



**Faculty of Engineering
Department of Textile Engineering**

**REPORT ON
Industrial Attachment
At
Fakir Apparels Ltd.
Enayethnagar, Fatullah, Narayangonj**

**Course Title: Industrial Attachment
Course Code: TE-418**

Submitted By

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This Report Presented in Partial Fulfillment of the Requirements for the Degree of Bachelor of Science in Textile Engineering.

Advance in Apparel Manufacturing Technology

Duration: From 11 September, 2014 to 28 October, 2014.

DECLARATION

We hereby declare that, this thesis paper has been done under the supervision of Md. Abdullah Al Mamun, Assistant Professor, Department of Textile Engineering, Daffodil International University. We also declare that neither this internship report nor any part of this internship report has been submitted elsewhere for award of any degree.

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1 EXECUTIVE SUMMARY

The Industrial Attachment is the most effective way for Textile Engineering student to be achieved the knowledge about the practical field of the Textile Manufacturing. It brings an opportunity to all the learners to enrich their academic knowledge by practicing with the experts of the practical field of textile.

It is our pleasure that we had an opportunity to complete our two month internship at **Fakir Apparels Ltd.**, which is one of the most modern industries of the country.

In this report we tried to cover a short profile of FAL and major customers of Fakir Apparels Ltd. and their different activities.

2 INFORMATION ABOUT FACTORY



Contact & Address

Fakir Apparels Ltd.

Head Office & Factory Address

A-127-138, 142-145, B-501-503

BSCIC Hosiery Industrial Estate

Enayethnagar, Fatullah, Narayangonj

Tel: 880-2-7671684-5, 7671300, 7672660-61

Fax: 880-2-7671301

Web: <http://www.fakirapparels.com>

2.1 INTRODUCTION

If the theoretical knowledge is a glass of water then the practical knowledge would be drinking of the water. It is always very easy to make a man understand about a firebox by showing and lighting practically rather than describing theoretically who has not ever seen a firebox. So, for any technical education the practical

experience is the most important along with the theoretical knowledge. As we are studying in a technical line, it is always important for us to gather the practical knowledge. Through our study life the only biggest chance for us to combine the theoretical knowledge with the practical knowledge is the ‘Industrial Attachment period’ that comes only once in the education life.

So we can easily realize the importance of Industrial Attachment. And in addition the knowledge we gathered from the industrial training reflects in the report of industrial attachment note book. So industrial attachment is the process where the trainee can blend his theoretical knowledge with practical knowledge increasing his/ her ability of work, skills, performance and attitude and so on. It also provides sufficient knowledge about production management, productivity evaluation, work study & efficiency, industrial management, production planning and control, production cost analysis, inventory management, utility, maintenance and so on. Industrial attachment makes us reliable to be accustomed with the industrial atmosphere and also improve courage and inspiration to take self-responsibility. We tried our best to prepare this note book applying our best efforts. We tried to gather all the necessary information to make it a valuable for me as well as for everyone. We think it will help us a lot in future in our practical life.

Fakir Apparels Ltd.:

100% Export Oriented Textile Composite Knit Manufacturing Company established in 1998 with the vision to be a world-class quality apparels manufacturer by satisfying social, ethical and environmental commitment.

2.2 HISTORY OF THE FACTORY

Sixteen Years is not a long time for a garment factory to grow up and avail one of the top positions, but Fakir Apparels is an exception. The companies who lead the knitwear number one export sector of the country. Fakir Apparels Ltd. is one of them. The company had a brand identity for themselves in the RMG sector.

Fakir Apparels started its expedition in 1998 with most comprehensive and strategic planning supported by sophisticated machinery, latest technology. Skilled workmanship, substantial marketing, proper discipline and consistent effort from all, the company entered into the global market.

This company comprises of ultra modern plants related to garments industry such as independent knitting, dyeing, sewing, finishing and packaging with sufficiently supportive backward linkage facilities. A huge 10 storied building located in BSCIC, Narayagonj, and one hour drive from Capital city Dhaka.

Values

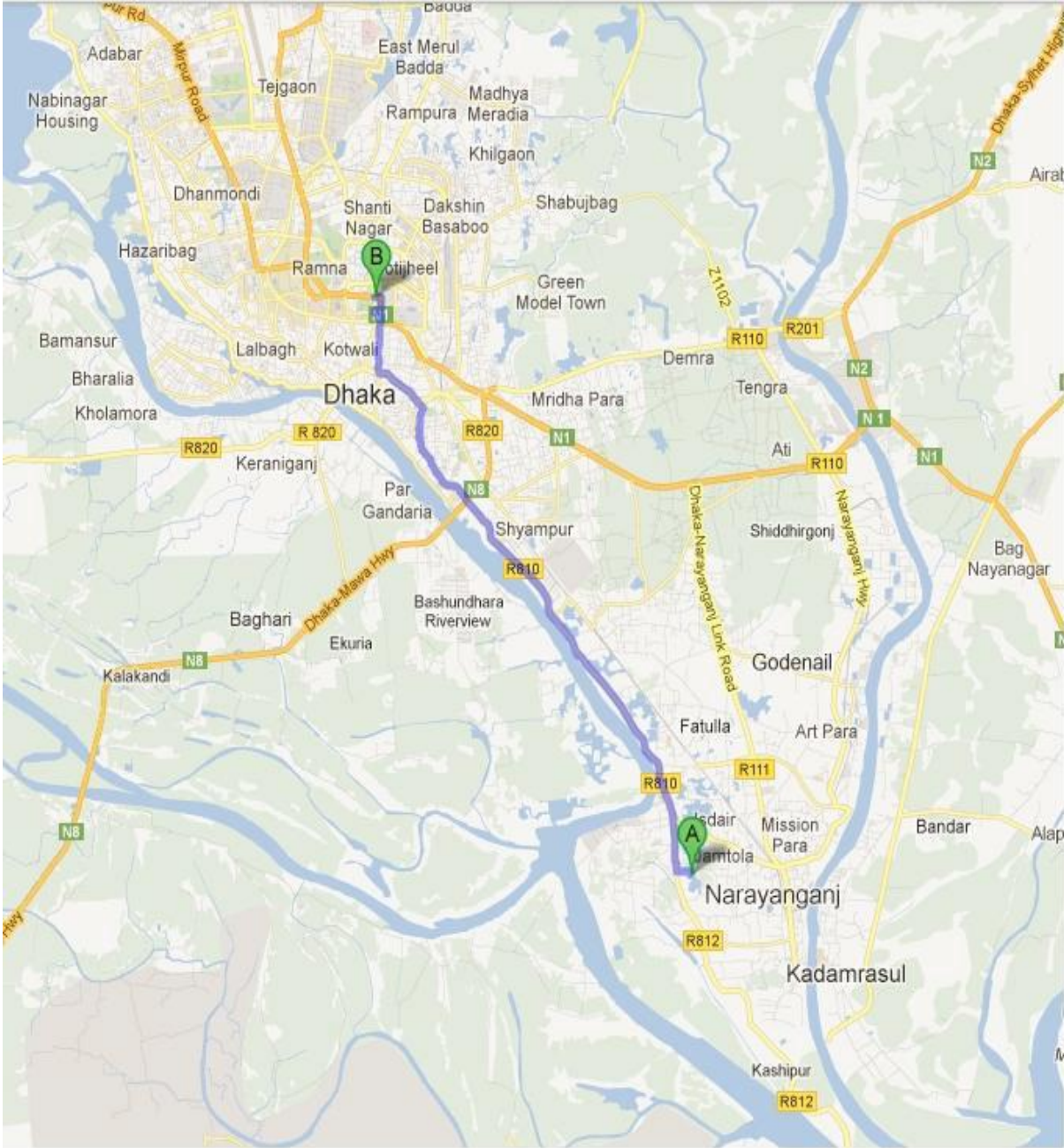
- ✚ Customer Satisfaction
- ✚ Inspiring creativity
- ✚ Integrity
- ✚ Corporate Social responsibility
- ✚ Healthy Work Environment
- ✚ Commitment & Teamwork
- ✚ Equal Opportunity Employer
- ✚ Greener Environment Specialties

2.3 AT A GLANCE:

- ✚ Total Manpower: 7500
- ✚ Year Established: 1998
- ✚ Current Export Markets: Germany, England, USA, Canada.
- ✚ Total area of: 700, 000 square feet
- ✚ Fabrics Capabilities: —
 - We can produce all types of knit fabric.
 - Single Jersey from 65 to 250 gsm, Ribs, Interlock, PK, Diff type of Waffle & etc with elastane attachment. Also we're doing Pima,

CMia., Organic, Viscose, Cool max, X4Air, blended fabric all types of functional fabric, fleece fabric.

2.4 SITE DIRECTION FROM DHAKA



Courtesy: Google Maps

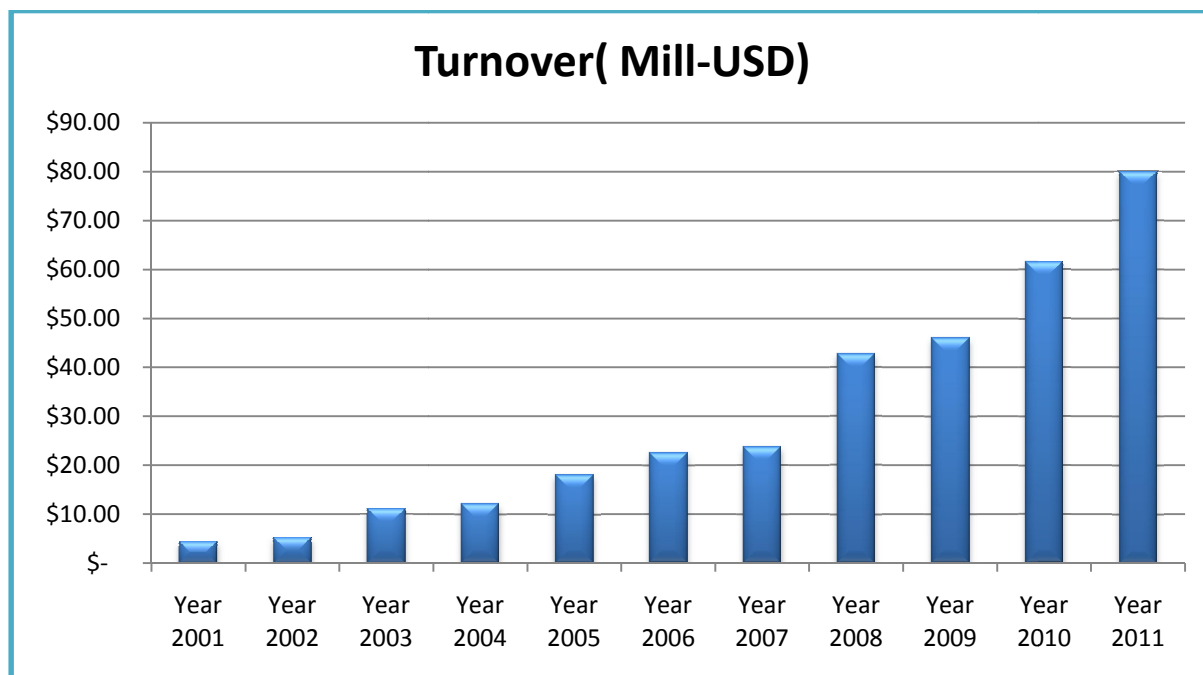
Construction of Fakir Apparels Ltd



Courtesy: Google Maps

- ✚ Established: 1998
- ✚ Managing Director: F. M. Zaman
- ✚ Floor Space: 400,000 shift.
- ✚ Annual Turn Over: US\$ 80 million
- ✚ Yearly Turnover: \$80 Million
- ✚ Manpower: 8000
- ✚ Garments Line: 78 lines
- ✚ Knitting: 20 tons/day
- ✚ Dyeing: 30 tons/day
- ✚ Dyeing Finishing: 50 tons/day
- ✚ Garments Washing: 20000 pcs/day
- ✚ Printing: 100000 pcs/day

Fakir Apparels Ltd. turnover in a Graph from 2001 to 2011



2.5 KEY PRODUCT

	Gender	Basics (units)	Fashion (units)	Total units/yr
Tees(Crew/Vee)	Men's	2439000	813000	3252000
	Women's	5691000	4607000	10298000
Polos/Henleys	Men's	948500	406500	1355000
	Women's	948500	406500	1355000
Jackets/Sweats	Men's	43360	780480	823840
	Women's	173440	86720	260160
Bottoms	Men's	146340	30000	176340
	Women's	1317060	132600	1449660
Kids products		1626000	1084000	2710000
Baby products		3252000	2168000	5420000

2.6 KEY FABRICS

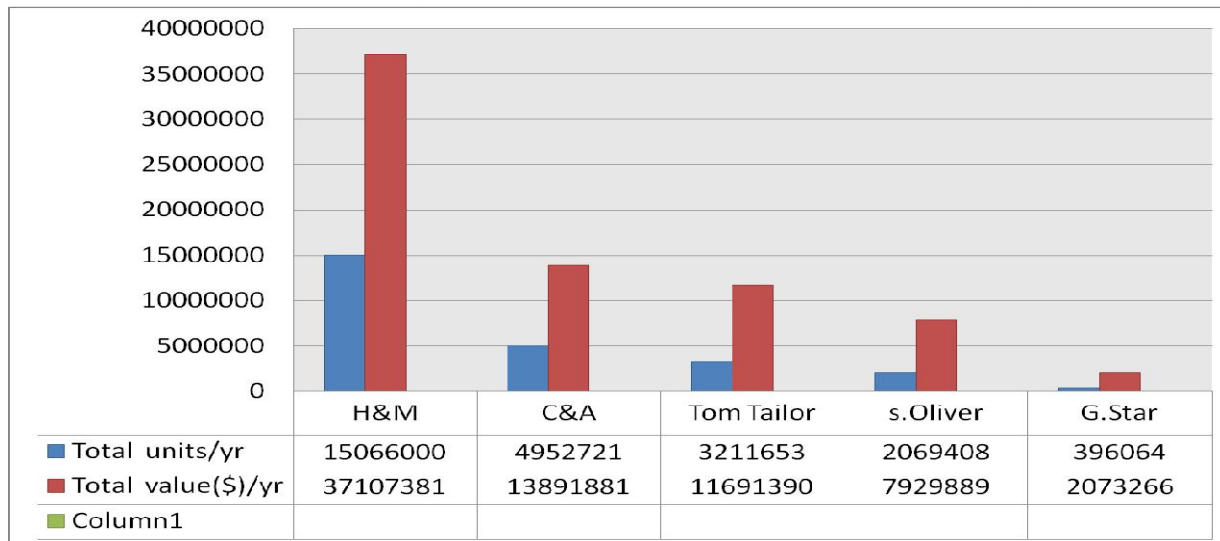
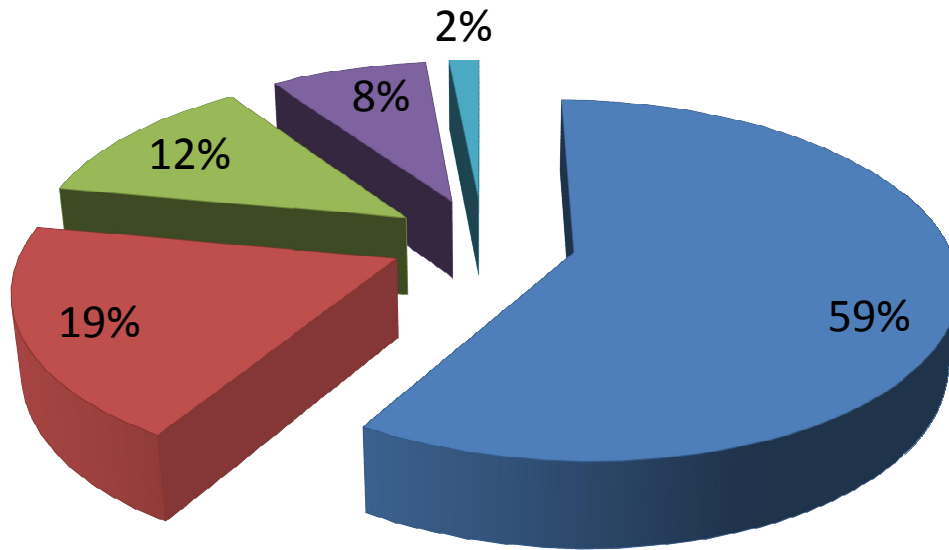
Fabric	Type	Total Qty/yr (units)
Jerseys	Solid	6775000
	Yarn Dyed	1355000
Pique	Solid	1626000
	Yarn Dyed	1084000
Ribs(1X1, 2X2, interlock)	Solid	12195000
	Yarn Dyed	2710000
Thermal/Raschel	Solid	0
	Yarn Dyed	0
French Terry/Fleece	Solid	1355000
	Yarn Dyed	

