



FACULTY OF ENGINEERING
DEPARTMENT OF TEXTILE ENGINEERING

Studies On the Effect of Wet Wash on Color Fading

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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 Wet Processing Engineering

DECLARATION

We hereby declare that, this project has been done by us under the supervision of **Tanvir Ahmed Chowdhury, Assistant Professor**, Department of Textile Engineering, Faculty of Engineering, 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 or diploma.



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LETTER OF APPROVAL

This project report prepared by Ishtiak Ahmed Mahin (ID: 201-23-946) and Proson Debnath (ID: 201-23-967), is approved in Partial Fulfillment of the Requirement for the Degree of BACHELOR OF SCIENCE IN TEXTILE ENGINEERING. The said students have completed their project work under my supervision. During the research period I found them sincere, hardworking and enthusiastic.



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**This project report is dedicated to our beloved
Parents and Teachers**

Abstract

Washing is an impressive process of bring out the different and amazing eye catching shade and effects on the textile garments. Washing process is mainly indicates the denim garments wash. Washing can be done on fabric and garments both. But garments wash is mostly preferable for the best output of wash. The effect and shade can be bring out on the garments properly and garments wash can ensure the less damage during wash process. Firstly the garments are made from the raw fabric and then after the quality checking of sewing, the garments are ready for wash. The raw garments are in dark shade and full of size material, which has a very rough surface of hand feeling. After different types of wash, the effect of the denim garments get a totally new look and amazing shade. Its size material also removed and softener added during the wash. Which makes the the garments handfeel very much soft and comfortable. The objective of our work was to find out the fabric quality and effect comparison of different type of wash for dark shade. For this we have to wait for the full process a from the beginning to the end to get the actual result and demanded shade of the denim garments. We started it from the raw denim garments and finishes it on the final inspection, when the garments are ready for delivery. From first to last process in washing, different types of machine, equipments, ingredients and chemicals are used. We watched the complete process of washing and noted down the process carefully.

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Chapter-1

Introduction

1.1:Introduction

Garment wash is a textile finishing technique that entails cleaning and washing clothing to provide particular practical and aesthetic outcomes. It is an important stage in the creation of many kinds of clothing, from casual wear to denim jeans. This extensive article offers a thorough overview of Garment Wash, covering its types, history, handling advice and profiles of leading manufacturers and users worldwide.

Garment washing became fashionable as a fashion statement in the late 1960s, which is when the technique originated. Many different washing processes were developed to create the desired worn-out, distressed appearance. At first, manual procedures like sandblasting and stone washing were used. But in the decades that followed, safer and more environmentally friendly techniques were adopted as a result of worker safety and environmental concerns.

There are different types of garments wash are applied in the washing factory. They are-

1. Desizing
2. Scouring
3. Enzyme wash
4. Bleach wash
5. Acid wash
6. Stone wash
7. Neutral wash
8. Over dye

Every garments are not washed in the same process and not with the same chemical. The wash are mainly depends on the demanded shade. The shade can

be different for different types of denim fabric. The denim fabric has different types of characteristics.

The different types of denim fabric are-

1. Organic cotton
2. BCI cotton
3. Recycled denim
4. Recycled cotton
5. Recycled polyester
6. Over dyed etc.

So, these all type of denim doesn't required the same wash process to get the perfect shade. Some shade could be matched after two or three types of wash, and some shade could be matched after all types of wash. The acid wash is very critical and lengthy processed wash. So, the shade matching is depended on the denim fabric and the wash process.

Here are the objectives of the garments denim wash-

1. To remove the size material from the denim garments.
2. To make the fabric surface from rough to soft.
3. To improve the handfeel of the denim.
4. To bring out the color effect of the denim fabric and make it dark shade or light shade.
5. To make the garments charming and fashionable.
6. To make the garments comfortable to wear.
7. Washing effect can improve the color fastness to wash.

So, all these objectives are found in the wash process. The wash process of denim makes the garments wearable and comfortable.

Chapter-2

Litarature Review

2.1:Washing Machine

Washing machine is the primary equipment of any washing factory to wash the fabric,garments and other textile materials.Washing machine is a cube box shaped machine which is powered by the electric power and there has a motor which can moves the washing machine's inner part both in forward and backward direction. In the washing machine,there has a intake pipe which fill water inside the washing machine.And there also has a exit pipe which can removes the water and chemicals from the washing machine.The washing machine is temperature controlled.So the temperature can be increase or decrease when it is needed.The door of the washing machine is hydrolic powered and the door lock is hydrolic pressed.There has a small window with a safety lock on the door of the washing machine.This is used to mix the chemicals on the washing machine.

