



REPORT ON
Industrial Attachment at Knit Concern Ltd
From 15th May'13 to 30th June'13

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Finally, we would like to acknowledge that we remain responsible for the inadequacies & errors, which doubtless remain in the following report.

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Our Apology
Special Thanks

CHAPTER-01

INTRODUCTION

1.1 Introduction:

The term “textile” derived from the Latin *textilis* and the French *texere*, meaning “to weave,” and it originally referred only to woven fabrics. It has, however, come to include fabrics produced by other methods. Thus, threads, cords, ropes, braids, lace, embroidery, nets, and fabrics made by weaving, knitting, bonding, felting, or tufting are textiles. Some definitions of the term textile would also include those products obtained by the papermaking principle that have many of the properties associated with conventional fabrics. In addition to clothing and home furnishings, textiles are used for such industrial products as filters to air conditioners, life rafts, conveyor belts, tents, automobile tires, swimming pools, safety helmets and mine ventilators.

At Knit Concern Ltd, cutting-edge technologies merge seamlessly with human ingenuity and deep seat recommitment to ensure excellence in every stage and area of their activities. From fiber to fabric, Knit Concern Ltd is truly integrated undertaking. The Knit Concern Ltd. has the capability to offer a complete product range for the export textile markets. The goal of Knit Concern Ltd. is to become the preferred partner for sourcing high quality fabrics and clothing from Bangladesh With highly advanced technology and an emphasis on developing local human resources. Knit Concern Ltd has the potential to make an important contribution to the nation's growing ready-made garments export sector.

CHAPTER-02
GENERAL
INFORMATION ABOUT
THE FACTORY

2.1 Vision of Knit Concern Limited

In the backdrop of a mercurial, ever-changing fashion world, knit Concern Ltd considers its prime mission to suit every new taste, whim and demand of customers from around the world and all strains of human culture.

KCL acts on the basic premise that “fashion is an exploration into the images people seek to convey – about themselves and the way they live.”

So, in dealing with its target consumers, KCL mainly aims to know their perception about themselves and translates those into garments. Doing that, over the years, KCL designers have acquired an almost telepathic understanding of the consumers’ needs.

KCL has started manufacture and export garments since late 1990. Its mission is to produce the latest design; quality knit fabrics and apparels for international markets.

KCL is one of the few elite private sector business groups, which contributed wealth as well as welfare to the struggling economy of Bangladesh. As time is essential to space so is taste to its products. The secret is love – which, paired with meticulous efficacy and a keen sensitivity to style, makes KCL an emerging brand destined to light up the horizon of fashion.

KCL has team of skilled and dedicated technocrats backed by adequate number of modern USA and European machinery and equipments to match international standard of all kinds of knitwear products.

2.2 Company Profile

Name of the factory: KNIT CONCERN LIMITED

Type : 100 % Export Oriented Composite knitwear Industry

Year of Establishment : 1998

Status (Legal Structure) : Private Limited Company

Annual Production capacity : 10000 ton of knit fabric (Open & tubular form)

Total Manpower: Around 8000

Address : 62 ,Water Works Road, Godnail.Narayanganj, Bangladesh.

Telephone Number : +88 – 02 - 7641086

Fax Number : + 88 – 02 – 7641087

URL : <http://www.knitconcern.com>

2.3 LOCATION OF KCL

Knit Concern Limited is located at Godnail , in Narayanganj about 18 km from the EPZ.

