and lowest value 2-3. For pH highest value 6.80 and lowest value 6.66. For Print durability highest value P=4-5 and lowest value 3 and for B highest value 4-5, lowest value 2.

3.1.3 Changed in Measurements of Garments

Here is given below the change in measurements before and after wash the garments.

Table 3.3: Changed in measurement of garments

Sample	Changed in Measurements of Garments														
	Front. L			Back. L			Chest			Bottom			Sleeve L		
	B	A	D%	B	A	D%	B	A	D%	B	A	D%	B	A	D%
01	74.1	73.3	-1.0	72.3	72.1	-2	50	48.6	-2.8	51.2	49.8	-2.7	21.0	20.8	-0.9
02	70.0	68.5	-2.1	61.4	60.7	-1.1	42.3	42.5	+4	47.2	46.7	-1.0	N/A	N/A	N/A
03	72.5	72.0	-0.6	71.7	72.4	+9	50.5	48.3	-4.3	50.5	48.7	-3.5	20.8	20.7	-0.4
04	38.8	36.5	-5.9	40.5	38.4	-5.19	31.8	30.7	-3.4	32.6	31.4	-3.6	N/A	N/A	N/A
05	66.5	64.2	-3.4	64.3	61.9	-3.7	43.8	42.5	-2.9	44.4	42.0	-5.4	15.5	15.3	-1.2
06	69.5	67.1	-3.4	66.2	64.7	-2.2	44.3	44.5	+4	48.5	47.3	-2.48	N/A	N/A	N/A
07	43.7	42.6	-2.5	43	41.6	-3.2	33.3	33.1	-0.6	32.9	32.7	-0.6	12.0	11.8	-1.6
08	69.4	69.8	+0.5	67.4	67.2	-2	43.6	44.6	+2.2	49.4	52.5	+6.2	18.0	18.1	+5
09	69.8	68.2	-2.2	61.5	60.8	-1.1	42.3	43.2	+2.2	46.0	46.8	+1.7	N/A	N/A	N/A
10	66.0	63.4	-3.9	66.2	64.4	-2.7	46.1	45.1	-2.1	46.0	43.7	-5.0	16.5	15.5	-6.0

Table 3.3 shows the changed in measurements of garments result for different samples. After wash, we measure the garments length, width, chest, bottom and sleeve length to checking dimension of garments for shrinkage. Then we got variation result from the garments sample. For front length we got the increase highest difference (%) +0.5, highest decrease difference (%) -5.9 and average difference (%) -2.45. For back length we got the increase highest difference (%) +0.9 and highest decrease difference (%) -5.19 and average difference (%) -1.87.



For chest we got the increase highest difference (%) +2.2 and highest decrease difference (%) -4.3 and average difference (%) -1.09. For bottom we got the increase highest difference (%) +6.2 and highest decrease difference (%) -5.0 and average difference (%) -1.26. For sleeve length we got the increase highest difference (%) +0.5 and highest decrease difference (%) -6.0 and average difference (%) -1.6

3.2 For 60% Cotton and 40% polyester Fabric

3.2.1 Fabric Details

Here is given below the fabric details of 60% Cotton and 40% polyester Fabric.

Table 3.4: Fabric details of different samples

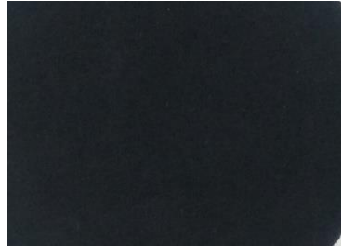
Sample No	Buyer	PO	Fabric Composition	Fabric Type	Color	GSM
01	Peacocks	130875	60% Ctn+40% poly	S/J	Pink	160
02		130906			Black	140
03		132934			Yellow	150
04		133077			Navy	140
05		131929			Soft Blue	160
06		132858			Yellow	150
07		132857			Blue	150
08		132806			Pale Pink	140
09		132934			Blue	150

Table 3.4 Shows the table Fabric details of different samples, Where it was ten sample peacocks buyer and different order number, same fabric composition and same fabric type and different color sample such as two sample are pink and pale pink color and one sample are black color and two sample are yellow color and one sample are navy and two sample are soft blue and blue. And it was different GSM such as there are four samples 150 GSM, two samples are 160 GSM, three samples are 140GSM.