The washing machine has forward lean position.It can lean to forward direction when it is needed.In this position,the machine can exit all the washed garments from inside to outside.

2.1.1:Washing machine's objective

The washing machine has different task to do in the washing factory.The main objectives are-

1. To wash garments for desizing,scouring,bleaching
2. To wash garments for enzyme washing/bio-polishing
3. To wash garments for rinsing,neutral washing,acid washing
4. To make the garments prepare for potassium permanganate wash and treating them with sponge balls
5. To over dye the white garments with various kind of dyes.

So,these are the main objectives of the washing machine.

2.1.2:Washing machine's specification

There was 3 types of washing machine on the washing factory.These are-

1. Tolkar washing machine
2. Tonello washing machine
3. Yilmak washing machine

1.

Machine name : Washing machine

Brand name : Tolkar

Country of origin : Turkey

Production capacity: 130 kg

Power capacity : 21.5 kw

Main task : Desizing, scouring, stone wash

Machine speed : 17 to 20 rpm (depends on wash type)

Amount of machine : 2

2.

Machine name : Washing machine

Brand name : Tonello

Country of origin : Italy

Production capacity : 150 kg

Power capacity : 24 kw

Main task : Scouring, bleaching, enzyme wash, acid wash, neutral wash

Machine speed : 17 to 22 rpm (depends on wash type)

Amount of machine : 12



Fig 1: Tonello washing machine

3.

Machine name	: Washing machine
Brand name	: Yilmak
Country of origin	: Turkey
Production capacity	: 130 kg
Power capacity	: 21.5 kw
Main task	: Scouring,bleaching,enzyme wash,acid wash,neutral wash
Machine speed	: 17 to 22 (depends on wash type)
Amount of machine	: 6

2.1.3: Washing flowchart

Washing is mainly a wet processing system, but before wet processing it needs to make prepare for wet process. In that case, washing is divided in two types-

1. Dry process
2. Wet process

Before wet process, the denim garments are treated with dry process and dry process are divided into 3 types-

1. 1st dry process
2. 2nd dry process
3. 3rd dry process

And wet process are 2 types

1. 1st wash process
2. 2nd wash process

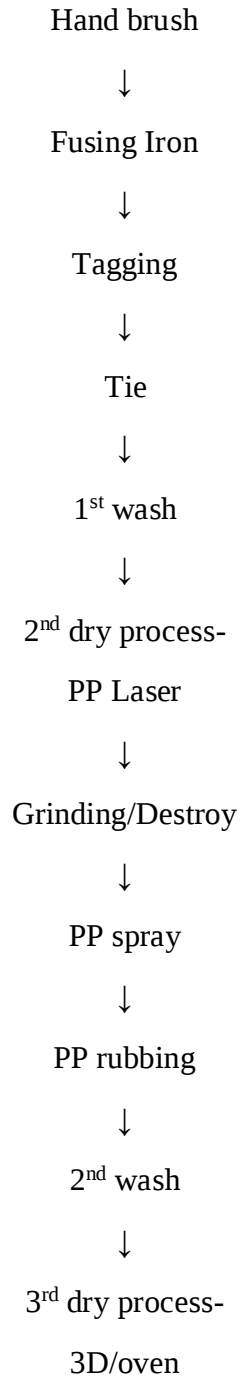
1st dry process is done first, then 1st wash done, after that 2nd dry process done and then the 2nd wash done, at last the 3rd dry process is applied. These process has to maintained the sequence. Each sequence has a special effect on the garments, which can be seen after the treatment.

So, the washing flowchart is given below-

1st dry process-

Whisker





2.1.4: Dry process

The dry process are applied when the fabric is in dry situation. Dry processes can not be done on wet garments. Some main dry processes are described below-

Whisker:

Whisker is a design of the denim pant, which is mainly done on pant's front upper part and back knee part. Whisker is mainly done with the sand paper with the help of pattern made with the hard board. Manually this process is done.

Now a days whisker can also be done with laser, which is automatic process.

Hand brush:

Hand brush is also done with sand paper. For hand brush, the sand paper's density is more than the whisker. Hand brush process is applied on pant's front upper part, front knee part, back pocket part, back upper part and back lower part. Hand brush can also be done with laser.

Fusing Iron:

Fusing iron is done the inner part of the pant's side seam, this fusing is given for bright up the wash effect on the side seam.

Tagging:

Tagging is mainly a plastic stapling on the denim garments, through the tagging, the tag area surface get a upper position and the wash effect can be seen on the surface after the wash process. Tagging can be done both manually and automatically. Tagging is mainly done for buyer requirement.