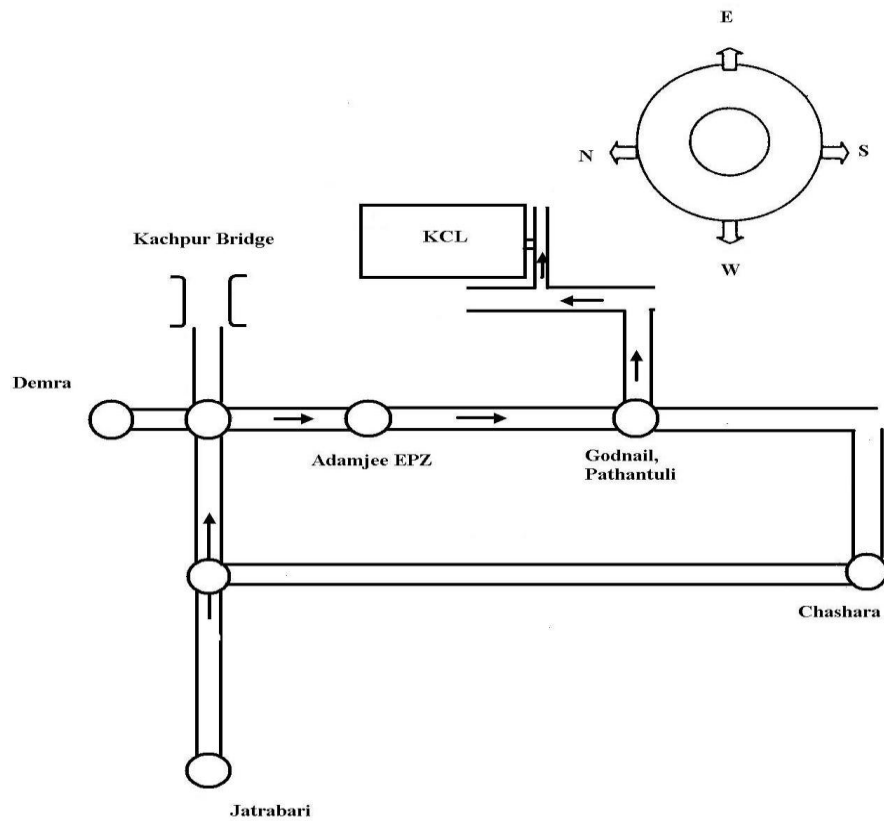


Figure-1: Location of KCL

CHAPTER-3

KNIT DYEING SECTION

3.1 Project Description

➤ Product mix:

- 100 % cotton
- CVC (Chief Value Cotton) (60/40)
- Grey melange
 - * 5 % Viscose & 95% Cotton
 - * 10 % Viscose & 90% Cotton
 - * 15 % Viscose & 85 % Cotton
- Ecro melange (2%)
- Camel melange (1%, 2%)
- PC (52/48, 60/40, 65/35, 80/20)
- Sewing thread.

➤ Project Cost: 1000 core Taka (Approximately).

➤ Project Area: approx. 82000 sq. ft.

➤ Physical Infrastructure:

Within only a decade, by hyper-growth has been transformed into a futuristic entrepreneurial saga. Its production has branched out into four full fledged factories at three locations – God nail in Narayanganj and Mirpur in suburban Dhaka.

KCL’s God nail premise houses the parent organization and ultra-modern Unit-1, with seven-story building as the main one. A new 10- story building is its subsidiary KC Apparels Ltd. Its other subsidiary, Crescent Star Ltd, is located at Mirpur.

▪ Knit Dyeing Section:

It has two section of knit dyeing floor – KCL (old floor) & KCA (new floor). Each contains around 100 thousands square ft area.

Production capacity: approximately **50 ton/day**

▪ Yarn dyeing section:

AREA: 100 thousands sq. fit. Floor: MULTI-STORED FLOOR (25,000 sq.ft/floor).

Production capacity: 15 Tons/day (Approximately). It has two lifts, two cranes of capacity=10 tons. There is a Bas Bar (have no wire) system to facilitate production.

➤ Different Departments:

Production Oriented Department:

- Yarn store
- Planning & Control
- Batching
- Chemical store
- Winding section
- Dyeing Section
- Finishing Section
- Dyeing lab section
- Wet lab
- Quality Control
- Maintenance
- Utility
- Water treatment plant
- Effluent treatment plant

➤ Supporting department:

- Procurement
- Merchandising
- Marketing
- IT
- HRD
- Finance & accounting
- Medical
- Personnel Administration
- Security

➤ Remarks:

Knit concern management system is consists of very skilled & experienced personnels.