Here is given below the image of samples:



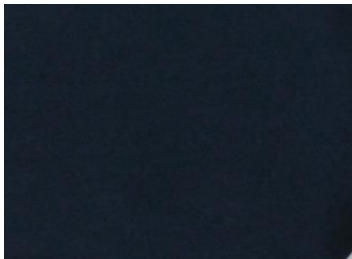
Sample 01



Sample 02



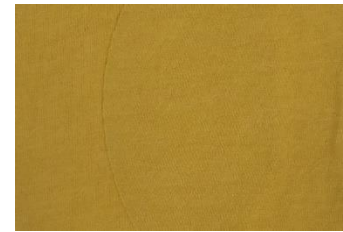
Sample 03



Sample 04



Sample 05



Samples 06



Sample 07



Sample 08



Samples 09

Figure 3.2: Different types of fabric of samples.

3.2.2 Quality Test Report of Garments

Here is show different test and their result for quality of garments.

Table 3.5: Different Quality test

Sample No	Different Quality test							
	Rubbing		Dimensional Stability		Spirality (%)	Pilling	PH	Print Durability
	Wet	Dry	Length (%)	Width (%)				
01	3	N/A	-2.2	-2.1	0.0	3	6.66	P=4-5,B=4
02	3-4	2-3	-2.0	-0.6	1.2	3	6.78	P=4-5,B=4-5
03	4-5	N/A	-1.8	-1.5	0.0	3	6.68	P=4-5
04	2-3	1-2	N/A	N/A	N/A	N/A	N/A	N/A
05	1	4-5	-2.3	-3.7	0.0	2-3	6.72	P=4
06	3-4	1	-1.6	-2.57	0.0	3	6.72	P=4-5,B=4
07	2-3	4-5	+1.9	+2.1	0.5	3	6.78	P=4-5,B=4
08	4	N/A	-1.2	0.57	3.5	3	6.75	P=4-5,B=4-5
09	3	2	-1.5	-2.2	2.2	3	6.76	P=4-5,B=4

Table 3.5 shows garment test result, where there is some test such as rubbing, dimensional stability, spirality, pilling, PH, print durability. See the table, there are number of sample and same fabric composition and all test same for sample. For 60% cotton and 40% polyester we get highest wet rubbing rate 4-5, lowest rubbing rate 1 and highest dry rubbing rate 4-5, lowest rubbing rate 1. For dimensional stability highest increase length +1.9%, highest decrease length -2.3% and highest increase width +2.1%, highest decrease width -3.7%. For spirality highest value 3.5% and lowest value 0.0%. For pilling highest performance rate 3 and lowest performance rate 2-3.

For pH highest value 6.78 and lowest value 6.66. For Print durability highest value P=4-5 and lowest value 4 and for B highest value 4-5, lowest value 4.

3.2.3 Changed in Measurements of Garments

Here is given below the change in measurements before and after wash the garments.

Table 3.6: Changed in measurements of garments

Sample	Changed in Measurements of Garments														
	Front. L			Back. L			Chest			Bottom			Sleeve L		
	B	A	D %	B	A	D %	B	A	D %	B	A	D %	B	A	D %
01	72.7	71.3	-1.9	72.0	70.6	-1.9	51.6	50.3	-2.5	51.3	50.2	-2.1	21.2	20.4	-3.7
02	77.8	76.2	-2.0	75.2	73.5	-2.2	57.2	56.2	-1.7	59.3	58.9	-0.6	13.4	13.0	-2.9
03	73.0	71.9	-1.5	73.1	72.0	-1.5	52.3	52.0	-0.5	52.3	51.1	-2.2	21.0	20.6	-1.9
04	79.9	78.2	-2.1	73.0	72.0	-1.3	52.0	50.2	-3.4	56.6	55.0	-2.8	17.6	17.5	-0.5
05	38.5	37.6	-2.3	40.0	39.0	-2.5	31.2	30.4	-2.5	32.2	31.0	-3.7	10.5	10.4	-0.9
06	73.0	71.8	-1.6	73.3	72.1	-1.6	51.4	50.6	-1.5	52.0	50.7	-2.5	20.8	20.3	-2.4
07	40.9	40.0	-2.2	40.8	40.0	-1.9	29.8	29.5	-1.0	32.7	32.0	-2.1	35.2	34.4	-2.2
08	64.0	63.2	-1.2	63.0	61.3	-2.6	46.3	45.0	-2.8	53.7	53.4	-0.5	12.5	12.5	0.0
09	70.8	69.5	-1.8	68.9	67.0	-2.7	50.5	49.8	-1.3	50.4	49.6	-1.5	20.4	20.0	-1.9