Tie:

Fabric is tied up with the rubber band and then wash. The tie process bright up the wash effect on the denim garments after wash.

Laser:

Laser is done with the laser, and the laser area make faded effect on the surface. It's a color burning process.

Grinding/Destroy:

This process is applied on the pocket, waist, bottom part. A mini air grinder is used to make the grinding. This makes the fabric specific part's surface destroyed and make soft surface.

And destroy is done with destroy machine, which can make a hole or a fabric surface fully destroyed to make garments more fashionable.

PP spray:

Potassium permanganate spray (pp) is used to make the fabric color faded to shown the wash effect. It's mainly make the color dull or faded. With a spray gun, the pp spray is done.

PP rubbing:

PP rubbing is done manually with the hand, same process as the pp spray.

3D:

3D is mainly a heat process. A crease mark on the front part upper part of pant is called the 3D. It is an effect of the denim pant. This effect can be shown after 2 or 3 time wash. So, 3D mark is temporary. If its need to make permanent effect, then it's need to oven work. For oven work, there used resin, and the resin make the crease marks permanent with heat. The heat can be upto 100 to 120 degree centigrade.

There are also more dry processes like knee cut, hem cut, pocket image, glue patch, clip crinkle, color spot etc. But mainly described dry processes are commonly applied on the garments.

2.1.5: Wet processes

Wet processes are very important to bring up the shade effect on the fabric surface. Different wet process are done for different types of shade. For dark shade, the wet process is one type and for light shade the wet process is another type. But the main wet process which are mostly applied on garments are described below-

Desizing:

Desizing is the size material removing process. It removes the size material and make the fabric soft and flexible.

Scouring:

Scouring is mainly natural impurities removing process, but in washing scouring mainly make effect on garment's fabric surface and also remove impurities.

Enzyme:

Enzyme wash is applied to show the used effect or fade effect of the denim garments. Enzyme wash also make the garments soft and comfortable. It removes the hairy surface of the garments.

Bleaching:

Bleaching is applied to remove the surface color of the garments. Mainly bleaching powder is used for the bleach wash. Bleaching wash make the garments color light.

Neutral:

Neutral wash is applied to neutralized the garments. Different types of chemicals are used on garments and make the garments acidic or alkalic. Neutral wash make the garments neutral by maintaining the pH which is suitable for our skin.

Stone wash: Stone wash is applied with pumice stone which are rubs the garments inside the washing machine and removes the color of the fabric surface.



Fig 2: Pumice stone

Acid wash:

Acid wash is applied on that garments, which are needed to bring out the light shade. Acid wash are normally done with thermocol ball mixed with potassium permanganate.



Fig 3: Thermocol ball

Rinse wash:

Rinse wash is mainly washing the garments with water. This type of wash can remove all the chemicals from the garments.

Tinting:

Tinting is mainly the color hue of the fabric surface of the garments. The tinting can be with blue color, green color, yellow color, brown color.

2.1.6: Used chemical in washing

Various chemicals are used in washing, but among them some chemicals are mostly used for different types of wash.

Resperse abs- Dispersing agent

Green Buff 1000 powder- Used as alkali buffer

Stable Bleach- Mild bleaching agent

Calcium Hypochloride- Very strong bleaching agent.

Soda Ash- Removing stains from the garments.

Caustic soda- Used as detergent.

Sodium meta bisulphite- Acidic condition neutralizing agent, which mainly neutralized the garments mixed with potassium permanganate.

Hydrogen peroxide- Mainly bleaching agent but in washing it mostly use in scouring.

Organ IQ Neutral- For using in neutralization.

Potassium permanganate- Used in acid wash of denim washing

Blue Breeze multi- Enzyme producing agent



Fig 4: Resperse abs

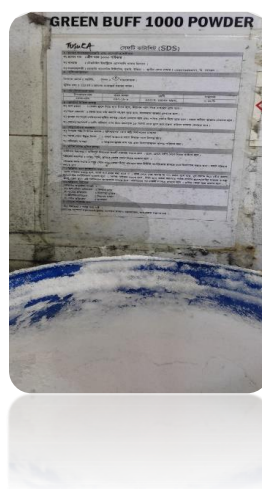


Fig 5: Green Buff 1000 powder



Fig 6: Sodium Meta Bisulphite

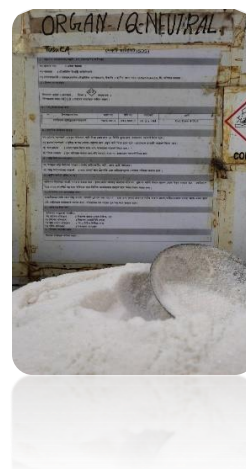


Fig 7: Organ IQ neutral



Fig 8: Others chemicals

2.2: Hydro extractor machine

Hydro extractor machine is a type of machine, which squeezes the water from the garments with centrifugal kinetic energy. When the garments are unloaded from the washing machine, the garments are full of water. This amount of water can not make the garments next process fast. Although it will take more time if it given on the dryer.