3.2 Manpower Management

➤ Organ gram of man power in Dyeing Section:

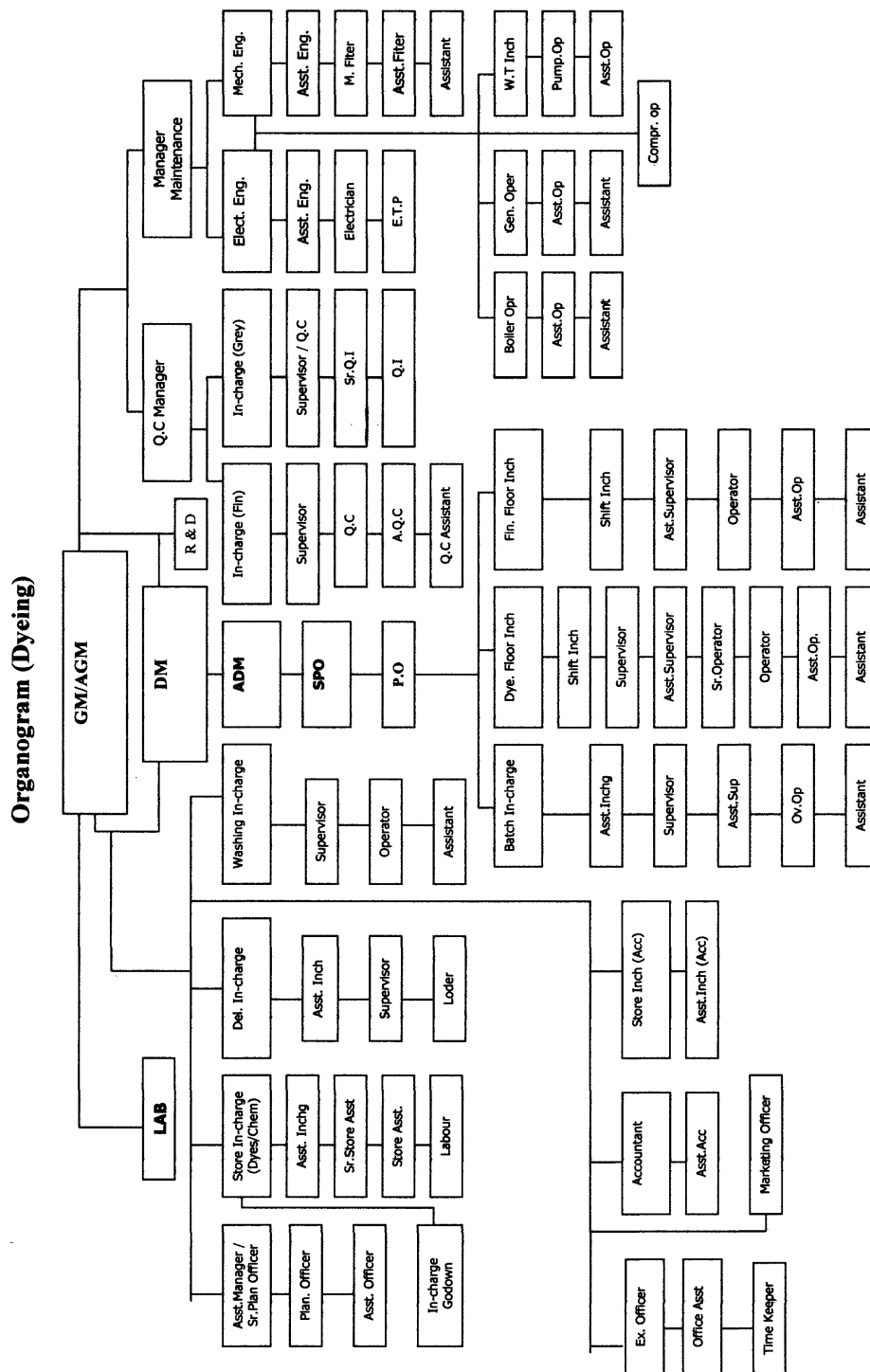


Figure-2: Organogram of management(Knit Dyeing)

➤ **Management system:**

- Buyer sample is send to G.M.
- Matching is done by lab in charge.
- Sample is prepared by asst. dyeing master.
- Sample is send to the buyer for approval.
- Approved sample is returned and taken as standard. Sample for bulk production.
- Asst. dyeing master gives responsibilities to production officer.
- Then production officer, with the supervisors start bulk production.
- On line and off line quality check is done by lab in charge and asst. dyeing master.
- After dyeing finishing in charge controls the finishing process with the supervision of production officer.
- After finishing, the material is checked by asst. dyeing master.
- Finally G.M. checks the result with asst. dyeing master and decision is taken for delivery.