Table 3.6 shows the changed in measurements of garments result for different samples. After wash, we measure the garments length, width, chest, bottom and sleeve length to checking dimension of garments for shrinkage. Then we got variation result from the garments sample. For front length we got the highest decrease difference (%) -2.3 and average difference (%) -1.8. For back length we got the highest decrease difference (%) -2.7 and average difference (%) -2.0. For chest we got the highest decrease difference (%) -3.4 and average difference (%) -1.09. For bottom we got the highest decrease difference (%) -3.7 and average difference (%) -2.0. For sleeve length we got the highest decrease difference (%) -3.7 and average difference (%) -1.8.

3.3 For 95% Cotton and 5% Elastane

3.3.1 Fabric Details

Here is given the fabric details of 95% Cotton and 5% Elastane.

Table 3.7: Fabric details of different samples

Sample No	Buyer	PO	Fabric Composition	Fabric Type	Color	GSM
01	Peacocks	132788	95% Ctn+5% Elastane	S/J	Pomegranate Red	150
02		130674			Black	180
03		132954			Grey Melange	160
04		132789			Bright gold	150
05		131926			Grey Melange AOP	160
06		131334			Grey Melange	160
07		130956			Grey Melange AOP	180
08		130814			Grey Abstract	200

Table 3.7 Shows the table Fabric details of different samples, where it was eight sample peacocks buyer and different order number, same fabric composition and same fabric type and different color sample such as one sample are Pomegranate Red color and one sample are black

Color and two samples are grey melange color and two samples are Grey melange AOP and one sample are bright gold. And it was different GSM such as there are two samples 150 GSM, three samples are 160 GSM, two samples are 180GSM, one sample 200 GSM.

Here is the image of samples given below:



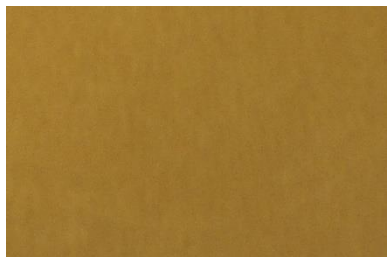
Sample 01



Sample 02



Sample 03



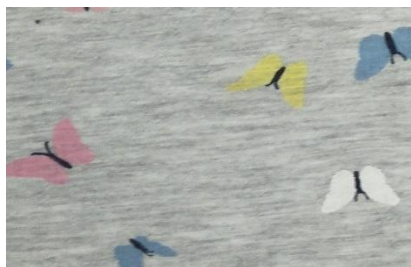
Sample 04



Sample 05



Samples 06



Sample 07



Sample 08

Figure 3.3: Different types of fabric samples.



3.3.2 Quality Test Report of Garments

Here is show different test and their result for quality of garments.

Table 3.8: Different Quality test

Sample No	Different Quality test							
	Rubbing		Dimensional Stability		Spirality (%)	Pilling	PH	Print Durability
	Wet	Dry	Length (%)	Width (%)				
01	3-4	1-2	+2.1	+1.8	1.0	4	6.68	P=4-5,B=4-5
02	4	3	-3.4	-4.7	0.0	4	6.78	B=4
03	2-3	3	-5.4	-0.2	2.7	3-4	6.68	P=4,B=4
04	3-4	N/A	N/A	N/A	N/A	4	6.66	N/A
05	3-4	4-5	-8.0	-6.0	N/A	3-4	6.72	P=4-5,B=4-
06	3-4	2-3	-4.3	-5.5	N/A	3-4	6.65	P=4-5,B=3-4
07	4-5	4-5	-7.1	-2.6	0.0	4	6.80	P=3-4,B=4
08	3	4-5	-5.3	-3.9	0.0	4-5	6.80	P=4-5,B=3-4

Table 3.2 shows the garment test result, where there is some test such as rubbing, dimensional stability, spirality, pilling, PH, Print durability. See the table, there are number of sample and same fabric composition and all test same for sample. For 95% cotton and 5% elastane we get highest wet rubbing rate 4-5, lowest rubbing rate 3 and highest dry rubbing rate 4-5, lowest rubbing rate 1-2. For dimensional stability highest increase length +2.1%, highest decrease length -7.1% and highest increase width +1.8%, highest decrease width -6.0%. For spirality highest value 2.7% and lowest value 0.0%. For pilling highest performance rate 4-5 and lowest performance rate 3-4. For pH highest value 6.80 and lowest value 6.65. For Print durability highest value P=4-5 and lowest value 3 and for B highest value 4-5, lowest value 3-4.