2.7 KEY CUSTOMERS-TOP 5:

	Genders	Products	Total units/yr	Total value(\$)/yr
H&M	Ladies, Baby, Mens	T-shirt, Polo, Baby	15066000	US\$ 37107381
C&A	Ladies	T-shirt, Polo	4952721	US\$ 13891881
Tom Tailor	Men's Kids, Baby, Ladies	T-shirt, Polo, Jacket, Baby	3211653	US\$ 11691390
s.Oliver	Ladies, Men's, baby	T-shirt, Polo, Jacket, Baby	2069408	US\$ 7929889
G.Star	Mens & Ladies	T-shirt, Polo, Jacket	396064	US\$ 2073266

Industrial attachment

■ H&M
 ■ C&A
 ■ Tom Tailor
 ■ s.Oliver
 ■ G.Star



Social Commitment:

Fakir Apparels Ltd, understand their responsibilities towards society and environment in which they operate. They give prime consideration to health &

safety, environmental protection & accident prevention in line with any other phases of operation or administration. They provide all first aid and free medical service to workers. As well, Fakir Apparels Ltd creating social awareness on related society.

2.8 DIFFERENT MAJOR DEPARTMENTS:

To ensure smooth running of various activities, some departments are given bellow:

1. Knitting department:

- a. Knitting
- b. Inspection

2. Knit dyeing department:

- a. Batch section
- b. Store house for dyes & chemicals
- c. Color Lab
- d. Dyeing Section
- e. Finishing & Delivery
- f. Washing
- g. Quality Control

3. Garments department:

- a. Merchandising
- b. Cutting
- c. CAD Section
- d. Sewing
- e. Embroidery
- f. Sample
- g. Printing
- h. Packaging

2.9 ORGANOGRAM

The organogram of the administration is as follows:

Organogram of Administration	Organogram of Operation
<p style="text-align: center;">Chairman ↓ Managing director ↓ Director ↓ Executive director ↓ General Manager ↓ Deputy General Manager ↓ Assistant general manager ↓ Production manager</p>	<p style="text-align: center;">Senior manager ↓ Assistant manager ↓ Production officer ↓ Shift in charge ↓ Supervisor ↓ Senior operator ↓ Operator ↓ Assistant operator ↓ Helper</p>

2.10 CLIENTS





2.11 CERTIFICATES:





3 DESCRIPTION OF THE ATTACHMENT:

3.1 KNITTING SECTION



3.1.1 KNITTING

The term knitting describes the technique of constructing textile structures by forming a continuous length of yarn into columns of vertically intermeshed loops. It relies heavily on the availability of fine, strong, uniformly spun yarn. The term ‘knitting’ dates from the mid-sixteenth century, earlier words such as the Saxon ‘cnyttan’ and the Sanskrit ‘nahyat’ being less precise, indicating that knitting, probably evolved from sources such as the experience gained by knotting and Coptic knitting.

Knitting Structure:

Knitted structures are progressively built-up from row after row of intermeshed loops. The newlyfed yarn is converted into a new loop in each needle hook. The needle then draws the new loop head first through the old (fabric) loop, which it has retained from the previous knitting cycle. The needles, at the same time, release, (cast-off or knock-over) the old loops so that they hang suspended by their heads from the feet of the new loops whose heads are still held in the hooks of the needles.

A cohesive knitted loop structure is thus produced by a combination of the intermeshed needle loops and yarn that passes from needle loop to needle loop.

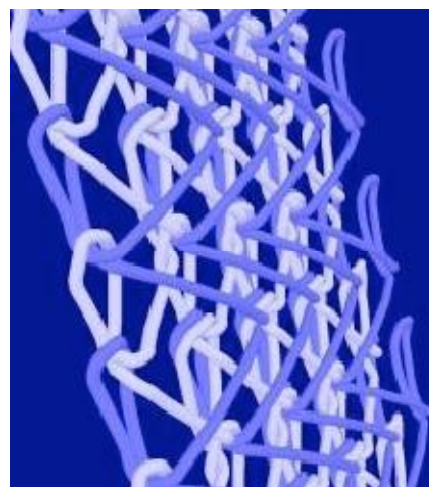
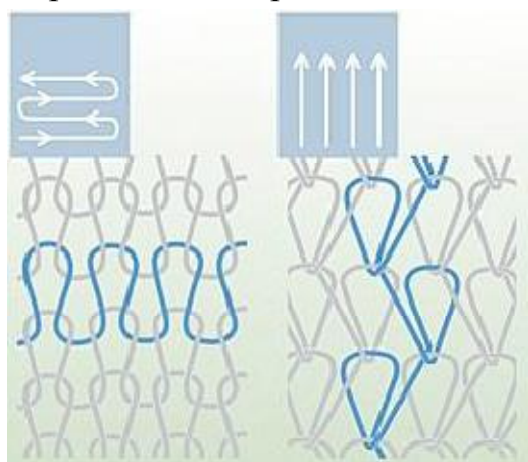


Figure: Knitting Structure

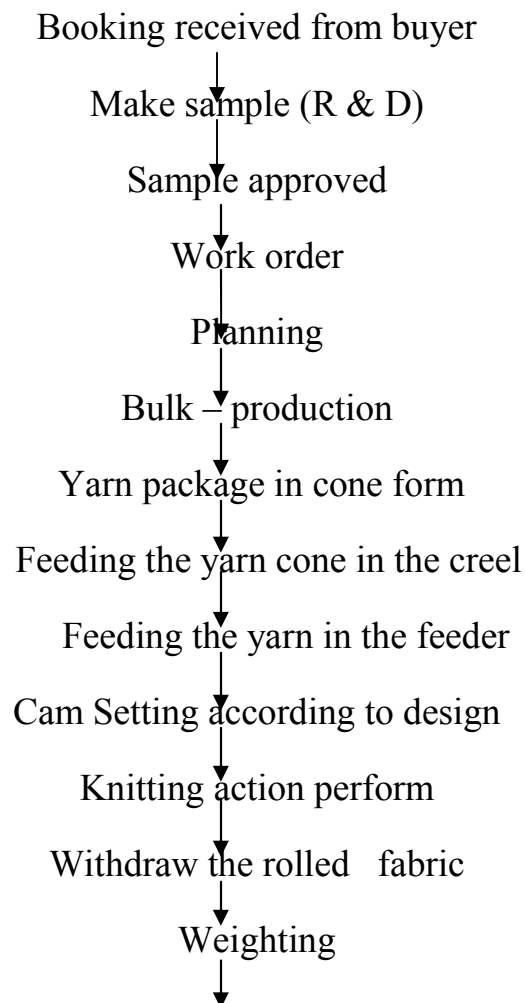
3.1.2 NO OF MACHINE IN THE MILL

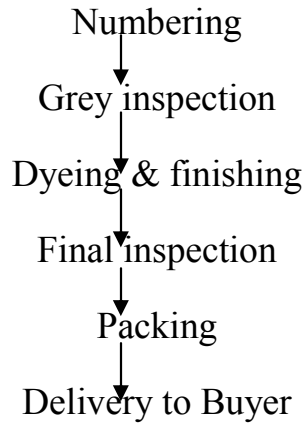
In Fakir Apparels mainly two types of machines are used. These are Circular knitting and Flat bed knitting machine. There is three floors in knitting section and three floor consists of 68 Circular knitting machine & 11 Flat bed knitting machine. In circular knitting, 5 machine are interlock for interlock production, 17 machine are rib production and rest machines are single jersey machines.



Knitting Floor

3.1.3 SEQUENCE OF OPERATIONS OF KNITTING SECTION:

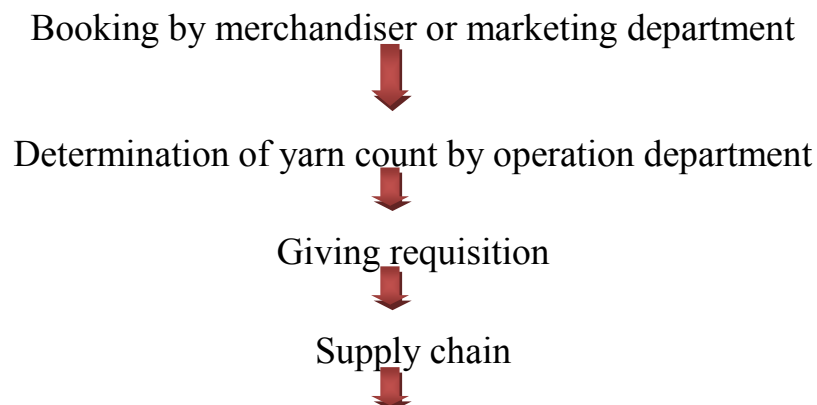


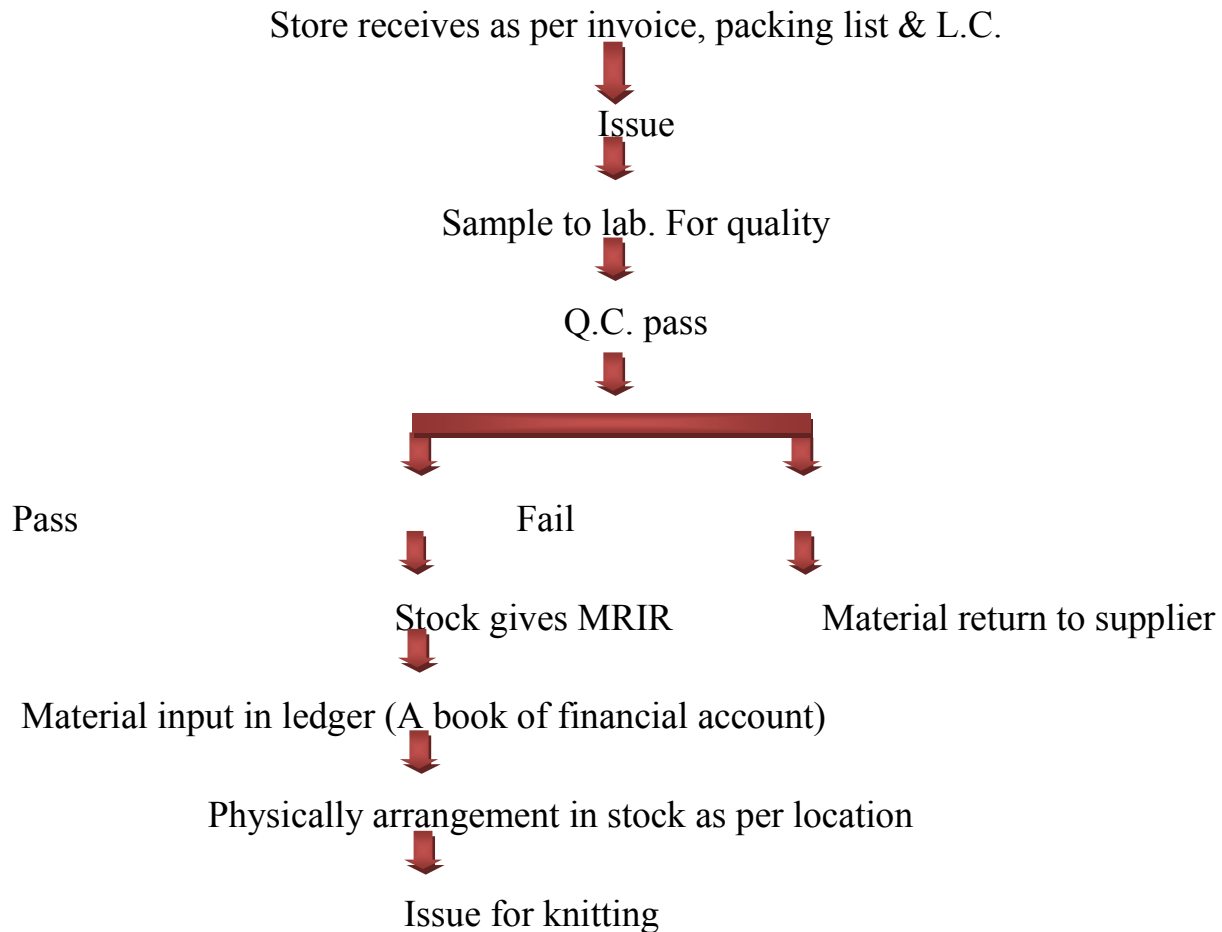


3.1.4 FACTORS CONCERNED WITH KNITTING:

- ✚ Machine gauge
- ✚ Machine dia.
- ✚ Yarn count
- ✚ Lycra % (if necessary)
- ✚ Finished GSM
- ✚ Finished width
- ✚ Stitch length
- ✚ Yarn tension during feeding

3.1.5 PROCEDURE OF YARN REQUISITION:





Description of production process:

In every mill, the concerned section maintains sequences in production processing. It is also followed in this mill where I completed my industrial attachment. The process sequences are in list below:

- 1) Firstly, knitting manager gets a production sheet from PMC (Planning, Monitoring & Controlling) section in accordance with consumer requirements. Then he informs or orders senior Executive about it.
- 2) Senior Executive informs management trainee and decides about m/c in which the production will be running.

3) Management trainee calls for leader of mechanical fitter troops, they two take decision about m/c for production considering m/c condition, production capacity, maintenance complexity etc.

4) Operators with experienced mechanical fitter adjust required stitch length and grey GSM (gram per square meter) for required final GSM.

5) Supervisor check daily production regularity and make operators conscious about finishing in due time.

6) Operators operate machine in highly attention as if there were no faults in the fabrics. If he becomes sure about any fabric fault, then he call for mechanical fitter in duty. Mechanical fitter then fixes it if he can or he informs technical in-charge. He then comes in spot.