➤ **Shift Change:**

Two shifts (day and night): each of 12 hrs

Day shift → 8:30 a.m. to 8:30 p.m.

Night shift → 8:30 p.m. to 8:30 a.m.

➤ **Responsibilities Of Production Officer:**

1. To give dyeing program slip.
2. To match production sample with target shade.
3. To collect production sample for sample matching next production.
4. To observe dyed fabric during finishing running & also after finishing.
5. To identify disputed fabrics & report to production manager for necessary action.
6. To discuss with production manager about overall production if necessary.
7. To sign the store requisition.
8. Also to execute overall floor works.
9. To maintain loading / unloading Shee

➤ **Manpower List (Dyeing Department)**

No.	Section	Person
01	GM	01
02	DM	01
03	DDM	01
04	SPO	01
05	P.O	08
06	Planning	02
07	Q.C / Q.I	86
08	Maintenance	71
09	Batch	75
10	Dyeing	149
11	Finishing	139
12	Store	26
13	Delivery	29
14	Washing	26
15	Accounts	03
16	Marketing	02
17	Store (Acc)	02
18	Ex.Of./Time	04
19	Pion	04
	Total	650

➤ **Description Of Work Of A Production Officer:**

Report to: Sr. production officer

Job Summary: To plan, execute & follow up the production activities & control the quality.

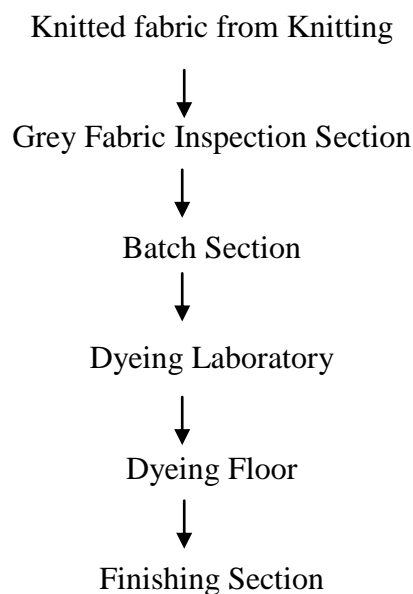
➤ **Duties & Responsibilities:**

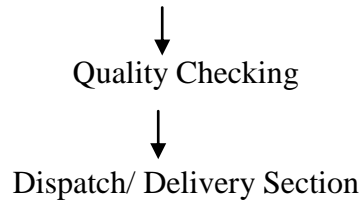
- Overall supervision of dyeing, finishing production.
- Batch preparation & pH check.
- Dyes & chemical requisition issue & check.
- Write fabrics loading & unloading time from m/c.
- Program making, sample checking, color measurement.
- Control the supervisors, operators' asst. operator & helpers of dyeing m/c.
- And also any other work as & when required by the management.

➤ **Remarks :**

In this dyeing plant all the P.O ,S.P.O & D.M are technical person . Thus why efficiency of this section is very high .

3.3 Different Sections:





➤ **Supporting sections:**

- Planning
- Chemical store
- Utilities Sections – water, power, boiler, compressor, waste water management system.
- Maintenance Section

➤ **Overview of knitting section:**

- Total no. of knitting m/c –
- Types of m/c – Single jersey, double jersey, Fleece m/c, Auto-stripper m/c etc.
- Types of Fabric Produced –
 - Single jersey
 - Single jersey with lycra
 - Interlock
 - Fleece
 - Single Lacoste
 - Double Lacoste
 - Pique
 - Rib with & without Lycra
 - 1x1, 2x2, 2x1, 9x1, 9x2, 7x5 Rib
- Cotton Yarn count frequently used – 20, 24, 26, 28, 30, 34, 40, 42, 48 etc. & for special organic fabric 50 count yarn is used.
- Production Capacity – 30 ton/day.