3.3.3 Changed in Measurements of Garments

Here is given below the change in measurements before and after wash the garments.

Table3. 9: Changed in measurements of Garments

Sample	Changed in Measurements Garments														
	Front. L			Back. L			Chest			Bottom			Sleeve L		
	B	A	D %	B	A	D %	B	A	D %	B	A	D %	B	A	D %
01	50.2	49.1	-2.1	41.7	41.0	-1.6	39.4	39.0	-1.0	43.7	44.5	+1.8	N/A	N/A	N/A
02	19.5	18.9	-3.0	49.0	47.8	-2.4	29.6	28.2	-4.7	25.5	24.0	-5.8	69.3	66.9	-3.4
03	56.5	53.4	-5.4	54.8	51.7	-5.6	38.9	38.4	-1.2	39.1	39.2	+0.2	13.4	12.6	-5.9
04	44.0	43.0	-2.3	47.0	45.7	-3.0	46.5	45.5	-2.2	50.5	50.0	0.0	N/A	N/A	N/A
05	39.7	36.5	-8.0	40.5	37.8	-6.6	31.9	30.2	-5.3	33.0	31.0	-6.0	N/A	N/A	N/A
06	41.8	40	-4.3	41.0	39	-4.8	31.4	30	-4.4	32.5	30.7	-5.54	34.0	32.9	-3.24
07	54.5	50.6	-7.1	51.9	48.5	-6.5	28.0	27.2	-2.8	53.2	51.8	-2.6	37.0	34.2	-7.5
08	68.6	64.9	-5.3	65.1	62.0	-4.7	46.0	45.8	-0.4	50.2	48.2	-3.9	63.0	59.5	-5.5

Table 3.9 shows the changed in measurements of garments result for different samples.

After wash, we measure the garments length, width, chest, bottom and sleeve length to checking



dimension of garments for shrinkage. Then we got variation result from the garments sample. For front length we got the highest decrease difference (%) -8.0 and average difference (%) -4.68. For back length we got the highest decrease difference (%) -6.6 and average difference (%) -4.4. For chest we got the highest decrease difference (%) -5.3 and average difference (%) -2.75. For bottom we got the highest increase difference (%) +1.8, highest decrease difference % -6.0 and average difference (%) -2.73. For sleeve length we got the highest decrease difference (%) -7.5 and average difference (%) -5.1.



CHAPTER 04

DISCUSSION OF RESULTS

4.1 Comparison of Color Fastness

Here is the given below comparison of color fastness for different samples.

Table 4.1: Comparison of color fastness for different samples

Rubbing Fastness						
Sample	100% Cotton		60% Cotton+40% polyester		95% Cotton+5% Elastane	
	Wet	Dry	Wet	Dry	Wet	Dry
01	2-3	3	3	N/A	3-4	1-2
02	4	2	3-4	2-3	4	3
03	3	4-5	4-5	N/A	2-3	3
04	1	1	2-3	1-2	3-4	N/A
05	3-4	4	1	4-5	3-4	4-5
06	4	2	3-4	1	3-4	2-3
07	5	4	2-3	4-5	4-5	4-5
08	3	2-3	4	N/A	3	4-5
09	1	3	3	2		
10	2	3-4				

For sample 01&02 by above compared with different fabric composition we get rubbing fastness of 95% cotton & 5% elastane is good quality. For sample 03 we get rubbing fastness of 100% cotton is good quality. For sample 04 we get rubbing fastness of 60% cotton & 40% polyester is good quality. For sample 05 we get rubbing fastness of 95% cotton & 5% elastane is good quality. For sample 06, 07 & 08 we get rubbing fastness of 95% cotton & 5% elastane is good quality. For sample 09 we get rubbing fastness of 60% cotton & 40% polyester is good quality. For sample 10 we get rubbing fastness of 100% cotton is good quality. Because of fabric quality, dyeing quality, and finishing quality is better .That's why we considered above sample is good quality with compared other sample.

4.2 Comparison of Dimensional Stability & Spirality

Here is the given below comparison of dimensional stability & spirality for different samples.