So, in that case, it needs dewatering. The hydro extractor also called the de watering machine. When it is loaded with wet garments, it gets covered. Then motor started, the machine started rotating. For

rotation, the garments get centered for the machine's centrifugal kinetic energy and the water are get pressurized to separate from the garments. By this, the water is removed from the garments and the 90% of water are separated.



Fig 9: Hydro Extractor machine

2.2.1: Hydro extractor machine's specification

Machine name	: Hydro extractor machine
Brand name	: Cranch
Country of origin	: China
Load capacity	: 300kg
Rpm	: 1000
Power capacity	: 30kw

2.3: Dryer machine

Dryer machine are dried the garments which are unloaded from the hydro extractor machine. This dryer can remove all the water and dried a garments at a short time, so production rate is

satisfactory. The dryer machine can be operated by gas or steam. Both can dried the water without any issues. The dryer is a big machinery in a washing factory, it's size huge and it should be operated with the skillfull operator.



Fig 10: Dryer machine

2.3.1: Dryer machine specification

Machine name	: Hydro extractor machine
Brand name	: Triveneta Grandi Impianti
Country of origin	: Italy
Load capacity	: 120-200kg
Temperature	: 135°-150° c
Power capacity	: 5kw
Operated by	: Gas/steam

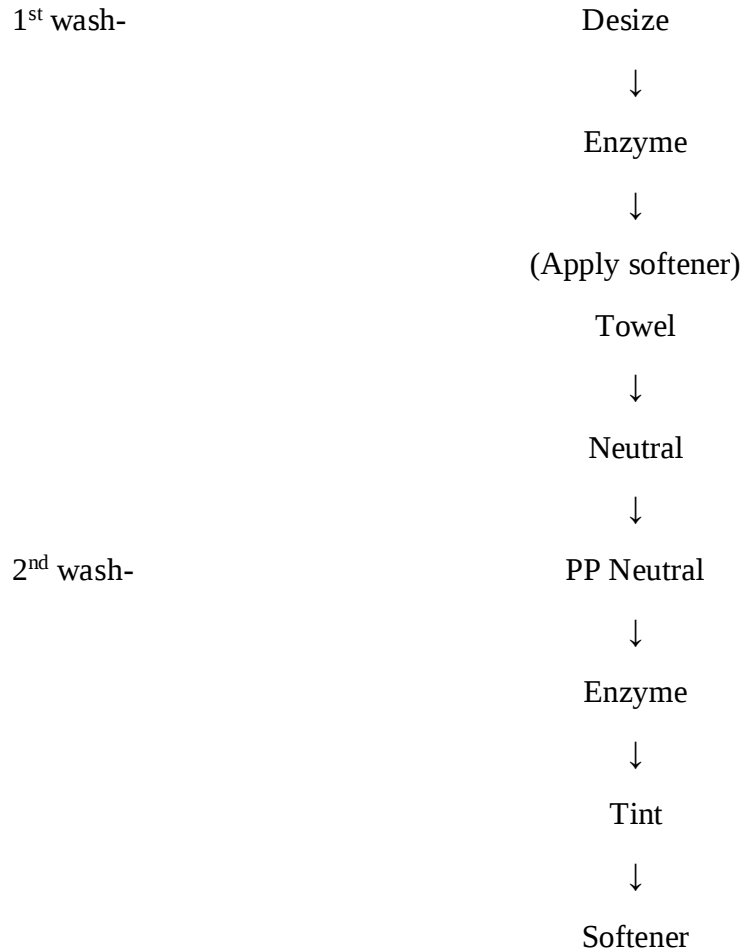
Chapter-3

Methodology

3.1: Wash sample 1

The process needs different types of wash to gain the required shade.

Here is the process flow chart-



Description of the process:

Here the final required shade comes after all the wash. Each and every wash has its own characteristics.

Desize: Desize wash removes the size materials from the garment. Size materials are used in warp yarns to avoid the warp yarn breakage and reduce the tension during the weaving.

Enzyme: Enzyme wash are applied to make the garment surface smooth and make used look on the garments.

Towel wash: Towel wash mainly done for to remove the specific amount of color from the garments. Towel wash mainly done with calcium hypochloride and towel wash is done after softening.