3.1.6 *FLOOR DATA COLLECTION:*

Fabric type	GSM	Yarn count	Stitch length	M/c dia x Gauge	Finished width
<i>Plain</i>	115	40/1	2.54	30x28	33'' Tube
<i>Single</i>	135	30/1	2.68	36x24	72'' Open
<i>Jersey</i>	150	28/1	2.75	36x24	74'' Open
	160	26/1	2.70	36x24	62'' Open
<i>Lycra</i>	H.F.L 190	32/1+20D	2.85	30 X28	64'' OPEN
<i>Single</i>	F.F.L 250	30/1+40D	2.98	30 X28	64'' OPEN
<i>Jersey</i>	190	32/1+20D	2.85	30 X28	64'' OPEN
	160/65	32/1	2.7	30 X24	43'' TUBE
	210/20	22/1	2.72	28 X24	76'' OPEN

Single	210/20	22/1	2.75	25 X24	35.5" TU BE
Lacoste	220	22/1	2.75	24 X24	66" OPEN
	220	22/1	2.75	25 X24	66" OPEN
	215/20	24/1	2.64	32 X24	46" TUBE
Lycra s/lacost	210	28/1+40D	2.85	26 X24	66" OPEN
	160/65	30/1	2.65	30 X24	43" TUBE
Double	160/65	30/1	2,65	28 X24	41" TUBE
lacost	160/65	30/1	2.58	30 X24	43" TUBE
	160/65	30/1	2.52	30 X24	43" TUBE
	175	34/1	2.54	40 X18	37" TUBE
	200	30/1	2.52	38 X18	74" OPEN
	200	30/1	2.64	38 X18	37" TUBE
1 X 1 RIB	200	30/1	2.54	38 X18	68" OPEN
	200	32/1	2.54	38 X20	41" TUBE
	200	28/1	2.58	38 X18	74" OPEN
	220	28/1	2.52	38 X18	68" OPEN
IXI Lycra	280	28/1 +70	2.85	34 X18	32" TUBE
Rib	380	34/1+70D	3.10	36 X16	34" TUBE
2 X 2	300	24/1	3.3	40 X18	24" TUBE
RIB	380	20/1	3.42	40	24"

				X18	TUBE
2X2LYCRA RIB	340	24/1 +70D	3.45	36X1 8	22" TUBE
Pique	220	20/1	2.78	26X2 4	37" TUBE
	260	30/1 +75D+26/2	K-4,B-3,L-1.5	30X2 0	68" OPEN
Fleece	280	34/1 +75D+20/2	K-3.5,B- 3.25,L-1.6	30X2 0	68" OPEN
	270	32/1+12/1	K-4,B-3.3,L- 1.6	30X2 0	74" OPEN
	300	32/1 +12/1	K-4.1,B-3.3,L- 1.6	30X2 0	74" OPEN
Lycra	260	30/1+70+26/1+20D	K-4,B-3.1,L- 1.5	30X2 0	68" OPEN
fleece	260	30/1+70D+26/1+20D	K-4,B-3,L-1.5	30X2 0	OPEN
Engineering	165	26/1 Dyed	2.75	30x2 4	64" OPEN
stripe	190	26/1 Dyed	3	36x2 4	76" OPEN
	200	26/1 Dyed	2.85	30x2 4	64" OPEN

3.1.7 END PRODUCTS OF CIRCULAR KNITTING MACHINE:

Single Jersey M/C:

- ✚ Single jersey
- ✚ ELASTANE SINGLE JERSEY
- ✚ YARN DYED SINGLE JERSEY
- ✚ POLO PIQUE
- ✚ SINGLE LACOSTE
- ✚ DOUBLE LACOSTE
- ✚ THREE THREAD FLEECE
- ✚ THREE THREAD ELASTANE FLEECE
- ✚ TWO THREAD FLEECE(TERRY FLEECE)

Double Jersey M/C:

- ✚ 1*1 RIB
- ✚ 1*1 ELASTANE RIB
- ✚ YARN DYED RIB
- ✚ 2*2 RIB
- ✚ 2*2 ELASTANE RIB
- ✚ 3*2 RIB
- ✚ 5*2 RIB
- ✚ FLAT BACK RIB
- ✚ INTERLOCK
- ✚ DROP NEEDLE
- ✚ WAFFLE
- ✚ MESH

3.1.8 SPECIFICATION OF MACHINES IN KNITTING SECTION

Machine no : A01 Machine type : Single jersey Circular knitting m/c Brand name : JIUNN LONG MACHINE CO. LTD. Origin : Taiwan No of needles : 3000 No of feeders : 120 Gauge :24 Diameter : 40"	Machine no : A02 Machine type: Single jersey Circular knitting m/c Brand name : JIUNN LONG MACHINE CO. LTD. Origin : Taiwan No of needles :2712 No of feeders :108 Gauge :24 Diameter :36"	Machine no :A03 Machine type : Single jersey knitting m/c Brand name : JIUNN LONG MACHINE CO. LTD. Origin : Taiwan No of needles :2544 No of feeders :102 Gauge :24 Diameter :34"
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Machine no :A04 Machine type: Single jersey circular knitting m/c Brand name :JIUNN LONG MACHINE CO. LTD. Origin : Taiwan No of needles :2400 No of feeders :96 Gauge :24 Diameter :32"	Machine no :A13 Machine type: Single jersey Circular knitting m/c Brand name : JIUNN LONG MACHINE CO. LTD. Origin : Taiwan No of needles :2136 No of feeders :76 Gauge :18 Diameter :38"	Machine no :A12 Machine type : Single jersey Circular knitting m/c Brand name : JIUNN LONG MACHINE CO. LTD. Origin : Taiwan No of needles :2756 No of feeders :80 Gauge :18 Diameter :40"
Machine no :A11 Machine type: Single jersey circular knitting m/c Brand name : JIUNN LONG MACHINE CO. LTD. Origin : Taiwan No of needles :2136 No of feeders :76 Gauge :18 Diameter :42"	Machine no :A10 Machine type: Rib Circular knitting m/c Brand name : JIUNN LONG MACHINE CO. LTD. Origin : Taiwan No of needles :2484 No of feeders :88 Gauge :18 Diameter :44"	Machine no :A09 Machine type : Single jersey circular knitting m/c Brand name: JIUNN LONG MACHINE CO. LTD. Origin : Taiwan No of feeders :90 Gauge :24 Diameter :30"

Note:

- A16,A07,A14,A15 no. machines are similar to A02 no. machine
- A04 no. machine is similar to A08 no. machine
- A05,A06 no. machines are similar to A01 no. machine

<p>Machine no :B01 Machine type : Single jersey circular knitting m/c Origin: Taiwan Brand name: JIUNN LONG MACHINE CO. LTD. No of needles :1968 No of feeders :76 Gauge :24 Diameter :26"</p>	<p>Machine no : B02 Machine type : Single jersey circular knitting m/c Origin : Taiwan Brand name: JIUNN LONG MACHINE CO. LTD. No of needles :2112 No of feeders :84 Gauge :24 Diameter :28"</p>	<p>Machine no : B04 Machine type : Single jersey circular knitting m/c Origin : Taiwan Brand name: JIUNN LONG MACHINE CO. LTD. Dia. : 30" Gauge : 24 No. of feeders :90 no of needle: 2256</p>
<p>Machine no : B06 Machine type : Single jersey circular knitting m/c Origin : Taiwan Brand name: JIUNN LONG MACHINE CO. LTD. No of needles :2400 No of feeders :96 Gauge :24 Diameter :32"</p>	<p>Machine no : B10 Machine type : Single jersey circular knitting m/c Origin : Taiwan Brand name: JIUNN LONG MACHINE CO. LTD. No of needles :2136 No of feeders :102 Gauge :20 Diameter :34"</p>	<p>Machine no :B12 Machine type : Single jersey circular knitting m/c Origin : Taiwan Brand name: JIUNN LONG MACHINE CO. LTD. No of needles :2262 No of feeders :108 Gauge :20 Diameter :36"</p>
<p>Machine no : B13 Machine type :Single jersey circular knitting m/c Origin : Taiwan Brand name: JIUNN LONG MACHINE CO. LTD. No of needles :2400 No of feeders :96 Gauge :28</p>	<p>Machine no : B15 Machine type : Single jersey circular knitting m/c Origin : Taiwan Brand name: JIUNN LONG MACHINE CO. LTD.</p>	<p>Machine no : B16 Machine type :Single jersey circular knitting m/c Origin : Taiwan Brand name: JIUNN LONG MACHINE CO. LTD. No of needles :2712</p>

Diameter :32"	No of needles :2544 No of feeders :102 Gauge :24 Diameter :34"	No of feeders :108 Gauge :24 Diameter :36"
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Machine no : B17 Machine type: Single jersey circular knitting m/c Origin : Taiwan Brand name: JIUNN LONG MACHINE CO. LTD. No of needles :2880 No of feeders :114 Gauge :24 Diameter :38"	Machine no :B25 Machine type : Single jersey circular knitting m/c Origin : Japan Brand name: FUKUHARA No of needles :1884 No of feeders :90 Gauge :20 Diameter :30"	Machine no :B27 Machine type: Single jersey circular knitting m/c Origin : Taiwan Brand name: JIUNN LONG MACHINE CO. LTD. No of needles :3000 No of feeders :120 Gauge :24 Diameter :40"
Machine no : B29 Machine type :Single jersey circular knitting m/c Origin : Taiwan Brand name: JIUNN LONG MACHINE CO. LTD. No of needles :3168 No of feeders :120 Gauge :24 Diameter :42"	Machine no : B30 Machine type : Single jersey circular knitting m/c Origin : Taiwan Brand name: JIUNN LONG MACHINE CO. LTD. No of needles :3312 No of feeders :132 Gauge :24 Diameter :44"	Machine no : B38 Machine type :Rib circular knitting machine Origin : Germany Brand name:MAYER AND CIE No of needles :1696 No of feeders :66 Gauge :18 Diameter :30"

<p>Machine no :C07 Machine type : Rib circular knitting m/c Origin: Taiwan Brand name: JIUNN LONG MACHINE CO. LTD. No of needles :2040 No of feeders :72 Gauge :18 Diameter :36"</p>	<p>Machine no : C05 Machine type :Rib circular knitting m/c Origin : Taiwan Brand name: JIUNN LONG MACHINE CO. LTD. No of needles :1800 No of feeders :64 Gauge :18 Diameter :32"</p>	<p>Machine no : C04 Machine type : Rib circular knitting m/c Origin : Taiwan Brand name: JIUNN LONG MACHINE CO. LTD. Dia. : 42" Gauge: 18 No. of feeders :84 No of needle : 2376</p>
<p>Machine no : C03 Machine type: Rib circular knitting m/c Origin : Taiwan Brand name: JIUNN LONG MACHINE CO. LTD. No of needles :2256 No of feeders :80 Gauge :18 Diameter :40"</p>	<p>Machine no : C01 Machine type : Rib circular knitting m/c Origin : Taiwan Brand name: JIUNN LONG MACHINE CO. LTD. No of needles :2136 No of feeders :76 Gauge :18 Diameter :38"</p>	<p>Machine no :C08 Machine type : Interlock circular knitting m/c Origin : Taiwan Brand name: JIUNN LONG MACHINE CO. LTD. No of needles :2880 No of feeders :72 Gauge :24 Diameter :38"</p>

Machine no : C16 Machine type : Rib circular knitting m/c Origin : Taiwan Brand name: JIUNN LONG MACHINE CO. LTD. No of needles :2544 No of feeders :72 Gauge :24 Diameter :34"	Machine no : C12 Machine type : Rib circular knitting m/c Origin : Taiwan Brand name: JIUNN LONG MACHINE CO. LTD. No of needles :2484 No of feeders :88 Gauge :18 Diameter :44"	Machine no : C11 Machine type : Rib circular knitting m/c Origin : Taiwan Brand name: JIUNN LONG MACHINE CO. LTD. No of needles :1920 No of feeders :68 Gauge :18 Diameter :34"
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Note:

- C09, C10 no. machines are similar to C07no. machine
- C06 no. machine is similar to C05 no. machine
- C02 no. machines are similar to C01 no. machine
- C17,C11,C13 no. machines are similar to C16 no. machine

Specification of Auto stripe machine:

Machine no.	Brand name	No. of needle	Gauge	Diameter (Inch)	Mfg. country	Model
C19	FUKUHARA	2268	24	34	JAPAN	VX-R8Y3RE
C18	FUKUHARA	2245	18	34	JAPAN	V-FY6



Auto rib striper

Auto S/J striper

Remarks:

All the machines are well arranged and availability of sufficient spaces among the machines facilitates the movement of personnel and smooth production.

3.2 DYEING SECTION



3.2.1 DYEING

3.2.2 INTRODUCTION:

The objective of dyeing is the uniform coloration of the mass of fibers constituting the material, usually to match a pre-specified color. Any significant difference in color from that requested by the customer, and any unevenness of the color of a fabric, will be immediately apparent. Many factors can influence the final color appearance. These include fiber characteristics such as the luster, denier, and staple length, texture, and cross-section, as well as the cloth construction. Since a client's colored sample is rarely of the same material as that to be dyed, dye house laboratories devote considerable time to dyeing trials aimed at developing recipes to reproduce the desired color on the given goods. Coloration of a textile material is achieved in a number of different ways:

1. Direct dyeing, in which the dye in the aqueous solution in contact with the material is gradually absorbed into the fibers because of its inherent substantively
2. Dyeing with a soluble precursor of the dye, which forms an insoluble pigment deep within the fibers on treatment after dyeing
3. Direct dyeing followed by chemical reaction of the dye with appropriate groups in the fiber;
4. Adhesion of the dye or pigment to the surface of the fibers using an appropriate binder.

All of these methods but the last require that the fibers, at some stage, absorb the dye, or an appropriate precursor, from an aqueous solution. This process is essentially reversible. Note, however, that precipitation of a pigment and reaction with the fiber are irreversible chemical processes.

Theory of Dyeing:

Dyeing theory covers a wide range of subjects mainly in the area of physical chemistry. As for all theory, the aim is to provide a set of hypotheses that explain

the behavior of known dyeing systems, and which are capable of predicting what will happen in a new situation. Dyeing theory has many qualitative aspects that are useful in explaining practical dyeing, but the physico-chemical measurements on dyeing processes that provide quantitative data are often far removed from actual dyeing practice. Some of the subjects included in dyeing theory are:

1. The state of dyes in solution and in the fiber during and after dyeing
2. The rates of dyeing processes and how these are influenced by mass-transfer of dye from the bath solution to the dye–fiber interface, and by diffusion of the dye from the interface into the fiber
3. The phenomena occurring at the dye–fiber interface such as dye molecule adsorption and the effects of surface potentials
4. The nature of the interactions between dye and fiber molecules, which are the origin of substantively
5. The treatment of dyeing as a thermodynamic equilibrium and its description in terms of thermodynamic variables
6. The theory of fiber structure and how this influences dyeing rates and equilibrium.

3.2.3 DYEING IN FAKIR APPARELS LTD.:

In Fakir Apparels Ltd. dyeing process mainly occurs in discontinuous process. That's why here process is very easy and can be described with easy manner. Here order is mainly comes for knitted fabric dyeing like single jersey, double jersey, Lycra single jersey, terry or locust fabric, mainly produced from cotton or polyester. That's why here mainly two dyes are used.

1. Reactive dyes for Cotton
2. Disperse dyes for Polyester.

Besides this pigment dyeing is done for garment dyeing.