➤ **Sample of frequently produced knit-fabrics:**

Single jersey	
---------------	--

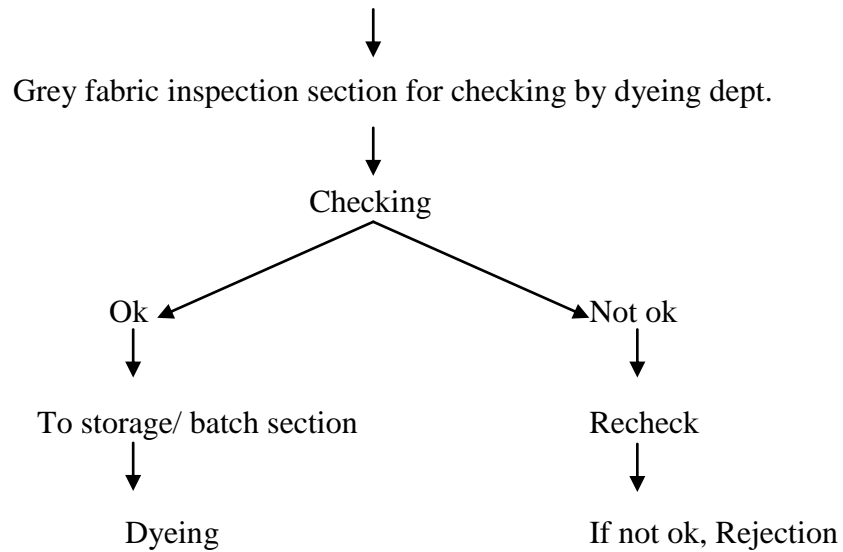
2x2 rib	
S/J- lycra	
S/J slub	
Terry fleece	
Waffle	

1x1 rib	
Interlock	
Single lacoste	

➤ **Inspection of Grey Fabric from knitting section to Dyeing:**

- Objective: - to find-out any kinds of faults in the grey fabric before dyeing operation, by thorough checking up.
- To ensure maximum quality assurance by double checking.

- Checking flow-chart – Knitted fabric (checked in knitting section)



➤ **Checking Standard:**

Varies depending on buyers' requirements.

For H&M – 4 point system is followed.

For others – 10 point system is followed.

➤ **Frequently found faults:**

1. Loop
2. Hole.
3. Set-up.
4. Needle broken
5. Yarn-out
6. Patty
7. Patta
8. Contamination
9. Lycra-out
10. Sinker-mark
11. Star-mark
12. Wheel-mark
13. Oil-mark
14. Groove-mark
15. Needle-mark
16. Thick-Thin stripe
17. Wavy Stripe

➤ **Inspection Machine Specification:**

- UZU machine for garment
- Width: 69 & 100 inch
- No of m/c: large – 3 small – 6
- Power supply required: 200 volt 50/60 Hz
- Motor- 1 hp.

- Efficiency – 75%
- Brand Name :UZU
Model: HC-TIM -1500 mm
Country Of Origin : Thailand
No of motor: 02
Motor: 210 HP
Power : 220 V

➤ **Inspected Fabric Storage Section:**

- Two storied storage sections with racks of multistoried rails.
- Total capacity – approx. 250 tons
- Storage fabrics are sorted and separated under following parameters----

1. Buyer
2. Order no
3. Color
4. Count
5. Brand
6. Yarn lot
7. Fabric Dia & GSM.

Batch Section:

- **Batching:** Batching means separation of fabric according to specification, Dyeing machine capacity & availability, urgency of the order.

- Two types of Batching: 1. Solid 2. Assorted

- Batch contains body of garments as well as collar-cuffs according to the design.

➤ Batch Quantity =
$$\frac{\text{Total required quantity} \times \text{Dia Quantity}}{\text{Total quantity}}$$

➤ Batch Ratio =
$$\frac{\text{Total batch quantity} + \text{total parts}}{\text{Batch Quantity}}$$

- Batch distribution:- Batch is distributed according to nozzle capacity.
- During distribution maximum equilibrium of different parts is taken into consideration.
 - Lycra fabrics are slit-cut to heat-set. That's why before dyeing they need to re-sewn. This is done by 'Bag-sewing' machine.
 - Tubular fabrics are turned into there backside by turning machine.