Neutral: Neutral wash firstly done to neutralize the garments, to maintain the correct pH of the garments. And secondly to make faded the garments.

PP Neutral: PP is mainly potassium permanganate wash. Potassium permanganate is an acidic wash term. After pp, the garments need to neutralize, that is why first pp, then the neutral wash is done with the process.

Enzyme: Enzyme wash makes the garment more used look. A denim garment can be washed with enzyme for two times. It depends on to achieve the required shade of the garments.

Tint: Tint is mainly a color hue. The color hue is applied on the denim garment to make the denim shade more eye catching.

Softener: Softener make the garments soft and improves the handfeel of the garments.

Here is the recipe for this sample of different types of wash, chemicals, doses, time, temperature and required amount of water.

1 st wash					
Process	Chemicals	Doses (gm)	Water	Temperature	Time
Desize	MLS	200	40ltr	50°	10 min
	ABS	50			
	CAT	100			
Enzyme	Power wash AK	50	50ltr	45°	35 min
	ABS	50			
	CAT	100			
Towel (Softening first)	Calcium hypochloride	100	40ltr	Cold temp	8 min
Neutral	Organ IQ	200	50ltr		5 min
2 nd wash					
PP Neutral	Organ	100			5min
Enzyme	ACC	200	50ltr		5min
	ABS	50			
Tint	GTL	0.7	40ltr		
	Yellow	0.2			
	Black	0.2			
Softener	CHW	300			5min

Table 1: Wash sample 1

3.1.1: Wash Sample 1 Images



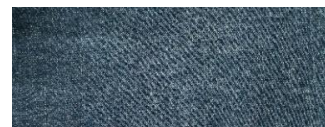
Raw fabric



Enzyme



Towel



Neutral



Enzyme with tint (Final shade)

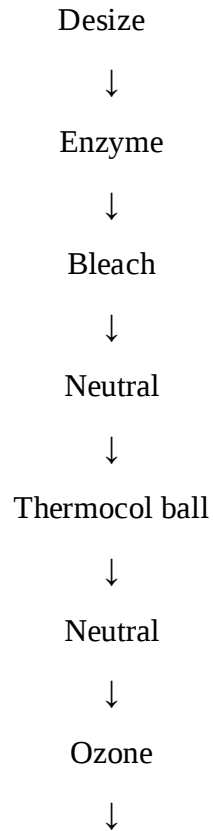
Fig 11: Wash sample 1 images

3.2: Wash sample 2

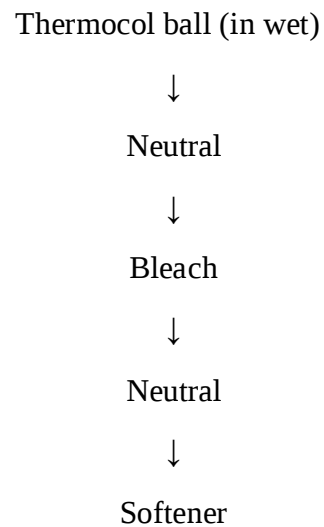
The process needs different types of wash to gain the required shade.

Here is the process flow chart-

1st wash-



2nd wash-



Description of the process:

Here the final required shade comes after all the wash. Each and every wash has its own characteristics.

Desize: Desize wash removes the size materials from the garment. Size materials are used in warp yarns to avoid the warp yarn breakage and reduce the tension during the weaving.

Enzyme: Enzyme wash are applied to make the garment surface smooth and make used look on the garments.

Bleach: Bleach is used to remove the denim color from the garment, to make the color light.

Neutral: Neutral wash firstly done to neutralize the garments, to maintain the correct pH of the garments. And secondly to make faded the garments.

Thermocol ball: Thermocol ball is applied for acid wash, potash acid is used for that.

Ozone: Ozone is applied for a short time to make the garment prepare for mild shade.

Softener: Softener is used to make the garments surface smooth and improve the handfeel.

Here is the recipe for this sample of different types of wash, chemicals, doses, time, temperature and required amount of water.