3.2.4 RAW MATERIALS FOR DYEING:

Reactive dyes:

Sunsol Black EPHC	1000	\$ 4.70
Sunfix Yellow S3R	1500	\$ 4.70
Sunfix Red S3B 150%	1500	\$ 7.50

Sunfix Navy SBF	1000	\$ 4.00
Sunsol Black B	1000	\$14.50
Sunfix Yellow SN2R	500	\$18.55
Sunfix Red SN2BL	500	\$20.65
Sunfix Blue SNR	1000	\$ 8.50
Sunfix Yellow SPR	100	\$ 7.50
Sunfix Red SG	75	\$20.50
Sunfix Blue SBRN	1000	\$ 9.62
Sunfix Red MFD	200	\$ 5.65
Sunfix Yellow MF-3RD	1500	\$ 5.00
Sunfix Yellow SPD conc	2000	\$ 5.00
Sunfix Red SPD	2000	\$ 7.30
Sunfix Navy SPD	2000	\$ 8.90
Sunfix Yellow S4GL 150%	300	\$18.50
Sunfix Yellow SF	50	\$18.50
SunfixBlu SF	50	\$14.60
Sunfix Red SF	100	\$ 5.50
Sunfix Red S2B	50	\$18.20
Sunfix Scarlet S2G	50	\$ 8.60
Sunsol Violet 5R	50	\$10.50
Sunsol Blue R Special	300	\$10.50
Sunsol Turq Blue G 266%	150	\$ 7.55
Sunsol Orange SRN	50	\$ 7.95
Sunsol Yellow SRN	100	\$ 8.65
Sunsol Red SBN	100	\$16.50
Sunsol Blue BB 133%	100	\$12.10
Sunsol Blue SRN	100	\$ 7.20
Bezaktive Black S Max	4000	\$ 6.80
Bezaktive Red S3B	500	\$ 7.80
Bezaktive Yellow S3R	500	\$ 7.80
Bezaktive Red SLF	100	\$23.20
Bezaktive Orange SRL	200	\$11.30
Bezaktive Turquoise Blue	200	\$ 6.00
Bezaktive Blue SGLD	600	\$17.20
Besaktive Blue SLF	150	\$17.20
Bezaltive Yellow SLF	150	\$11.80
Bezaktive Yellow S8G	100	\$12.80
Bezaktive Black SLF	1000	\$15.50
Bezaktive Navy SLF	500	\$20.70

Disperse dyes:

Disperse Yellow 8GFF200%
Taicron Black HWTECO
Taicron Black WW-GST
Taicron Blue2RHWT
Taicron Blue EACT
Taicron Blue XFT
Taicron Brill BlueSE-GLT
Taicron Deep Red XF-T
Taicron Golden yellow WRST
Taicron Navy Blue HWT
Taicron Navy Blue XF-T
Taicron Red E-ACT

CHEMICALS:

Acid buffer	Anticreasing	Anti foam	Basic chemicals	Cationic softner
Eulysin S	Ac-200	Antifoam AFJ	Acetic acid	Belfasin 44 cone
Merapen KP	Biavin-109	Kappasol AF2000	Caustic soda	
	Breviol PAM-N		Gluber salt	
Detergent	Kappavon CL	Fixing Agent	Hydrogen peroxide	Levelling agent
E.WetWell	Primasol Jet	Albafix ECO	Soda Ash	Kappaquest A41
Foryl BGL	Ruclin JES	Fixos FDR		Lekol SN
Kappawet BOS		Hydrocol Sun		Levegal RL
Rucozen NZA		KappafixGG100		
Rucozen WBL		Lamfix -L		
Wetto NOF				
Neutralizer	Non ionic	OBA for cotton	Peroxide Killer	Levelling

	softner			(Polyster)
Heptol DBL	Perapret F-PEB	Kappaphor-ME	Pk-20	Crocolor PLD
Heptol EMG	Tubingal-1112	Syno white 4BK	Verolan NBO	Satavin SUE
Neutracid NVM		Tuboblanc HV-S3	Visco color	
		Tuboblanc Rub		
		Tuboblanc – EBF		
		Tuboblanc-HAPD		
		Ultraphor -PFA		
Enzyme HDL160	Sequester AntisilConz	Resin Condensole-FAM	Silicon Softner Adasil ME	Soaping Avolan IS
Retrocell Plx	Chelate DBC	Fixapret F-ECO	Antipil Jet	Cyclanon xc –W
	Chemsoft MAK-P	Lurotex TX2504	Kappasoft BD	DSP-1250
	Kappaquest – FE	Perapret Booster	Kappasoft – SM	Setamol WS
	Securon-540		Polyavain-LPE	
			Ultratex S	
Stabilizer	Stripping agent	Utility		
Contavan GD	Dyapol ECO	Biocide LF2		
Stagen B	Meropan-RED	Biocide TS15		
	Sodium Hydrose	Common salt		
		Sodium hypochloride		

REMARKS:

Fakir Apparels ltd. uses best quality raw materials. It produces fabrics from best quality yarn. They use the best quality dyes like REMAZOL, REACTRON, REACTIVE, TERACIL etc. During the time of using dyestuff

they give importance upon the quality of dyes than the price of the dyes and chemicals.

3.2.5 DYEING MACHINERIES IN FAKIR APPARELS LTD.:

In Fakir Apparels ltd there mainly two types of machines .One is winch dyeing and another is jet dyeing machines. There are two floors or two section of dyeing. Such as

Dyeing floor 1: This floor consists of 13 machines of well equipped high-tech such as ATYC from Spain, THIES from Germany, FONGS from China, and AK from Taiwan.

Dyeing floor 2: This floor also consists of 9 machines including sample dyeing machine with mentioned company made. Here total capacity 25000 kgs/day.

<u>Dyeing Floor -01</u>				
<i>SL</i>	<i>Brand</i>	<i>Origin</i>	<i>Capacity(kg)</i>	<i>Max.Temp</i>
1	ATYC	SPAIN	300	135
2	ATYC	SPAIN	600	135
3	ATYC	SPAIN	600	135
4	ATYC	SPAIN	900	135
5	Fong's	CHINA	1000	98
6	Fong's	CHINA	1000	98
7	AK	TAIWAN	200	98
8	AK	TAIWAN	200	98
9	Fong's	CHINA	1500	98
10	Fong's	CHINA	1500	98
11	Thies	Germany	480	98
12	Thies	Germany	300	98
13	Thies	Germany	700	98
S2	ATYC	SPAIN	80	135
S3	Fong's	CHINA	100	130
S4	Fong's	CHINA	30	130
S5	Fong's	CHINA	30	130
S6	Fong's	CHINA	12	130
S7	Fong's	CHINA	12	130

<u>Dyeing Floor 02</u>					
<i>SL</i>	<i>Brand</i>	<i>Origin</i>	<i>Capacity(kg)</i>	<i>Max.Temp</i>	
1	Thies	German	150	130	
2	Thies	German	300	130	
3	Thies	German	300	130	
4	Thies	German	500	130	
5	Thies	German	500	130	
6	Thies	German	800	130	
7	Thies	German	600	130	
8	Thies i- master	German	1600	130	

Casting details of a machine: The machine which we want to brief it is situated on the second floor & 8 no. machine. This machine has some extra ability for dyeing that maintains a liquor ratio of 1:4.

Here is a brief

Company Name: THIES

Type: Farbekessel i master

Chamber: 1

Permissible Working over pressure: 0.3 Mpa

Test pressure: 0.47 Mpa

Working temperature: (0 – 145 ° C)

Capacity Volume: 31732 lt

Manufacturer: Germany



atic

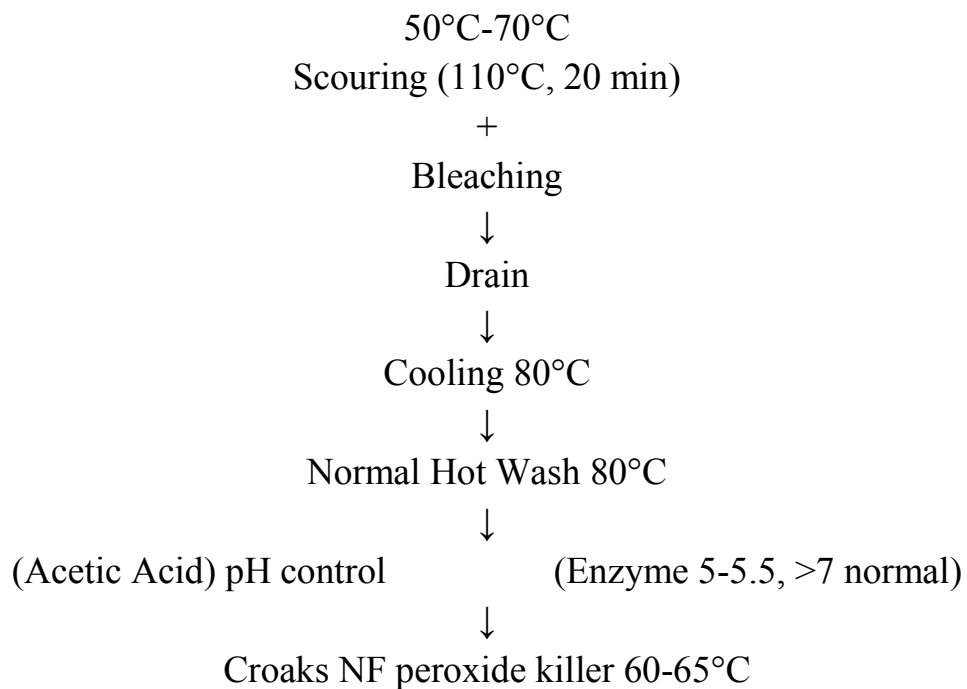
Figure Farbekessel iMaster (Winch/Jet dyeing of 6 nozzles)

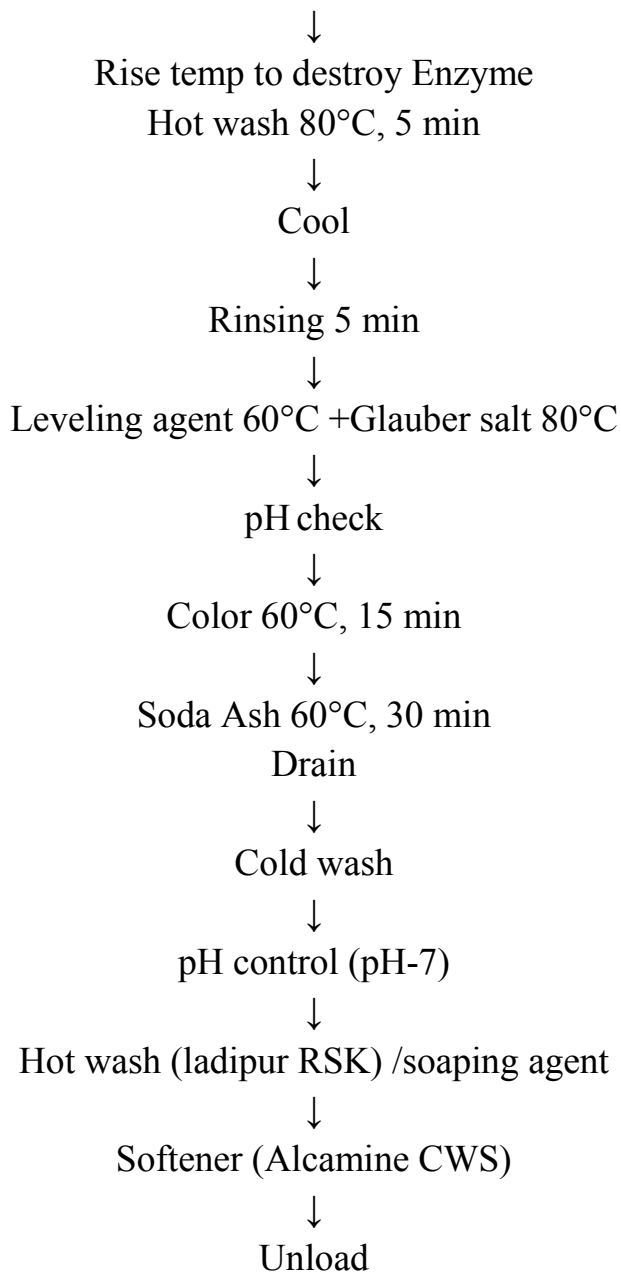




Fig: New Machine (ATHENA 2) appointed in floor 2 in Fakir Apparels

3.2.6 FLOWCHART OF ALL GREEN/TURQ DK :





SCOURING, BLEACHING, ENZYME WASH:

✚ Scouring-bleaching is carried out in the same bath and at the same time simultaneously.

✚ Bleaching is not carried out for black shade.

- ✚ Scouring is carried out for every type of shade.

Scouring-Bleaching chemicals:

Agent	Brand	g/l used
Wetting agent	Sandoclean PCLF	1
Alkali	Caustic soda	2
Ant creasing agent	Romapon 173	.5
Bleaching agent	H ₂ O ₂	2
Stabilizer	Stab.soft	0.5
Acid	Acetic acid (Neutralization)	2

- ✚ Firstly the fabric is load on to the bath.
- ✚ Required amount of water is taken to the bath.
- ✚ Wetting agent i.e. PCLF, & anticreasing agent i.e.Romapon is added.
- ✚ Steam pipes are on & scouring agents (i.e., caustic soda/soda ash) added by the aid of dosing when the temperature reaches at 50°C.
- ✚ When the temperature reaches at 60°C, then stabilizer is added.
- ✚ Then H₂O₂ is added by the aid of dosing system in 10 mins and the material is run for 10-15 mins to reach the temp. 100°C.

- ✚ Temperature is then raised to 100°C & the process is then carried out for 30 mins depending on the requirements.
- ✚ The liquors are then drained at 75°C.

ENZYME WASH:

- ✚ To remove hairiness from the material.
- ✚ This treatment can be done before dyeing & after dyeing. Sometimes double enzyme treatment occurs if buyer wants.
- ✚ The fabric knitted with carded yarn always requires enzyme wash for obtaining combed effect by biopolishing. This process is very sensitive to P^H (4-5) & temperature.