➤ **List of machines in Batch Section:**

Batch Section	Bag sewing m/c Manufacture: MTG MECCANICA SNC Country Of Origin : Italy	03
	Turning m/c Brand Name: HSING CHENG Model: HC-TFM-1500 mm Country Of Origin : Thailand No of motor: 02 Motor: 210 HP Power: 220 V Year of Manufacture : 2005	02
	Plaiting m/c	02

➤ **Planning Section:**

➤ **Objectives:** To follow-up total lead-time of any order & maintain schedule. After getting every order all planning required from yarn to dyeing is done by planning section.

➤ **Activities:**

- Order for yarn.
- Give time limit to knitting.
- Machine & nozzle distribution after getting the fabrics fro knitting.
- Light shades are generally planned to do first.
- In case of critical color small batch is planned first.
- No. of batch is kept as minimum as possible.

➤ **Central Laboratory:**

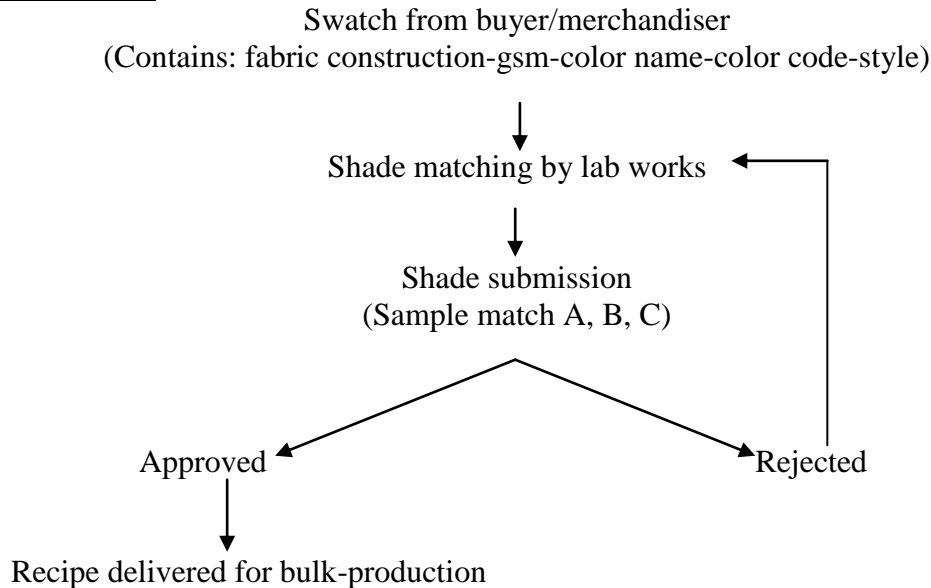
Knit concern has a 'Central Lab' including three major sections – Knit-Dyeing lab, Yarn-Dyeing lab & Physical Lab.

➤ **Main Responsibility:**

- Accepting the 'Swatch' from the buyer and analyze the color & Dyes.
- Preparing the Recipe accurately matching the required color.
- Storing & maintain the dyes to be used for dyeing.
- Producing self-shades & storing it into the computer.
- Record & analysis of chemicals & dyes quality.
- Making plans for bulk dyeing.

- Following the color coding system given by the distinctive buyer & also prepare own color bank.
- Testing the dyed goods.

➤ **Flow of work:**



➤ **Shade matching system:**

▪ **Spectrophotometer**

Spectrophotometers designed specifically for the measurement of coloured materials, are at centre of any modern colour formulation, colour production, or colour quality control system. Although these colour spectrophotometers are designed measure samples both accurately & repeatedly, they accomplish these measurements only within a range of applicable tolerances. Spectrophotometers are not perfect measuring devices, & how well they measure often depend on factors under control of system operator. The objective is how to better operate and control colour spectrophotometers, so that their measurements are as accurate & repeatable as possible. These tips are intended for those attempting to get the best possible measurement performance from their colour measuring spectrophotometer

The Datacolor high performance bench top spectrophotometers (Datacolor 650™, Datacolor 600™, Datacolor 400™) are the newest generation of bench top color measuring instruments, incorporating state-of-the-art CMOS integrated circuit technology in the instrument design. All are intended for use as a device for measuring, specifying and evaluating color in both laboratory and production settings.