1st wash					
Process	Chemical	Doses(gm)	Water	Temperature	Time
Desize	MHS	200	40ltr	45°	10min
	ABS	50			
Enzyme	Power wash AK	50	50ltr	40°	25min
	ABS	50			
Bleach	Stable Bleach 35%	2kg	40ltr	40°	5min
Neutral	Sodium Meta Bisulphite	200	50ltr		5min
Thermocol Ball	Potash	2			12min
	Acid	2			
Neutral	Sodium Meta Bisulphite	200	50ltr		5min
Ozone					30 sec
2nd wash					
Thermocol ball after pp(in wet)	Potash	3			13min
	Acid	3			
Neutral	Organ	200	50ltr		5min

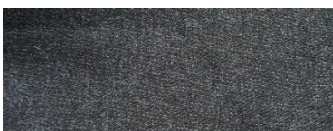
	ACC	100			
Bleach	Stable Bleach 35%	50	40ltr	45°	1min
Neutral	Organ	200	50ltr		5min
Softener	CHW	200			4min

Table 2: Wash sample 2

3.2.1: Wash Sample 2 Images



Raw sample



Enzyme



Bleach



Neutral



Bleach



Neutral then softener (Final Shade)

Fig 12: Wash sample 2 Images

3.3: Wash Sample 3

The process needs different types of wash to gain the required shade.

Here is the process flow chart-

1st wash-

Desize



Enzyme



Bleach



Neutral



Thermocol Ball



Neutral



2nd wash-

PP Neutral



Enzyme



Softener

Description of the process:

Here the final required shade comes after all the wash. Each and every wash has its own characteristics.

Desize: Desize wash removes the size materials from the garment. Size materials are used in warp yarns to avoid the warp yarn breakage and reduce the tension during the weaving.

Enzyme: Enzyme wash are applied to make the garment surface smooth and make used look on the garments.

Bleach: Bleach is used to remove the denim color from the garment, to make the color light.

Neutral: Neutral wash firstly done to neutralize the garments, to maintain the correct pH of the garments. And secondly to make faded the garments.

Thermocol ball: Thermocol ball is applied for acid wash, potash acid is used for that.

PP Neutral: PP is mainly potassium permanganate wash. Potassium permanganate is an acidic wash term. After PP, the garments need to neutralize, that is why first PP, then the neutral wash is done with the process.

Softener: Softener is used to make the garments surface smooth and improve the handfeel.

Here is the recipe for this sample of different types of wash, chemicals, doses, time, temperature and required amount of water.

1st wash					
Process	Chemical	Doses(gm)	Water	Temperature	Time
Desize	Amylese	200	40ltr	45°	10min
	ABS	100			
	CAT	100			
Enzyme	Power Wash AK	50	50ltr	40°	25min
	ABS	50			
	CAT	100			
Bleach	Stable Bleach 35%	500	40ltr	40°	5min
Neutral	Organ IQ	200	50ltr		5min
Thermocol ball	Potash	4	1ltr		10min
	Acid	4			
Neutral	Sodium Meta Bisulphite	200			5min
2nd wash					

PP Neutral	Sodium Meta Bisulphite	200			5min
Enzyme	ACC	100	50ltr		30min
Softener	CHW	500			4min