Table 4.2: Comparison of Dimensional Stability & Spirality

Dimensional Stability & Spirality									
Sample	100% Cotton			60% Cotton & 40% polyester			95% Cotton & 5% Elastane		
	Dimensional Stability		Spirality %	Dimensional Stability		Spirality %	Dimensional Stability		Spirality %
	Length %	Width %		Length %	Width %		Length %	Width %	
01	-0.1	-2.77	1.0	-2.2	-2.1	0.0	+2.1	+1.8	1.0
02	-2.1	-1.7	1.0	-2.0	-0.6	1.2	-3.4	-4.7	0.0
03	-0.6	-3.5	1.0	-1.8	-1.5	0.0	-5.4	-0.2	2.7
04	+0.5	+6.2	0.0	N/A	N/A	N/A	N/A	N/A	N/A
05	-3.4	-5.4	0.5	-2.3	-3.7	0.0	-8.0	-6.0	N/A
06	-3.4	+0.4	1.0	-1.6	-2.57	0.0	-4.3	-5.5	N/A
07	-2.5	-0.6	0.0	+1.9	+2.1	0.5	-7.1	-2.6	0.0
08	+0.5	+6.2	0.0	-1.2	0.57	3.5	-5.3	-3.9	0.0
09	-2.0	+2.0	0.0	-1.5	-2.2	2.2			
10	-3.9	-5.0	0.5						

For sample 01 by above compared with different types of fabric composition we get dimensional stability and spirality of 95% cotton & 5% elastane is good quality. For sample 02,03, 05, 06,08 we get dimensional stability and spirality of 60% cotton & 40% polyester is good quality. For sample 04 we get dimensional stability and spirality of 100% cotton is good quality. For sample 07, 09,10 we get dimensional stability and spirality of 100% cotton is good quality.

Because of elasticity and twist is good that's why we considered above sample is good quality.

4.3 Comparison of Performance (pilling)

Here is the given below comparison of performance pilling for different samples.

Table 4.3: Comparison of performance pilling

Sample	Performance of Pilling.		
	100% Cotton	60% Cotton+40% polyester	95% Cotton +5% Elastane
	Pilling.	Pilling.	Pilling.
01	3	3	4
02	3	3	4
03	2	2	3
04	3	N/A	4
05	3-4	2-3	3-4
06	3-4	3	3-4
07	4	3	4
08	3	4	4-5
09	3	3	
10	3		

For sample 01,02,03,04 by above compared with different fabric composition we get pilling performance of 95% cotton & 5 % elastane is good quality. For sample 05,06,07 we get pilling performance of 95% cotton & 5 % elastane and 100% cotton is good quality. For sample 08 we get pilling performance of 95% cotton & 5 % elastane and 100% cotton is good quality. For sample 09 we get pilling performance of 100% cotton and 60% cotton 40% polyester is same quality. Because of less short fiber , less hairiness, good finished that's why we considered above sample is good quality.

4.4 Comparison of PH & Print Durability

Here is the given below comparison of PH and print durability for different samples.

Table 4.4: Comparison of PH & print durability

Sample	PH & Print Durability					
	100% Cotton		60% Cotton+40% polyester		95% Cotton+5% Elestane	
	PH	Print Durability	PH	Print Durability	PH	Print Durability
01	6.75	P=4-5,B=4-5	6.66	P=4-5,B=4	6.68	P=4-5,B=4-5
02	6.72	P=4-5,B=4-5	6.78	P=4-5,B=4-5	6.78	B=4
03	6.66	P=4-5,B=4-5	6.68	P=4-5	6.68	P=4,B=4
04	6.68	P=4	N/A	N/A	6.66	N/A
05	6.72	P=4-5,B=4-5	6.72	P=4	6.72	P=4-5,B=4-5
06	6.80	P=4-5,B=4	6.72	P=4-5,B=4	6.65	P=4-5,B=3-4
07	6.76	P=3,B=2	6.78	P=4-5,B=4	6.80	P=3-4,B=4
08	6.68	P=4-5,B=4	6.75	P=4-5,B=4-5	6.80	P=4-5,B=3-4
09	6.72	P=4-5,B=4	6.76	P=4-5,B=4		
10	6.66	N/A				

For all sample, pH is good. For sample 01 we get by compared print durability of 100% cotton & 60% Cotton & 40% polyester is good quality. For sample 02 we get by compared print durability



of 60% cotton & 40 % polyester and 100% cotton is good quality . For sample 03 we get by compared print durability of 95% cotton & 5% elastane and 100% cotton is good quality . For sample 05 we get by compared print durability of 100% cotton and 95% cotton & 5% elastane is good quality . For sample 06 we get by compared pH value & print durability of 100% cotton and 60% cotton & 40 % polyester is good quality . For sample 08 we get by compared print durability of 60% cotton & 40% polyester is good quality .