Cotton dyeing:

Shade%	Dye selection	Temp. (°C)
Light shade (<0.5%)	Drimarine	60
Medium shade(0.5-1.5%)	Reactive	60-65
Deep shade(>1.5%)	Reactive	60-65
Turquoise shade	Reactive	70-80

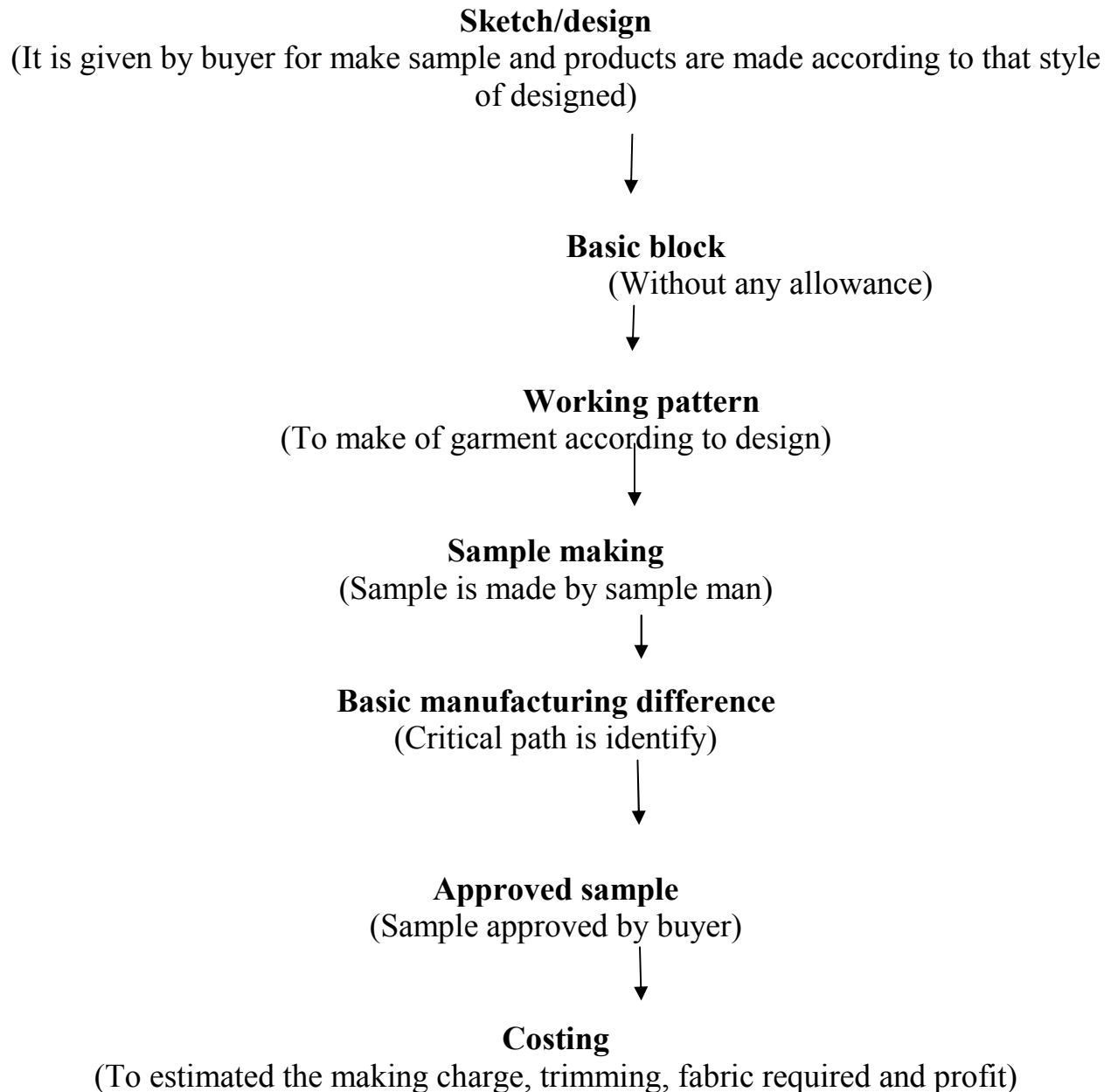
- ❖ Deep shade: Navy, Red, Black, Green, etc.
- ❖ Medium shade: Khaki, Yellow, Blue, Orange, Olive, Royal, etc.
- ❖ Light shade: Sand, Beige, Stone, Pink, Rose, Purple, Rose petal, etc.
- ❖ Sensitive shade: Red, Black, and Turquoise.

3.3 SAMPLE SECTION

3.3.1 *SAMPLE:*

- The style done by designer or developer.
- Particular purchase order.
- Sample is the specimen of any product.
- Any revision to the style work.
- Sample is a specimen or we can say a part which shows that the whole is look like.
- Conform with any specific requirement
- Sample is the physical form of design.

3.3.2 *FLOW CHART OF SAMPLE DEPARTMENT:*



Design or Sketch:

It is nothing but one kind of engineering art including all measurement of particular style.

Basic Block:

It is an individual component of garments without any design or style.

Working Pattern:

To make pattern for a particular style with net dimension.

Problem of Production or Production Related Matter:

Production related problems should be eliminated in this step.

Approved Sample:

The sample which is approved by buyer is called approved sample.

Send to Buyer:

When all process is done, then the garments are sent to buyer.

Production Pattern:

To make pattern for a particular style with net dimension along with allowance. S

3.3.3 SAMPLE TYPE:

1. Development sample
2. Salesman Sample
3. Photo Sample
4. Approval Sample
5. Size set Sample
6. Mock up Sample
7. Pre-production Sample
8. Production Sample
9. Shipping Sample

The Details Attached to the Garment Sample:

After the confirmation of order, each sample sent to the buyer has the following details attached to it, with the help of a tag. It contains the details pertaining to both, what the buyer has demanded and what supplement fabric/trim etc they have used (if applicable).

- ❖ Ref no.
- ❖ Color
- ❖ Fabric
- ❖ Composition
- ❖ Description
- ❖ Quantity
- ❖ Style no/ Size
- ❖ Store

There may be a separate sampling department in a company. But as the merchandiser is the person who is interacting with the buyers regarding samples and other requirements, this sampling department will work under the supervision of merchandising department. Also as the samples are to be made according to the buyers' price ranges and quality levels, merchandiser has to advise sampling department suitably.

In the sample section there are different types of department need to be overcome for sampling. The entire department thoroughly discussed in following:

3.3.4 PATTERN MAKING:

Pattern is the one of important element of a design. In a garment industries there are two type of pattern uses based on their capability. Mostly big companies are use CAD (Computer aided design) as well as little companies' uses manual pattern. In FAL use CAD also manual pattern in some cases. Basically **INVESTRONICA** Software uses here. There are 10-12 high skilled pattern masters working here.

3.3.5 MARKER SECTION:

In FAL marker is made both manual system & automatic system. In computer aided marker FAL use **INVESTRONICA** software. In manual marker making process, marker man use pattern paper to draw different garments parts in marker paper.



Fig: Marker making machine (Plotter M/C)

3.3.6 FABRIC SPREADING:

Fabric spreading is very important part of the production process because it is basic for obtaining a high quality final product. Spreading is the process of unwinding large rolls of fabric onto long, wide tables in preparation for cutting each piece of a garment. The number of layers of fabric is dictated by the number of garments desired and the fabric thickness. Fabric Spreading Machines are used for bulk production.

Objectives of spreading process:

- ✚ Understanding the process of fabric spreading
- ✚ Factors affecting spreading
- ✚ Face and nap of the fabric

Number of plies depends on:

1. Capacity of the cutting machine
2. Volume of production.
3. Type of fabric itself (rough or slippery).
4. Thickness of fabric.

Types of Fabric Spreading:

The spreads can be of two basic types:

1. Flat spreads- all plies are of the same length.
2. Stepped spreads- this as the name suggests, is built up in steps, with all the plies in one step having the same length. A stepped spread is generally used when the quantities to be cut precludes the use of a flat spread. The cut order plan details the colors and ply lengths for a stepped spread, if it is needed.

Requirements of Spreading Process:

- 1. Alignment of plies in both length and width direction-** length and width of fabric must be at least equal to marker length and width.
- 2. Elimination of fabric defects/flaws-** any faults identified on the incoming fabrics will be tagged and will be avoided.
- 3. Correct ply direction (especially for asymmetrically printed fabrics)-** all faces up, all faces down, face to face etc.
- 4. Correct ply tension-** ply tension must be uniform and as much less as possible.

5. Avoidance of distortion in the spread during cutting- polythene sheets are used under the bottom ply to resist friction of the bottom ply with the base plate of the knife.

6. Fabrics must be flat and free from any crinkle & crease- these cause defects in garments due to variation in dimension.

7. Checks and stripes should be matched

Ideal Lay height of Cutting

Heavy Weight	4-5"	5-4"
Med Weight	3-4"	3-3.5"
slights Weight	2.5-3"	2-2.25"

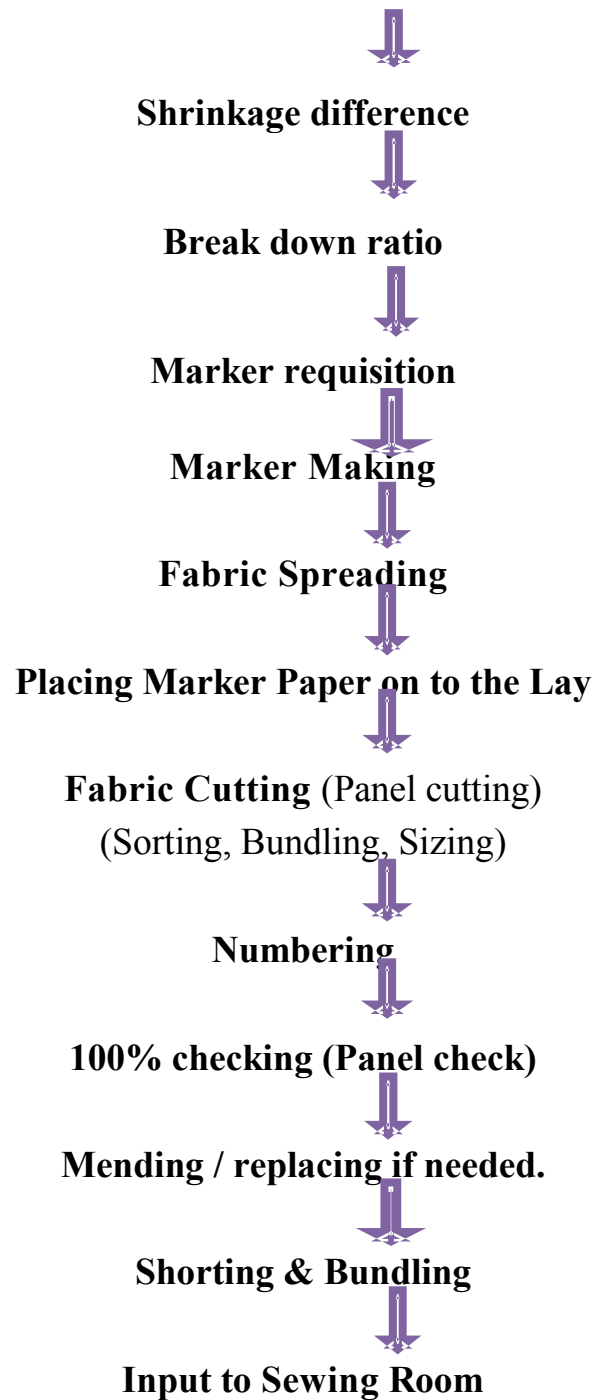
3.4 CUTTING SECTION

3.4.1 FABRIC CUTTING:

Cutting is the major operation of the cutting room, when the spread fabric is cut into garment components. Of all the operations in the cutting room this is the most decisive, because once the fabric has been cut, very little can be done to rectify serious mistakes. Cutting can be done manually using powered knives or by computer-controlled system.

3.4.2 PROCESS SEQUENCE IN CUTTING ROOM:

Fabric requisition



Factors affect the cutting process for fabrics are as follows:

- ❖ Nature of fabric (grain line shade, twill etc.)
- ❖ Thickness of fabric.
- ❖ Design characteristics of finished garment.
- ❖ Machines and tables used.

3.4.3 TYPES OF CUTTING MACHINE:

There have three types of cutting machine.

1. Manual:
 - Die cutting
 - Drill cutting
 - Hand operated cutting scissor

2. Manually operated power knife:
 - Straight knife cutting m/c
 - Round knife cutting m/c
 - Band knife cutting m/c

3. Computerized cutting
 - Knife
 - Water jet
 - Laser
 - Plasma torch

Straight knife, Round knife, Band knife cutting machine is used in Fakir Apparels Ltd.

3.4.4 CUTTING PROCEDURE FOR A PARTICULAR ORDER WITH REQUIRED TIME

S' Oliver- 8589

1. Cutting Manager received this mail - **02.09.13- 3.30** pm.
2. All fabric and accessories are received from supplier- **02.09.13**
3. Cutting submit their marker requisition in pattern section- **02.09.13 – 5.00**
pm
4. Trial run fabric received from Central store. **03.09.13 - 08.40** am
5. 1st marker received from pattern – **04.09.13 – 8.30** am
6. Marker checked by cutting - **04.09.13 – 12.00** pm
7. Fabric spreading for trial run start- **04.09.13 – 3.00** pm
8. Send for embroidery – **05.09.13 – 3.00** pm

9. Received from embroidery – **07.09.13 - 9.30** am
10. Input in line for trial run- **07.09.13- 3.30** am
11. Sent for wash- **12.09.13- 5.00** pm
12. Received from wash – **13.09.13- 5.00** pm
13. Measurement for QC check – **13.09.13 – 7.00** pm
14. Send to pattern – **14.09.13 – 8.30** am
15. PP ok – **16.09.13 – 12.30** pm
16. Fabric relaxation for bulk – **15.09.13**
17. 2nd Marker received from pattern- **15.09.13**
18. Fabric spreading – **15.09.13 – 4.00** pm
19. Bulk Cutting start- **16.09.13 – 10.15** am
20. Cutting end – **16.09.13 – 12.30** pm
21. Send for embroidery – **16.09.13 – 3.00** pm
22. Received from embroidery – **17.09.13 – 2.00** pm
23. Input the line for bulk production – **17.09.13- 5.00** pm

3.4.5 DESCRIPTION OF CUTTING M/C:

3.4.6 Straight Knife Cutting M/C:

This is designed with a low center of gravity for ease of handling and features the best power to gravity weight ratio in the industry.

It is designed for maximum productivity and minimum fatigue. The XD-629 is the obvious Choice when one machine is required to perform many roles. It is suitable for cutting most light to medium weight fabric.

BEST USED FOR:

Light to medium weight fabrics & Woven fabric.

3.4.6.1 FEATURES:

- ✚ Automatic sharpening system
- ✚ 8” blade size
- ✚ Low-profile ergonomic design
- ✚ 1-1/2” stroke

3.4.6.2 OPTIONS

Specify U-ground or twist plug when ordering Machine. Fine, medium and course sharpening bands are available

Some advantages from others which are follows:

- ❖ Comparatively cheap
- ❖ Can be transferred easily
- ❖ Easily operated
- ❖ Round corner can cut smooth easily
- ❖ Fabric can be cut from any angle
- ❖ Directly garments components separated from fabric lays
- ❖ Properties of Straight Knife Cutting Machine:
- ❖ Directly cut the pattern pieces from the fabric lays
- ❖ Could be used to cut for higher depth of fabric
- ❖ Cutting speed high
- ❖ Sharp and heavy corners can be cut
- ❖ Blade is very sharp

Advantage of round knife:

- ✚ Round knife is widely used to separate the big parts and separate the blocks of fabric from relatively small height fabric lay.

Disadvantage of round knife:

- ✚ Not suitable for cutting very curved lines in higher number of lays as the blade does not strike all the piles simultaneously at the same point.
- ✚ Round knife is used only for straight line & lower number of piles.
- ✚ Not suitable for higher production.
- ✚ Possibility of accident is high.
- ✚ Difficult to cut small components.

3.4.7 BAND KNIFE:

Band knife cutting machine is look like a wood cutter machine. Band knife is used for precession cutting small parts of garment.

Advantage of band knife:

- Band knife are used when a higher standard of cutting accuracy is required.
- Consistent cutting is possible by using the templates.
- Possible to cut in 90 angle of the fabric.

3.4.8 Disadvantage of band knife:

- Workload is high as machine is stationary & fabric is movable.
- It is not suitable for cutting large amount of garments pattern.
- Fabric wastages are very high.

3.4.9 *COMPUTER CONTROLLED KNIFE CUTTING:*

3.4.10 Advantage:

- Very active & fast cutting by computer controlled system.
- Suitable for very large-scale production.
- Speed of cutting can be controlled.
- Cutting defects are less than other.
- Less labor cost.
- No need of marker paper.