Figure-3: Spectrophotometer

This high-precision, close-tolerance, reference grade spectrophotometer has special capabilities to handle fluorescent materials.

- ❖ Automated zoom lens and specular port
- ❖ Exceptional inter-instrument agreement
- ❖ Automated UV control
- ❖ Multiple viewing apertures with automatic aperture recognition
- ❖ Automatic gloss compensation

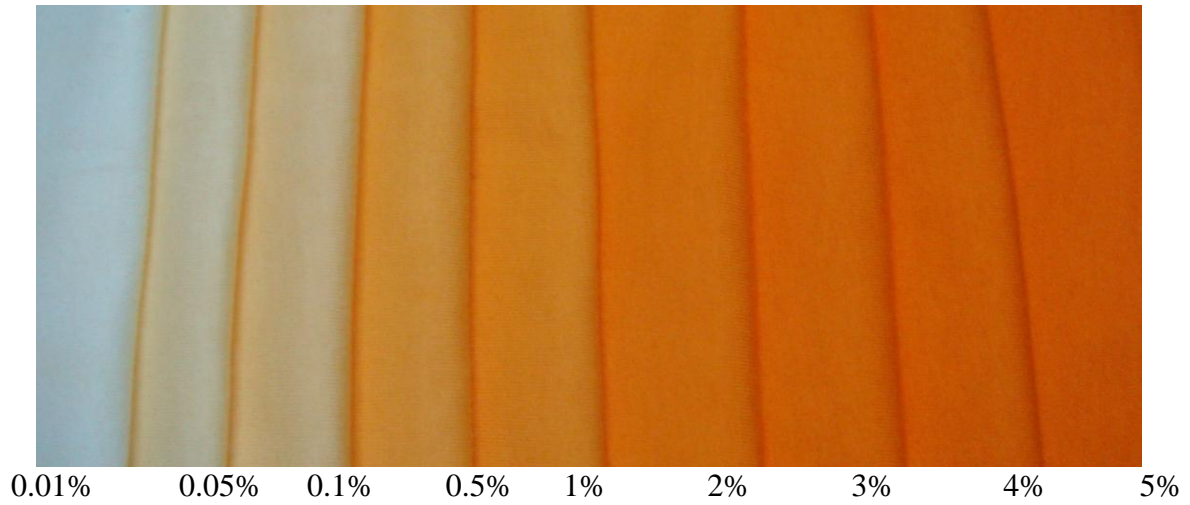
▪ **Pantone book**



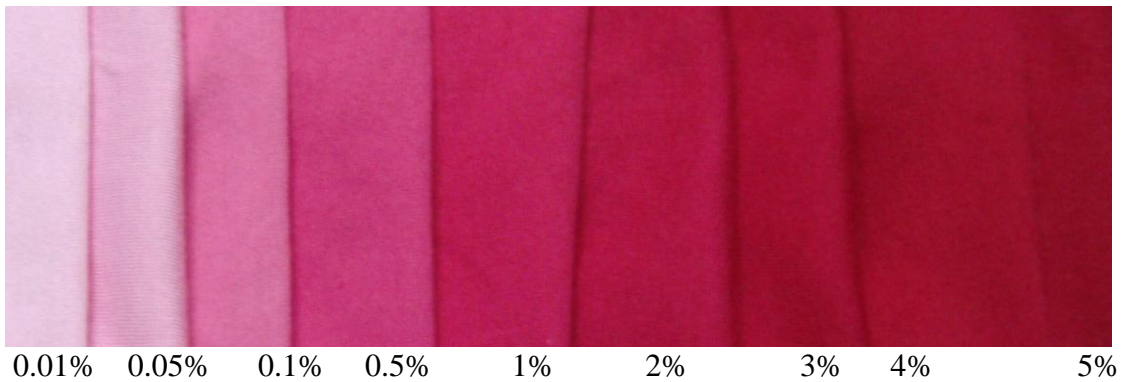
- Buyer's Swatch: may be piece of fabric or C.I. number of any specified '**Pantone book**'.
- There are 4 types of pantone book is available:
 1. TP ----- textile paper
 2. TC ----- textile cotton
 3. TPX --- textile paper for bright
 4. TCX --- textile cotton for bright
- The given swatch is measured by the 'Spectrophotometer', which is prepared by reach memory of different dyestuff self-shades.
- Also the matching may be done by previous working record.