Table 3: Wash sample 3

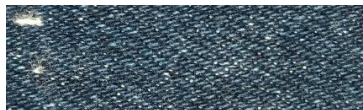
3.3.1: Wash Sample 3 Images



Raw sample



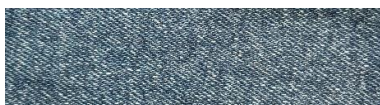
Enzyme



Bleach



Thermocol ball then Neutral



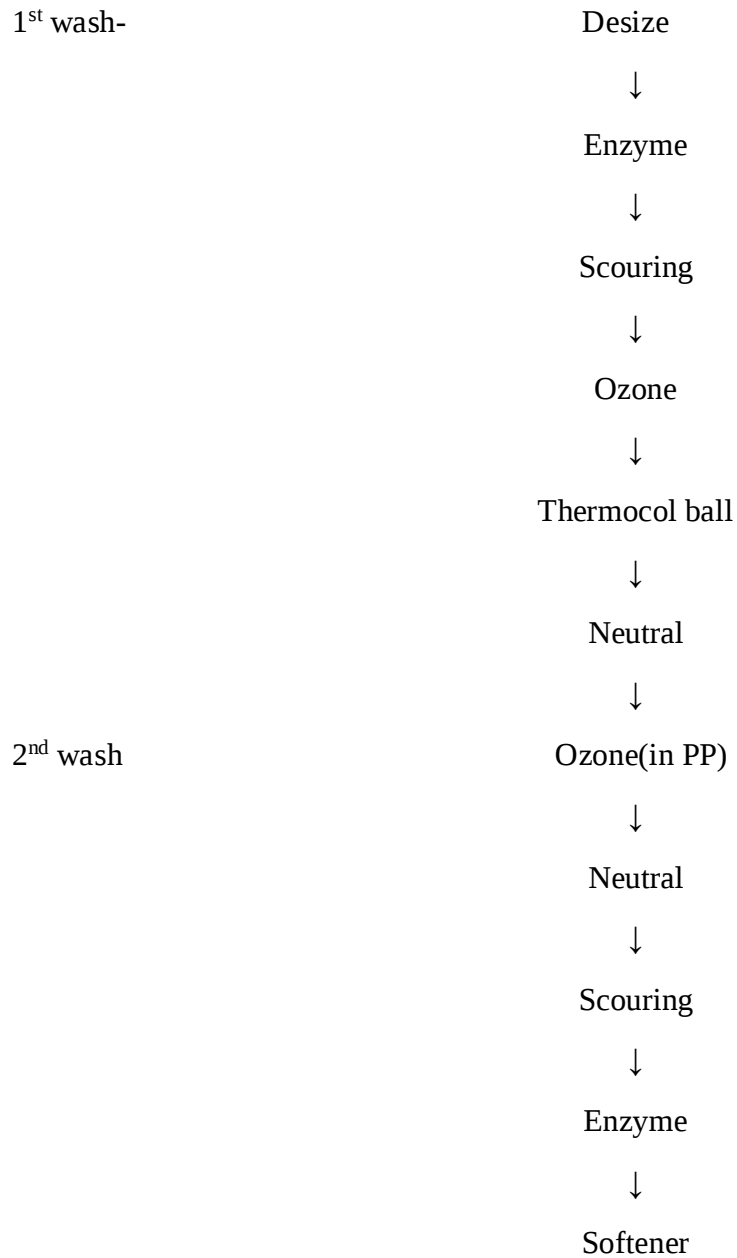
Enzyme then softener (final shade)

Fig 13: Wash sample 3 Images

3.4: Wash Sample 4

The process needs different types of wash to gain the required shade.

Here is the process flow chart-



Description of the process:

Here the final required shade comes after all the wash. Each and every wash has its own characteristics.

Desize: Desize wash removes the size materials from the garment. Size materials are used in warp yarns to avoid the warp yarn breakage and reduce the tension during the weaving.

Enzyme: Enzyme wash are applied to make the garment surface smooth and make used look on the garments.

Scouring: Scouring is normally done for to remove natural impurities, and also for removing the color of fabric to make it faded shade.

Ozone: Ozone is applied for a short time to make the garment prepare for mild shade.

Thermocol ball: Thermocol ball is applied for acid wash, potash acid is used for that.

Neutral: Neutral wash firstly done to neutralize the garments, to maintain the correct pH of the garments. And secondly to make faded the garments.

Softener: Softener is used to make the garments surface smooth and improve the handfeel.

Here is the recipe for this sample of different types of wash, chemicals, doges, time, temperature and required amount of water.

1st wash					
Process	Chemical	Doges(gm)	Water	Temperature	Time
Desize	Mhs	200	40ltr	45°	10 min
	ABS	50			
Enzyme	Power wash AK	50	50ltr	45°	25min
	ABS	50			
Scouring	Soda	100	50ltr	45°	7min
	H ₂ O ₂	100			
	NCD	100			
Ozone					2min
Thermocol ball	Potash	2			8min
Neutral	Meta	100	50ltr		5min
2nd wash					
Ozone(in PP)					20sec
Neutral	Meta	200	50ltr		5min
Scouring	Soda	100	50ltr	45°	5min

	H2O2+NCD		100+50			
Enzyme	ACC		200	50ltr	45°	1min
	ABS		50			
Softener	CHW		100			5min

Table 4: Wash sample 4

3.4.1: Wash Sample 4 Images



Raw sample



Enzyme



Scouring



Neutral





Scouring



Enzyme then softening(final shade)

Fig 14: Wash sample 4 Images

Chapter-4

Result & Discussion

4.1: Tearing Strength Test

Tearing Strength Test Report

For Enzyme wash-

Test Repoprt				
Color: Dark Indigo	Requirement	Treatment steps	Observations	Result
Warp	20N	Desize	78.48	Pass
		Enzyme	76.31	
Weft	15N	Desize	45.14	Pass
		Enzyme	43.62	

For Bleach wash-

Test Report				
Color: Dark Indigo	Requirement	Treatment steps	Observations	Result
Warp	20N	Enzyme	76.32	Pass
		Bleach	60.29	
Weft	15N	Enzyme	45.14	Pass
		Bleach	37.46	

For Finished product-

Test Report				
Color: Dark Indigo	Requirement	Treatment	Observations	Result
Warp	20N	Bleach	60.29	Pass
		Finished product	56.22	
Weft	15N	Bleach	45.14	Pass
		Finished product	38.99	