3.4.11 Disadvantage:

- Very expensive machine.
- Higher maintenance cost.
- Skilled manpower is required

3.4.12 *FACTORS CONSIDERED FOR CHOICE OF CUTTING:*

Type of the fabric: Technique should be such as that it should not damage the fabric. In case of natural fiber fabric, all methods may be

applied, but Laser and Plasma method is not suitable for Man Made Fiber fabric.

Accuracy of cutting: for higher accuracy, computerized method may be adapted & for lower accuracy, manual technique may be suitable.

Available of cutting machine: machine is available to suit the cutting technique.

Volume of cutting: For small amount of cutting, round knife is suitable and for large volume of cutting, straight knife is suitable.

Quality of cutting: Computerized cutting methods are suitable for high quality fabric cutting and manually operated powered knife is suitable for comparatively lower cutting quality.

Time factor: For urgent requirement of fabric cutting, straight knife is more suitable as that technique requires comparatively less preparatory time.

3.4.13 NUMBERING:

Sorting out the components according to size and for each size make individual bundle.

Cutting no	: 3
Bundle no	: 2
Style no	: 1700
Quantity	: 10

Color : Red
Parts name : Pocket
Size M L : 8c
Serial no : 145-170=26

3.4.14 BUNDLING:

3.4.15 BUNDLE CARD:

The bundle card is most important in the garments section. In export qualify garments any type of shading and size mistake is not accepted, so it is used. Because buyer can not accepted any types of shading and size mistake garments.

Understanding the information in a Bundle card:

C- 7 : Cutting number Seven.
723 : Bundle Number.
HPB : Hammer pocket big.
1912-1936 : Lay number.
5TE : Size.
Quantity : 25 pcs

Factors involved in Cutting Fabrics:

Factors affect the cutting process for fabrics are as follows:-

- Nature of fabric (grain line shade, twill etc.)
- Thickness of fabric.
- Design characteristics of finished garment.
- Machines and tables used.

REQUIREMENTS OF THE CUTTING PROCESS:

1. Precision of cut- It depends on:

- ✚ Methods of cutting employed.
- ✚ Marker planning- distance between two pattern pieces.

- ✚ Marker marking- correct marking by pen/pencil.
- ✚ Condition of cutting equipment- machine, blade etc.
- ✚ Skill and motivation of the operator.

2. Clean edge- Free from fraying.

3. Un fused edge- High temperature produced during cutting can fuse fabric edges by melting. Unused edges can be ensured by taking the following measures:

- ✚ Well sharpened blade.
- ✚ Use of anti-fusion (heat absorbent) paper.
- ✚ Spraying silicon lubricants on the blade.
- ✚ Less cutting speed.
- ✚ Reducing the height of the lay.

4. Support of the lay- using a polyethylene sheet or nylon bristle under the bottom ply

5. Consistent cutting- all plies should be of same dimension

3.4.16 CUTTING TOOLS THAT MOSTLY USED ON CUTTING DEPARTMENT IN GARMENT INDUSTRY:

Here is a list of cutting tools and accessories often used on cutting department in garment industry.

1. Scissor
2. **Straight Knife.**
3. **Band Knife**
4. Round Knife

- 5. Die Cutter
- 6. Computerized Knife Cutter.
- 7. Computerized Laser Cutter.
- 8. Drill Machine.

Here Scissor is used in 100% cases in **cutting section**. Straight Knife is used in 100% cases for bulk cutting directly from lay cutting.

Mainly DCKIL used Straight knife cutting machine for fabric cutting. They are given below:

Brand Name	Mack
Origin	Japan
Frequency	50/60 Hz
Volt	50/60 Hz
Phase	1
Blade	Straight bar blade
Speed	3000/3600
Current	AC

3.4.17 WORKING PRINCIPLE OF STRAIGHT KNIFE AS CUTTING ACCESSORIES:

The Working Principle of Straight Knife of Garment Manufacturing which is used on **Cutting Section** is as below-

- 1. Firstly, switch on this cutting machine.
- 2. Then, place the cutting machine at any corner of the table.
- 3. Then switch on the blade.
- 4. Then the operator moves the machine by hand through the stationary fabric layers and cut along marker lines until finish the marker.

Disadvantages of Straight Knife as Cutting Machine:

1. Blade deflection occurs so quality may be hampered.
2. Skill hand required.

Different type of fabric fault:

1. Knot
2. Slub
3. Holes
4. Spot
5. Thick & Thin Places
6. Dirt & Stains
7. Oil stain
8. Missing yarn
9. Dye mark
10. Foreign mark
11. Crease mark

3.5 SEWING SECTION

3.5.1 SEWING:

This is the main assembly stage of the production process, where sewers stitch fabric pieces together, and a garment is assembled. Computerized sewing machines (costly), can be programmed to sew a specific number of stitches to perform a standard operation, such as setting a zipper or sewing a collar.



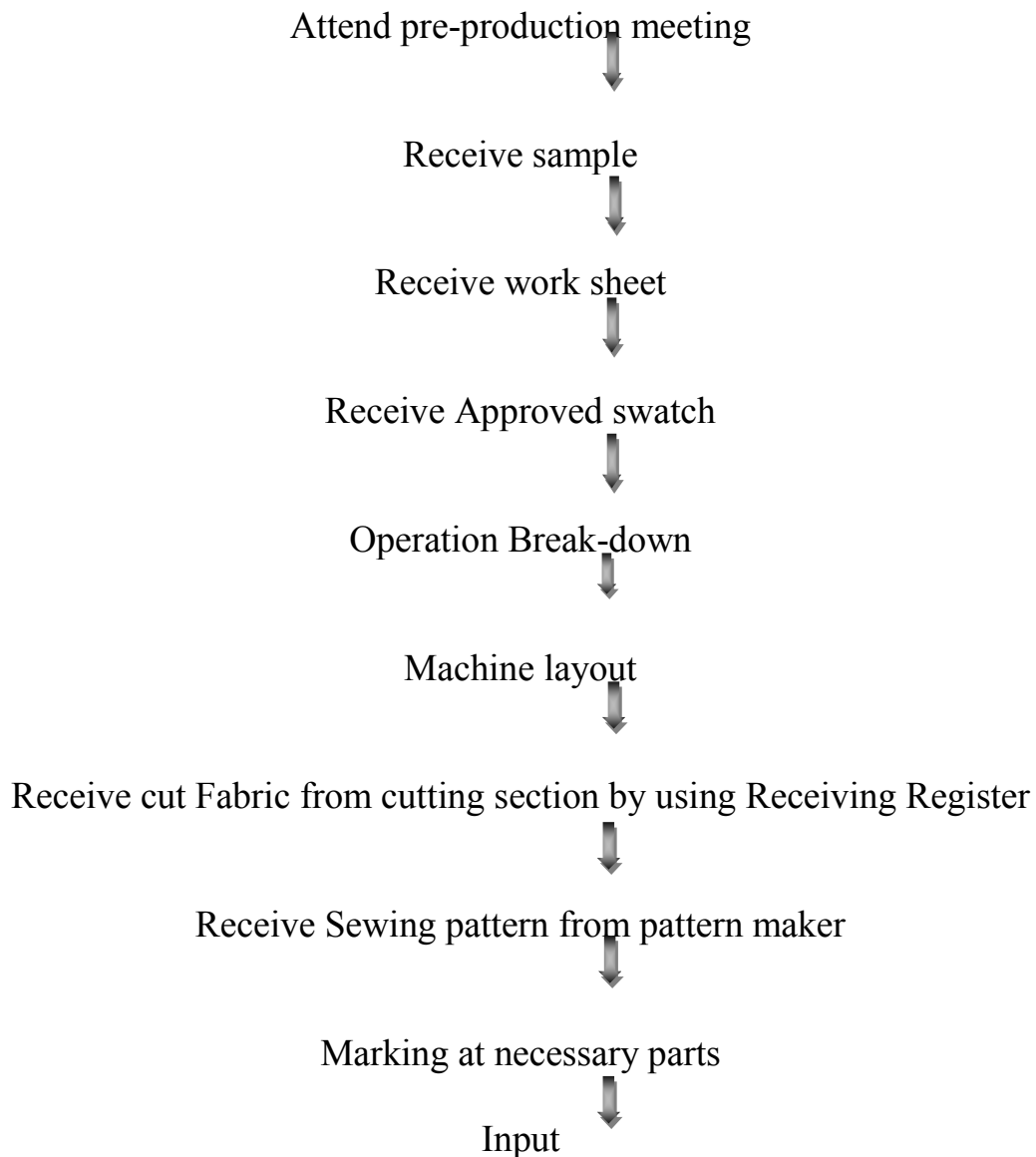
3.5.2 PROCESS SEQUENCE OF SEWING SECTION:

3.5.3 NAME OF THE MACHINES USED IN SEWING SECTION ARE:

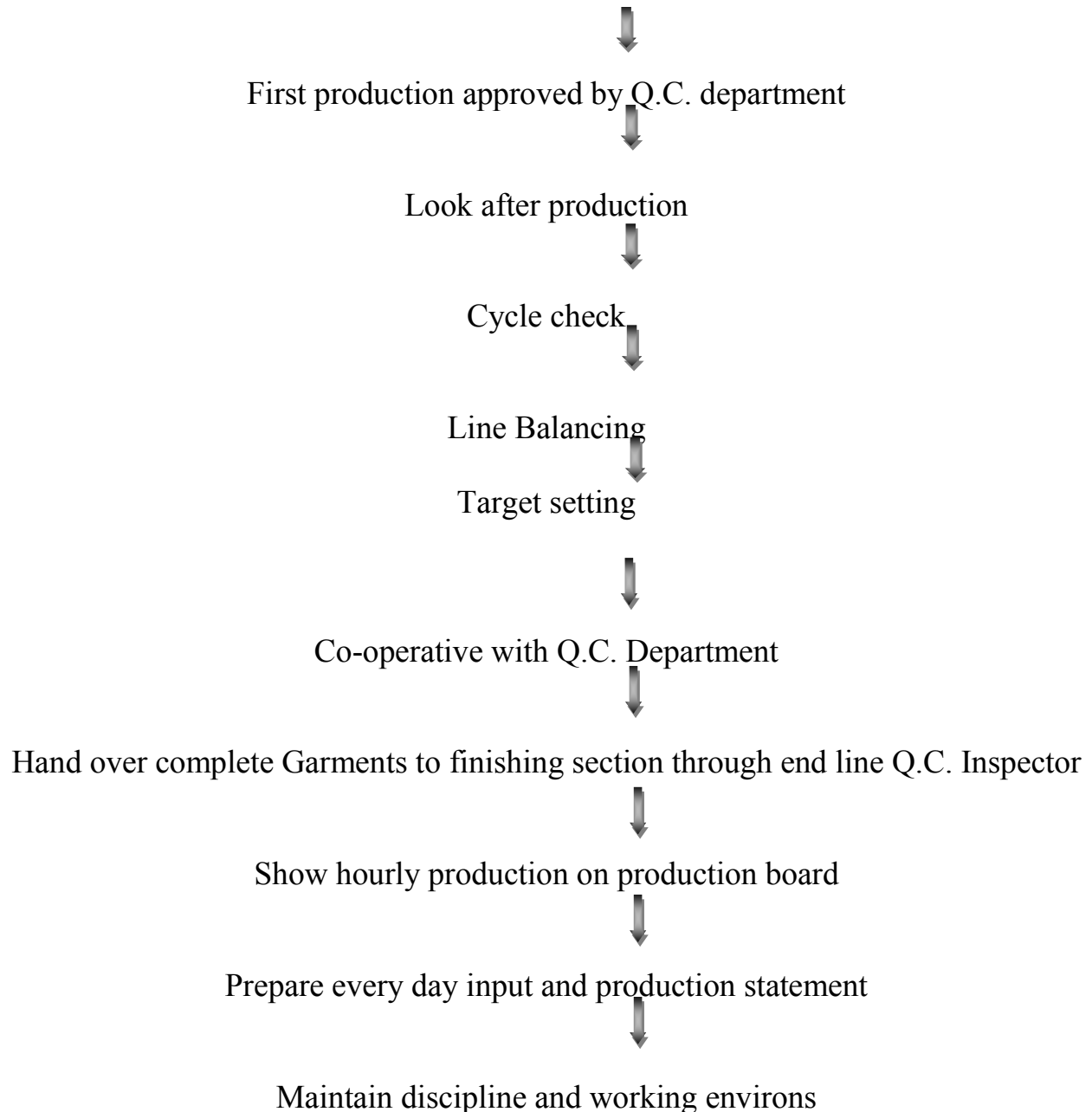
- ✚ Single needle lock stitch Machine
- ✚ Double needle lock stitch Machine
- ✚ Single needle chain stitch Machine
- ✚ Double needle chain stitch Machine
- ✚ Multi needle chain stitch Machine
- ✚ 3 thread Over lock Machine
- ✚ 5 thread Over lock Machine

- + Bar tack Machine
- + Button hole Machine
- + Button attaching Machine
- + Snap button attaching Machine
- + Velcro Machine
- + Feed of the arm Machine
- + Fusing Machine

3.5.4 ACTIVITIES OF SEWING SECTION:



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3.5.5 DIFFERENT TYPES OF STITCHES:

The two main stitches that sewing machines make of which the others are derivatives are lockstitch and chain stitch.



- ❖ BACK TACK
- ❖ BACKSTITCH - A STURDY HAND STITCH FOR SEAMS AND DECORATION
- ❖ BASTING STITCH (OR TACKING) - FOR REINFORCEMENT

- ❖ BLANKET STITCH
- ❖ BLIND STITCH (OR HEM STITCH) - A TYPE OF SLIP STITCH USED FOR INCONSPICUOUS HEMS
- ❖ BUTTONHOLE STITCH
- ❖ CHAIN STITCH - HAND OR MACHINE STITCH FOR SEAMS OR DECORATION
- ❖ CROSS-STITCH - USUALLY USED FOR DECORATION, BUT MAY ALSO BE USED FOR SEAMS
- ❖ LOCKSTITCH - MACHINE STITCH, ALSO CALLED STRAIGHT STITCH
- ❖ OVERHAND STITCH
- ❖ OVER LOCK
- ❖ PAD STITCH
- ❖ PADDING STITCH
- ❖ RUNNING STITCH - A HAND STITCH FOR SEAMS AND GATHERING
- ❖ SAIL MAKERS STITCH
- ❖ SLIP STITCH - A HAND STITCH FOR FASTENING TWO PIECES OF FABRIC TOGETHER FROM THE RIGHT SIDE WITHOUT THE THREAD SHOWING
- ❖ STRETCH STITCH
- ❖ TENT STITCH
- ❖ TOPSTITCH
- ❖ WHIPSTITCH (OR OVER SEWING OR OVERCAST STITCH) - FOR PROTECTING EDGES
- ❖ ZIGZAG STITCH

3.5.6 DESCRIPTION OF DIFFERENT TYPE SEWING MACHINES:

3.5.7 Plain m/c:

Component:

-  One needle
-  Two tensioners

- ✚ Three guide
- ✚ One hook
- ✚ Two thread
- ✚ One bobbin case
- ✚ One magnate guide



Fig: plain machine

Application:

- ✚ Bottom hemming
- ✚ Belt top seem stitch
- ✚ Belt joint stitch
- ✚ Loop tack stitch
- ✚ Pocket joint stitch
- ✚ Zipper joint
- ✚ Flap top stitch
- ✚ Flap joint
- ✚ Fly top stitch
- ✚ Flap 1/4 stitch
- ✚ Front rise stitch
- ✚ Back rise stitch

3.5.8 OVER LOCK M/C:

Component:

- ❖ 5 thread
- ❖ 4 tensioner

- ❖ 2 knives (up / down)
- ❖ 2 needle for 5 thread
- ❖ 1 needle for 3 thread
- ❖ 3 looper for 5 thread
- ❖ 2 looper for 3 thread



Fig: Over lock m/c

Applications:

- ❖ Over lock stitch

Bar tack m/c:

3.5.9 APPLICATIONS:

- ✓ To created bar tack stitches in garments.
- ✓ Loop attach
- ✓ Fly make
- ✓ Pocket side
- ✓ Front side
- ✓ Back pocketing
- ✓ zipper lay
- ✓ In seem

3.5.10 Flat lock

3.5.11 COMPONENT:

- ❖ 4 tensioner
- ❖ 3 thread
- ❖ Contain a holder
- ❖ 2 needle

Applications:

- ❖ Zigzag stitch
- ❖ Knit hemming
- ❖ Loop making

3.5.12 Eye late Button holing m/c:

Component:

- ❖ 3 thread or 4 thread
- ❖ 1 needle
- ❖ Contains bobbin case
- ❖ 2 lopper
- ❖ Contains a hammer

Applications:

- To make eye late hole in garments.