4.5 Comparison Changed in Measurements of Garments

Here is given below the change in measurements before and after wash the garments.

Table 4.5: Changed in Measurements of Garments

Sam ple	Changed in Measurements of Garments														
	100%Cotton					60%Cotton+40%polyester					95%Cotton+5%Elestane				
	F/L	B/L	C	B	S/L	F/L	B/L	C	B	S/L	F/L	B/L	C	B	S/L
01	-1.0	-2	-2.8	-2.7	-0.9	-1.9	-1.9	-2.5	-2.1	-3.7	-2.1	-1.6	-1.0	+1.8	N/A
02	-2.1	-1.1	+4	-1.0	N/A	-2.0	-2.2	-1.7	-0.6	-2.9	-3.0	-2.4	-4.7	-5.8	-3.4
03	-0.6	+9	-4.3	-3.5	-0.4	-1.5	-1.5	-0.5	-2.2	-1.9	-5.4	-5.6	-1.2	+0.2	-5.9
04	-5.9	-5.19	-3.4	-3.6	N/A	-2.1	-1.3	-3.4	-2.8	-0.5	-2.3	-3.0	-2.2	0.0	N/A
05	-3.4	-3.7	-2.9	-5.4	-1.2	-2.3	-2.5	-2.5	-3.7	-0.9	-8.0	-6.6	-5.3	-6.0	N/A
06	-3.4	-2.2	+4	-2.48	N/A	-1.6	-1.6	-1.5	-2.5	-2.4	-4.3	-4.8	-4.46	-5.54	-3.24
07	-2.5	-3.2	-0.6	-0.6	-1.6	-2.2	-1.9	-1.0	-2.1	-2.2	-7.1	-6.5	-2.8	-2.6	-7.5
08	+0.5	-2	+2. 2	+6.2	+5	-1.2	-2.6	-2.8	-0.5	0.0	-5.3	-4.7	-0.4	-3.9	-5.5
09	-2.2	-1.1	+2. 2	+1.7	N/A	-1.8	-2.7	-1.3	-1.5	-1.9					
10	-3.9	-2.7	-2.1	-5.0	-6.0										



For sample 1, by above compared we get difference% of garments measurement of 60% cotton & 40% polyester is most changeable. For sample 2, by above compared we get difference% of garments measurement of 95% cotton & 5% elastane is most changeable. For sample 3, by above compared we get difference% of garments measurement of 95% cotton & 5% elastane is most changeable. For sample 4, by above compared we get difference% of garments measurement of 100% cotton is most changeable. For sample 5,6 &7,8 by above compared we get difference% of garments measurement 95% cotton & 5% elastane is most changeable. For sample 9, by above compared we get difference% of garments measurement of 100% cotton is most changeable. So we can say that by analyzing change in measurement garments of 95% cotton&5%elastane shrinkage more after wash compared with 100% cotton and 60% cotton + 40% polyester.



CHAPTER 05

CONCLUSION



Conclusion

After lots of experiment & discussion we have completed our project by collecting the information from NAZ Bangladesh Ltd. We have gathered lot of experience by doing this study. This project will help us to know the different kinds of test and their testing procedure. We also be able to gain knowledge by compared quality variation for different fabrication. By doing project we learned if any test failed then how treatment is done in testing lab and also learned how to test report is made according to buyer requirement. In this project we worked 10 samples of three types of fabric which gave us idea about fabrication. By doing research we got colorfastness of 95% cotton & 5% elastane is good quality, (for wet 3-4 &for dry 4-5) because of fabric, dyeing, and finishing is good. Dimensional stability &spirality of 60% cotton & 40% polyester is good quality because of elasticity & twisting is good. Pilling performance of 95% cotton & 5% elastane is good quality (Highest pilling rate 4-5) because of less short fibers, less hairiness, & good finished. For all sample fabrication pH value is good and Print durability of 100% cotton and 60% cotton & 40% polyester is good quality (for 100% cotton and 60% cotton+ 40% Polyester, highest pH value 6.80 & print durability P=4-5, B=4-5) At last we can say that this project will be help us in job future to take challenge in hard working as a textile engineer.



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