Table 5: Tensile Strength test

4.2: Color Fastness to washing

Color fastness to wash

For Enzyme wash Treatment-

Test Method: ISO 105-C06

Color Fastness to washing	Requirements	Test Results	Rating
Color Change	4	4.5	Pass
Self Staining	4.5	4.5	Pass
Color Staining (Acetate)	4	4.5	Pass
Color Staining (Cotton)	4	4.5	Pass
Color Staining (Nylon)	4	4.5	Pass
Color Staining (Polyester)	4	4.5	Pass
Color Staining (Acrylic)	4	4.5	Pass
Color Staining (Wool)	4	4	Pass

For Bleach wash treatment-

Test Method: ISO 105-C06

Color Fastness to washing	Requirements	Test Results	Rating
Color Change	4	4.5	Pass
Self Staining	4.5	4.5	Pass
Color staining (Acetate)	4	4.5	Pass
Color Staining (Cotton)	4	4.5	Pass
Color Staining (Nylon)	4	4.5	Pass
Color Staining (Polyester)	4	4.5	Pass
Color Staining (Acrylic)	4	4.5	Pass

Color Staining (Wool)	4	4.5	Pass
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For Finished Product-

Test Method: ISO 105-C06

Color Fastness To washing	Requirements	Test Results	Rating
Color Change	4	4.5	Pass
Self Staining	4.5	4.5	Pass
Color Staining (Acetate)	4	4.5	Pass
Color Staining(Cotton)	4	4	Pass
Color Staining (Nylon)	4	4.5	Pass
Color Staining (Polyester)	4	4.5	Pass
Color Staining(Acrylic)	4	4.5	Pass
Color Staining (wool)	4	4	Pass

Table 6: Color Fastness to washing

4.3: Color Fastness to Rubbing

For Enzyme Wash Treatment

Test Method: BS EN ISO 105

Color Fastness to Rubbing	Requirement	Test result	Rating
Dry Crooking	3.0	4	Pass
Wet Crooking	2.5	4	Pass

For Bleach Wash Treatment

Test Method: BS EN ISO 105

Color Fastness to Rubbing	Requirement	Test Result	Rating
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Dry Crooking	3.0	4.5	Pass
Wet Crooking	2.5	4.5	Pass

For Finished Product

Test Method: BS EN ISO 105

Color Fastness to Rubbing	Requirement	Test Result	Rating
Dry Crooking	3.0	4.5	Pass
Wet Crooking	2.5	4.5	Pass

Table 7: Color fastness to rubbing

Chapter-5

Conclusion

5.1: Conclusion

In this thesis report, it is described how different could be the faded effect of dark wash hues of the denim fabric. There are different types of dark wash and the effects are shown on the whole report. From the first to last, how the garments are made, how many processes are required for washing, what kind of chemicals are used for washing and what is the result of the after treatment of the garments washing, all are fully described on the report.

Firstly, the dry process is done with the garments then the wet process sequentially done. From a raw fabric garment, we can get a different different amazing dark shade effect through the enzyme wash, scouring, bleaching, neutral, pp wash, rinse wash, acid wash, thermocol ball wash, ozon process and after all the softening the garments. Softening is the last process of a denim garment washing, which mainly improves the handfeel of the garments. After the wash process, the garments are going for next process to get the certification of safety and ready for wear.

Secondly, the wash fabric sample with the color fading effect is shown on this report. From the raw fabric to a finished product how the color variation is happened, that is broadly elaborated. The recipe and the time-temperature also included in that side. Anyone can easily understand the process at a glance by knowing the recipe and see the color fading of the garments.

Thirdly, the test result of the garments specimen showing the strength about the fabric after wash. After wash treatment, some damages happened due to washing. For this, the test result is important for knowing the strength value about the fabric, if it is strong enough for wearable clothes or not. If it is not, the garments can not be exported and the whole process of washing will go to for a great loss. So, to prevent this the test result is very necessary for know about the garments strength.

From the washing to get the faded effect of the fabric, it is very much challenging and costly process of textile industry. All the parameters like as temperature, time, treatment, chemical, water ratio, machine revolution everything is very important to get the final product. The color variation of the faded garments is seen on the fabric surfaces. All the data of this fading effect is collected carefully and investigate the process maintaining the time period.

This study of this thesis will broaden our knowledge about the color fading effect of denim wash and also will be helpful to our future workplace. This type of study can encourage our knowledge to get an ethical production of the denim wash and make sense about the production type output.

References

1. <https://www.textileglossary.com/terms/garment-washed.html> (08.02.2024, 12:53pm)

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