Fig: Button Attach M/c

3.5.13 Button Attach m/c:

Component:

- ❖ 2 thread
- ❖ 1 needle
- ❖ Contains shoulder, shoulder Cap bobbin catching

Applications:

- ✓ To attach button in garments

3.5.14 MACHINE WISE SEWING THREAD CONSUMPTION (FOR 1"STITCH):

Machine wise sewing thread consumption per inch are gives in bellow:

Machine	No. of needle	Thread consumption per inch
Plain	1	2.5"
Plain	2	5"
Over lock	3	16"
Over lock	4	18"
Over lock	5	21"
Bar tack	-----	7"---8"
Button hole stitching	-----	6"—7" normally per hole
Button attaching 2 hole	-----	4" per button

Kanshai Stitching	-----	4” per one needle
-------------------	-------	-------------------

3.5.15 *DIFFERENT TYPES OF SEAM DESCRIPTION:*

Superimposed Seam (SS):

The superimposed seam is achieved by two or more separate pieces of together. This is the one of the most common method of seaming.

Lapped Seam (LS): Lapped seam is made with two or more pieces of fabric overlapping each other. LS commonly, but not always, have one ply of fabric fold under itself for a finished edge.

Bound Seams (BS): Bound seam is made to finish and edge of a garment. A common example of this would be a neckline of a Crew T.

Flat Seam (FS): A flat seam is constructed by having two pieces of fabric meet precisely at their edges. A cover stitch is used to sew the two pieces of fabric together.

Edge Finished Seams (EF): This seam is used to prevent the edges of the fabric from rolling or curling. Primarily used for knit fabrics and is suitable for straight or curved seams and edges.

Ornamental Seam (OS): This seam is made using machines with zigzag capability. It is used on a plain seam on woven or knit fabric.

Factors Affecting Appearance of Seam: The technique and skill of the sewing machine operators also govern the appearance of sewn seams. Some of the factors that will adversely affect the appearance of a seam.

Stitch Defects	Seam Appearance Defect
Loose Stitches	Puckers
Poorly formed stitches	Twists
Crowded stitches	Plaits
Tight stitches	Undulations
Crooked stitches	Run-off (raised seams)
Skipped stitches	Raw edges exposed (felled seams)

3.5.16 *DIFFERENT TYPE OF SEWING FAULT:*

1. Skip/ Drop stitch
2. Uneven stitch
3. Over stitch
4. Joint stitch
5. Raw edge
6. Tension loose
7. Broken stitch
8. Puckering
9. Open stitch
10. Oil spot
11. Shading
12. Incorrect stitch per inch
13. Pleat
14. Needle cut
15. Wrong Thread
16. Wrong size/ care label
17. Slanted
18. Wrong button placement

19.Run off stitch

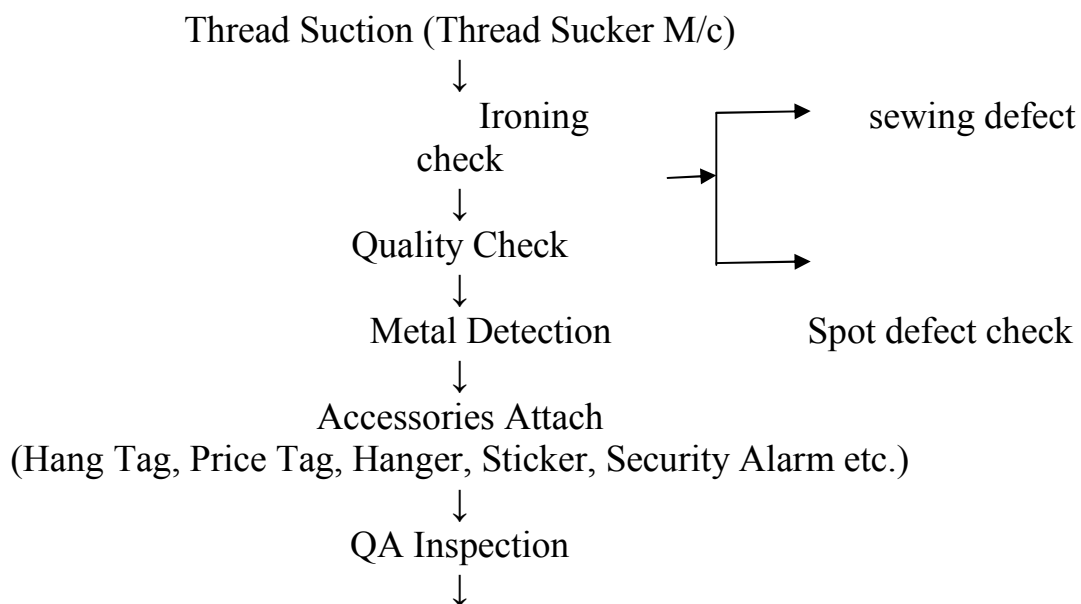
3.6 FINISHING SECTION

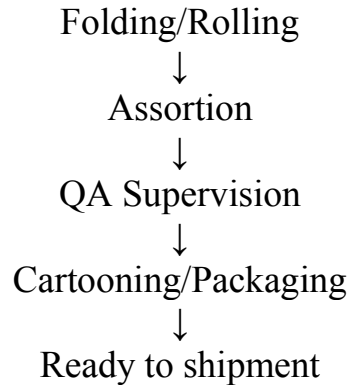
3.6.1 FINISHING

Garments Finishing:

Garment finishing through wet processing is responsible for adding beauty to the garment. Proper finishing could provide better look to the garment, change the feel of the fabric and bring about a change to the texture of the fabric. There are various types of finishes like peach finish, anti-microbial finish, wrinkle free finish, aroma finish, UV guard finish, acid wash, enzyme wash, etc.

3.6.2 PROCESS FLOW CHART OF GARMENT FINISHING:





Object of Finishing:

- ✚ To enhance the suitability of the fabric for end use.
- ✚ To improve appearance and sale appeal for comfort and utility.

To give desirable qualities to the fabric like-

1. Softness
2. Luster
3. Drape
4. Dimensional stability
5. Crease recovery
6. Soil repellence

3.6.3 WORK FLOW IN THE FINISHING ROOM:

As mentioned earlier, workflow in the Finishing Department is shown here for reference:

- Eliminate micro-dust and residual thread from the garment
- Press/iron garments as specified by buyer or as per requirements
- Fold the garments as required by customer
- Fix necessary tickets (Price tickets) or tags (hang tags), etc to the garments at this stage
- Insert garments into poly bags
- Divide garments as per size and color (assortment)

Machine Description of finishing section (Fakir Apparels Ltd.):

Machine	Number
1. Steam iron	029
2. Metal detector	02
3. Thread sucker	03

Finishing capacity: 1000 pcs/hr (approximately)

Metal detection machine:



Fig: Metal Detector M/C (Brand name: HASHIMA)

Thread sucker machine:



Fig: Thread Sucker M/C

3.6.4 MATERIALS USED IN GARMENT

FINISHING:

- ✚ Neck board
- ✚ Back board
- ✚ Collar stand
- ✚ Butterfly
- ✚ Tie placket support
- ✚ Fit label
- ✚ M-clip
- ✚ T-clip
- ✚ Metal clip
- ✚ Cuff link
- ✚ Droop loop
- ✚ Cable tie
- ✚ Boa tie
- ✚ Full board
- ✚ Hand tag
- ✚ Tag pin
- ✚ Tissue paper
- ✚ Al pin
- ✚ Ball pin
- ✚ Elastic clip
- ✚ Hanger
- ✚ Poly bag
- ✚ Size sticker
- ✚ Gun tap
- ✚ Inner box
- ✚ Muster cartoon box
- ✚ Pp belt
- ✚ Blister

The General Rules of Spot Removing:

1. The longer a stain remains, the tougher it is to remove.
2. Always treat a stain before laundering.
3. Blot gently — never rub; and don't ever blot with hot water.



Stain Removal:

STAIN TYPE	USED CHEMICAL (COMMERCIAL NAME)
1. Oil stain	Spot lifter
2. General stain	Thinner
3. Termeric stain	MRS
4. Ink stain	MR
5. Glue stain(Polymer based)	Heat gun
6. Rust stain	Markvill
7. Print mark	Printvill

Ironing:

Ironing is the use of a heated tool (an **iron**) to remove **wrinkles** from fabric. The heating is commonly done to a temperature of 180–220 °Celsius, depending on the fabric. Ironing works by loosening the bonds between the long-chain **polymer molecules** in the fibers of the material. While the molecules are hot, the fibers are straightened by the weight of the iron, and they hold their new shape as they cool. Some fabrics, such as cotton, require the addition of water to loosen the intermolecular bonds.

Basic Ironing Symbols:

	Do not iron
	Cool iron (110°)

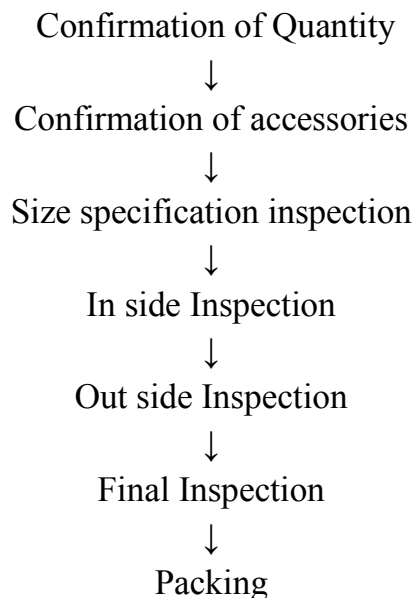


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	Medium iron (150°)
	Hot iron (200°)

3.6.5 GARMENT INSPECTION:

FLOW CHART OF GARMENT INSPECTION



3.6.6 INSPECTION PROCEDURE OF GARMENTS ARE DESCRIBED BELOW:

Confirmation of Quantity:

First step of garment inspection start with confirmation of Quantity with the vendors packing list by counting all Pecs of each box. If Qty is not matching to the packing list and written in the box then this discrepancy is informed to the vendor.

Confirmation of Accessories:



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Next step is the confirmation of accessories, here we confirm brand tags, demerit tags, Price tags, or other tags, wash care labels, woven labels, or other labels and accessories as required by the buyer.

Size Specification inspection:

After confirmation of accessories all pieces are checked as per size specification based on the instruction sheet which is given by the buyer side. If any measurement problem is noticed then we check the original sample and inform the buyer same time.

In Side Inspection:

At this stage garment is checked from reverse side to ensure that there is no fabric defect, poor stitching, and stains etc. in the garment.

Out Side Inspection:

At this stage garment is checked from outside to ensure that there is no color variation, weaving defect, fabric defect, printing defect, holes, poor stitching, bad smell , dying defect and stains etc in the garment.

Final Inspection:

Final Inspection stage is the most important part of inspection process, here garment is rechecked to confirm that inspection is done properly without missing any checking step if any defect is noticed we put it into rejection bin or send it for repay.

Packing:

All “Grade-A” goods are put back into poly bags as per the original packaging and then they are send for needle inspection

3.6.7 PRESSING OR FOLDING:

Although pressing remains largely a manual task, new automated process exists that apply force and steam to garments placed over a body form.

Different type of folding:



- ❖ Standard folding
- ❖ Semi standard folding
- ❖ Flat folding:
 - Roll folding
 - Hang folding
 - Half folding
 - Eco folding
 - Twill folding

3.7 PACKAGING:

After final inspection, the garments are poly-packed, dozen-wise, color wise, size ratio wise, bundled and packed in the cartoon. The cartoon is marked with important information in printed form which is seen from outside the cartoon easily.

Assortment:

Buyers generally place order of garments in certain assortment of color and sizes. The production of such colors and sizes is called assortment. Another order with an assortment of 1:2:2:1 is shown below:

Color/size	S	M	L	XL	Quantity
Red	1000	2000	2000	1000	= 6000
Yellow	1000	2000	2000	1000	= 6000
Olive	1000	2000	2000	1000	= 6000
Violet	1000	2000	2000	1000	= 6000
Total=					24000



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Cartooning procedure:

There are 4 types of cartooning assortment:

- 1) Solid size and solid color (the order comprises one size & one color)
- 2) Solid size & assorted color (the order comprises one size & different colors)
- 3) Assortment sizes & assorted color (the order has only one color but different sizes)
- 4) Assorted sizes & assorted color (different sizes & different colors in the order)

Generally most of the order comes in assorted sizes & assorted colors

Cartoon type:

- Master carton (Almost cubic)
- Coffin carton (Length > 2*width)
- Inner carton (Small & insert able into other carton)
- Etc.

Dispatch:

The cartoons of the manufactured garments are delivered or placed in the dispatch department or finished product Go down, from where the garments lot is delivered for shipment



3.8 QUALITY MANAGEMENT SYSTEM

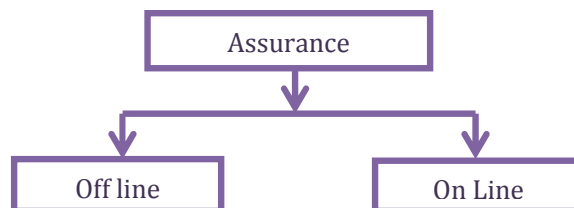
3.8.1 *QUALITY ASSURANCE:*

Quality assurance (QA) refers to the planned and systematic activities implemented in a quality system so that quality requirements for a product or service will be fulfilled. It is the systematic measurement, comparison with a standard, monitoring of processes and an associated feedback loop that confers error prevention. This can be contrasted with *quality control*, which is focused on process outputs.

3.8.2 *OBJECTIVE OF QUALITY CONTROL:*

- Research
- Selection of raw material
- Process control
- Process development
- Product testing
- Specification check

3.8.3 *QUALITY MANAGEMENT SYSTEM:*





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Table inspection:

To maintaining good quality - BGL & BDL make a inspection report from "sewing line finish garment";

1. Date/hourly production quantity, inspected quantity, rejected quantity & pass quantity
2. Identify defective & rectified quantity

3.8.4 ACCEPTABLE QUALITY LABEL (AQL) -2.5:

Before start finishing work - BGL & BDL follow AQL system through a format;

1. Buyer, item, style, purchase order, order quantity, audit time, lot quantity, sample quantity, measurement, total defects percent of defects. Pass/fail
2. Pass >> for start the finishing work
3. Fail >> full lot - 100% re-inspection

3.8.5 ONLINE QUALITY ASSURANCE TEST:

The entire online QA test for finished fabric of BGL & BDL can be grouped as-

- Pattern measurement
- Marker making
- Fabric spreading
- Cutting check
 - Fabric fault
 - Shade variation
 - Size measurement
 - Cutting pieces matching



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- Sewing inspection
- Packing & finishing

3.8.6 OFFLINE QUALITY ASSURANCE TEST:

The entire offline QA test for finished fabric of BGL & BDL can be grouped as-

- **Physical test**
- **Chemical test**

The detail of all application QA test for finished fabric are discussed in bellow-

- **Physical test:**

The applicable QA physical test for finished fabric is as follows-

- Tensile strength test
- Tear strength test
- Abrasion resistance test
- Pilling resistance test
- Crease resistance test

3.8.7 FLOW DIAGRAM OF OFF-LINE QUALITY CONTROL FOR EACH PRODUCTION:

Inspection fabric in the inspection machine



Fabric lot no.



Buyer's order No check



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Style No. check



Product quality check according to buyer's requirement



Inspection and testing of the produced garments

3.8.8 FLOW DIAGRAM OF ON-LINE QUALITY CONTROL:

Raw material inspection



Pattern making inspection



Marker making inspection



Cutting inspection



Sewing inspection



Pressing and finishing inspection



Packing and cartoning inspection

3.8.9 IN PROCESS QC IN CUTTING SECTION:

Shade check with buyer approved swatch





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Check GSM



Running shade check



Roll wise shade check



Batch to batch shade check



Shrinkage test



Marker check



Cutting panel check



Pattern check



Shape check of different parts



Measurement check



Check number of different parts in bundle

3.8.10 *IN PROCESS QC IN SEWING SECTION:*

Seam joint of two parts



Seam damage



Slipped stitch



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Staggered stitch



Unbalance stitch



Stitch density



Needle, lopper thread breakage



Fabric distortion



Fabric damage through the stitch line



Label attaching place



Check label



Check oil mark



Shading of different garment parts

3.8.11 ***IN PROCESS QC IN FINISHING SECTION:***

Getup check





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Measurement check



Final garments inspection



Ratio wise packing inspection

3.9 STORE & INVENTORY

INVENTORY: – Inventory in a wider sense defined as any idle resources or assets of an organization; however it is commonly used to indicate raw materials, finished, semi-finished, packing, spares & other stocked in order to meet an expected demand on distribution. Even though inventory of materials is an idle resource in the sense & is not meant for the most immediate use but it is almost necessary to maintain some inventories for the smooth function of an organization.

CAUSES OF MAINTAIN INVENTORY:–

1. To run manufacturing operations economically.
2. To take care of uncertainties demand.
3. To reduce the clerical cost & to take advantage of discounts, transportation etc.
4. It takes time to complete one operation & more products from one stage to another.
5. To take care of order cycles.

SCOPE OF INVENTORY CONTROL:–

1. Raw materials inventories.
2. In process inventories.



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3. Finished goods inventories.
4. Miscellaneous inventories.

Frequency of inventory control:–

1. Daily inventory control.
2. Monthly inventory control.
3. Yearly inventory control.

Procurement system:–

- a. Fakir dyes & chemical is sister concern of Fakir Apparels Ltd. so Dyes (mostly used like Sumifix, Cibacron & Remazol dyes) & chemical (regular items like Sequestering agent, Anti-creasing agent, Anti-foaming, Levelling agents, Stabilizer etc) are collected from there.
- b. Some dyes are purchased from local market if urgently required.

Inventory management for raw material:–

In Fakir Apparels Ltd there are different inventory systems are maintained for different materials.

Grey fabric store:–

All the grey fabric is stored in the fabric store near the knitting section. Different types of fabric are listed in the sheet according to fabric types, quantity, & consumer's requirement.

Dyes & chemical store:–

There is a different store for dyes & chemicals. Various types of dyes & chemicals are stored here according to dyes & chemicals companies. Different types of dyes & chemicals are listed in a sheet. In the sheet the stored quantity of dyes & chemicals are also included. Every day the sheet is updated & a copy



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of this sheet is supplied to the factory manager, Dyeing manager, & Dye house & Lab section.

Finished fabric store:–

In Fakir Apparels Ltd finished fabric are sent to the garments section. After use in the garments excess fabrics are stored in finish fabric store according to the lot no, quantity, order no, fabrics diameter, buyers name color, size other considering technical parameters.

Finished goods store:–

In garment section during production they always consider some allowances%. After shipment the remaining garments are stored in the finished goods store to the product name, order name, color name, & other subjected points.

Spare Parts store:–

In Fakir Apparels Ltd required amount of spears of different machines are stored in the mechanical store room. All the spears are listed in a sheet which is controlled by the mechanical & maintenance personnel. Spares are arranged in the store room according to their size, quantity, & requirements. There are shelves in the store room to keep the small spare parts.

Store capacity:–

Items	Amount
Dyes	10-12 tons



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Chemicals	20-25 tons
Yarn storage	10-15 tons
Grey fabric	20-25tons
Finished fabric	30-35tons

Reorder point:–

The re-order point is stated in terms of the level of inventory at which an order should be placed for maintaining the current inventory.

In other words, re-order point may be defined as the level of inventory when fresh order should be placed with supplies for procuring additional inventory equal to the economic order quantity.

3.10 UTILITIES

3.10.1 AVAILABLE UTILITIES:

The following utility facilities are available at Fakir Apparels Ltd.

- Water.
- Steam.
- Electricity.
- Gas.
- Compressed air.
- Covered Van for Transportation.

3.10.2 SOURCES OF UTILITIES:

Water: Natural water by own supply pump

Steam: Own supply from Boiler

Electricity: Generator & PDB



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Gas: Titas Gas Transmission & Distribution Co. Ltd.

Compressed Air: Own supply from Air compressor

Water supply:

Water is supplied by pump. Pump supplies water on the basis of pressure. Pump pressure ranges 0-10 bar. The pump is operated at 2-4-bar pressure. 3 motors are used for uniform water supply. These are automatic on-off system motor. When the pressure is reduced to the desired level (2 bars) then the motor is turned on. Similarly when the pressure is above the desired level (4 bars) then the motor is turned off. So, it has variable water supply capacity & supplies water as required. The water, which is used for cooling, is brought to a tank & again supply by a pump.

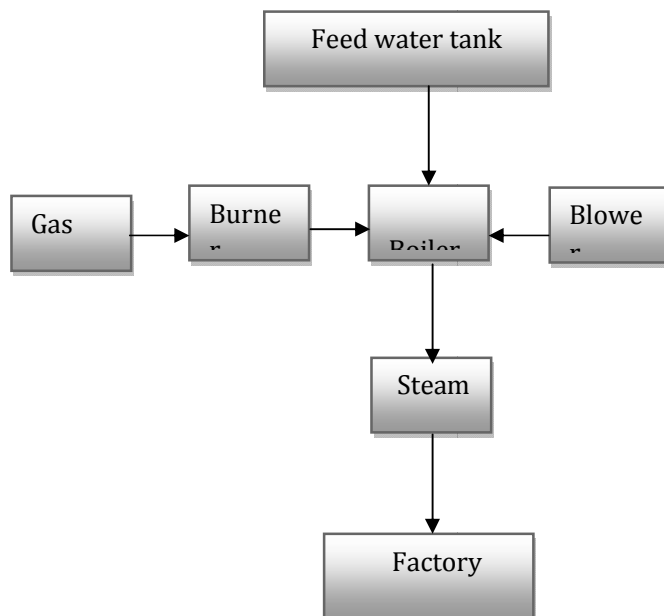
Boiler:

Number of Boiler -02

- | | |
|--------------------------------|----------------------|
| 1. Brand Name | :Cleaver Brooks, USA |
| 2. Type No. | : DDH 15.0 – 10 |
| 3. Serial No. | :18709 |
| 4. Year of manufacturing | :1996 |
| 5. Max. Working pressure gauge | :10 bar |
| 6. Max Temperature | :183 ⁰ C |
| 7. Max heat capacity | :3.25 MW |
| 8. Water content up to ‘NW’ | :9.62 cubic meter |
| 9. Max steam output | :9.4 ton/hr |
| 10. Gas pressure in line | :1 bar |
| 11. Gas pressure (in boiler) | :010 bar |
| 12. Gas consumption | :34 cubic meter/day |
| 13. Steam pressure | :7.5 bar |
| 14. Steam header pressure | :120 PSI |
| 15. Blow down line | :4 times/day |
| 16. Soft water supply pipe dia | :1 inch |
| 17. Establishment cost | :60 lacks |

Operation Procedure of Boiler:

These two types of boiler are horizontal fire boiler. At first the boilers take NTA (Natural gas) from the gas line and suck air. Then through the air and gas inside the boiler. For this reason the water is boiled water and produce steam. The steam is supplied by the steam line in the different section.





Water supply for the boiler:

Water required for steam production is supplied by deep tube well.

Pretreatment of the boiler water:

Boiler feed water needs special standard. Any deviation from the required standard may result in scale formation, which eventually reduces the efficiency of the boiler. This ultimately affects the cost of steam generation and makes the production cost high. To maintain the required standard of the water, there should be some means to pretreat the boiler feed water.

Manufacturer of the softener:

The manufacturer of the softener is also cleaver brooks®, USA.

No. of the softener:

There are two water softener to pretreat the boiler feed water.

Softener specification

Brand name : Cleaver brooks®

Model no. : ACC-SMR-150-1- ½ T

Serial no. :CS-0000235

Capacity : 150000 GRS / tank

Unit no. : HS008891

Pipe size : 1 ½ inch

Salt capacity brine marker: 575 lbs

Electricity supply:

It is totally impossible to continue the production without electricity. A frequent supply of electricity is very essential for soundless production. Here all the machines in washing and dyeing section are provided electricity by the govt. electricity with own standby generator of the industry. Fakir Apparels has two

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generators for power supply to ensure continuous dyeing & knitting operation and help to fulfil their target production. One is gas generator & other is diesel generator. Both of these two generators are widely used because of lower production cost.

Technical Details about Generator:

Types : Gas generator (Main source)

Number : 02

Company : Deutz.

Model : 560.

Country origin : Germany

Capacity : 1344KW, 1344KW

Frequency : 50Hz

RPM : 1500.

Cylinder no : 16

Pressure of gas : 50m bar.



Types : Diesel generator (Auxiliary back up)

Number : 03

Company : Perkins

Model : PS380FI.

Country origin: United Kingdom

Capacity : 1000KW, 1000KW, 340KW

Frequency : 50 Hz

RPM : 1500

Generator:





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$1\text{m}^3\text{gas} = 4.73\text{ TK.}$

1 litre diesel =44.45 TK.

1KW/hr electricity can be produced by using 0.33 litre diesel per hr.

To produce 1KW/hr electricity diesel required for 1 day = $(0.33*24)$ or 7.92 ltr.

Running load = 2 MW

Connecting load =4 MW

Steam Boiler:

Boiler gas bill= 27, 00,000 TK./boiler/month.

4 IMPACT OF INTERNSHIP

4.1 IMPACT OF DIFFERENT SECTION:

4.1.1 IMPACT OF SAMPLE SECTION:

- ✚ Understood why sample section is called a mini-industry
- ✚ Observed how skilled workers work in sample section
- ✚ Learned the process of preparing a pattern for an individual size & design
- ✚ Cleared the conception about different types of sample required to produce a garment
- ✚ Learned about the digitizing board in CAD room
- ✚ Learned the process of determining breakdown ratio for a particular order



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- ✚ Understood how to make marker from a pattern by software (Investronica) in CAD room
- ✚ Observed the process of printing a marker on a paper with plotter machine in CAD room

4.1.2 IMPACT OF CUTTING SECTION:

- ✚ Learned about different type of cutting machines (i.e. Straight knife cutting machine, Round knife cutting machine, Band knife cutting machine etc.)
- ✚ Learned the process of fabric spreading
- ✚ Observed the process of fabric cutting according to the marker
- ✚ Understood different process of fabric lay
- ✚ Realized the use and importance of metal gloves for fabric cutting process through different cutting machines
- ✚ Observed the panel check process for different type of fabric of different style and design
- ✚ Understood how numbering and bundling is done
- ✚ Understood the role of input man in the industry

4.1.3 IMPACT OF SEWING SECTION:

- ✚ Observed different sewing or joining process of different body parts of a shirt
- ✚ Learned about different type of machines used in a sewing floor (i.e. Single or double needle lock stitch machine, Multi needle chain stitch machine, Over lock machine, Feed of the arm machine etc.)
- ✚ Observed the ironing and fusing process for different body parts (i.e. Collar, Placket, Facing Interlining etc.)
- ✚ Learned about Standard Minute Value (SMV) of different sewing process
- ✚ Learned the process of determining operator's efficiency in an individual process for a shirt



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- # Cleared the conception about production of a sewing floor (line by line and total floor)
- # Observed and realized the importance of final inspection at the end of every sewing line
- # Got experienced in making production study of an operator for an individual process for a definite time interval
- # Also got experienced in making capacity graph of a sewing line of a definite style and design
- # Attended Pre-production meeting before the bulk production of an order
- # Realized the importance of Dept. of IE in raising the efficiency of production in a sewing floor

4.1.4 IMPACT OF FINISHING SECTION:

- # Observed various type of finishing process after sewing and washing
- # Observed different type of machines used in finishing section (i.e. Neck press machine, Metal detector machine etc.)
- # Learned about different type of iron machines
- # Learned about various type of accessories used to attach to the garment (i.e. Security alarm, Hang tag, Price tag, Barcode label etc.)
- # Observed the application of different chemicals for the removal of various type of stain
- # Observed and learned different type of folding process (i.e. Standard fold, Semi-standard fold, Hanger fold, Twill fold, Half fold, Full fold etc.)
- # Cleared the conception about different packing type (i.e. Master pack, Blister pack, Coffin pack etc.) and packing ratio
- # Understood the basic difference between gross weight and net weight
- # Finally realized why finishing section is unavoidable in garments industry for making the garment attractive and decorative for selling purpose



5 CONCLUSION

We have completed our Industrial Training successfully by the grace of Allah. Industrial Attachment sends us to the expected destiny of practical life. Fakir Apparels Ltd is one of the best factories in the textile field of Bangladesh. The completion of the six weeks industrial attachment at Fakir Apparels Ltd. gave us the inspiration that factory is one of the appropriate destiny to implement the theoretical knowledge. From this industrial attachment we got the details idea about the factory environment, production process, total management, store & inventory process, maintenance, utility etc.

Fakir Apparels Ltd. is well equipped and the working environment is excellent. The relation between top management to bottom level is so nice. We are lucky to get the opportunity of having training in this mill. The factory runs by a number of efficient Textile Engineers, Skilled technical & Non-technical persons.

All the Textile Engineers, technical & Non-technical persons are very sincere, co-operative and helpful. We wish good luck of them and also for this factory.



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