➤ **Some self-shade samples:**

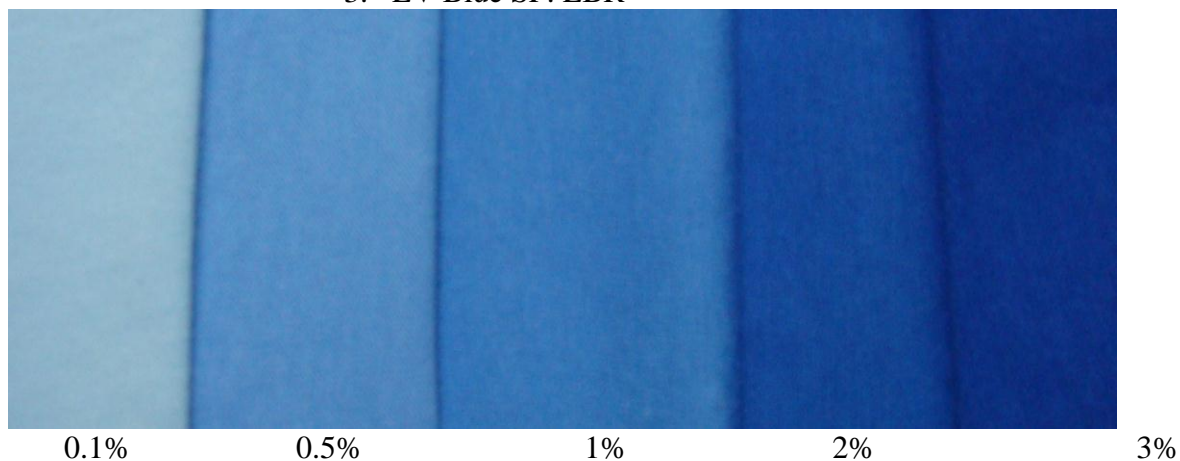
1. Dyechufix Yellow HS-3R :



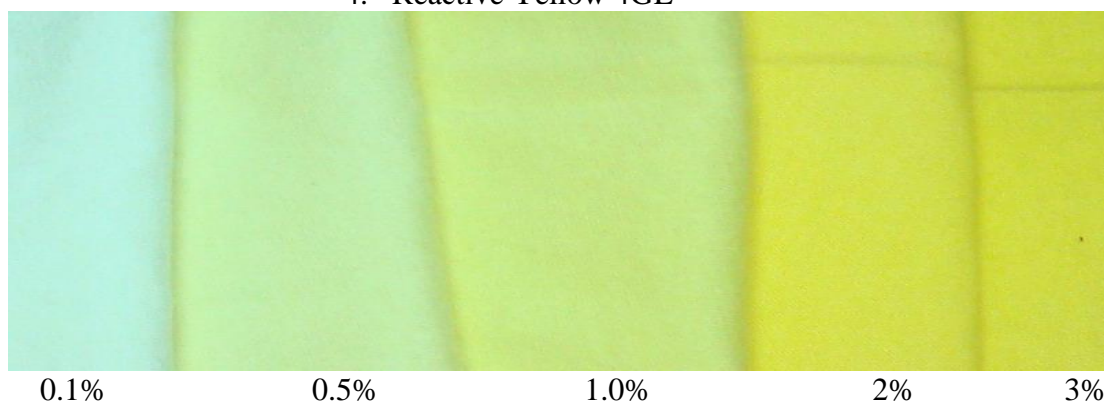
2. Amron Red HR2D



3. EV Blue SP. EBR



4. Reactive Yellow 4GL



➤ List of machine:

Auto lab Dispenser & Solution maker	01
Ahiba Naunce-(Sample Dyeing m/c)	01
Sandolab sample d/m	04
Lab Extractor	01
Dryer	01
Data color Spectrophotometer SF 600 Plus CT	01
Incubator (Oven)	01

➤ **Lay out of Knit-Dyeing Lab:**

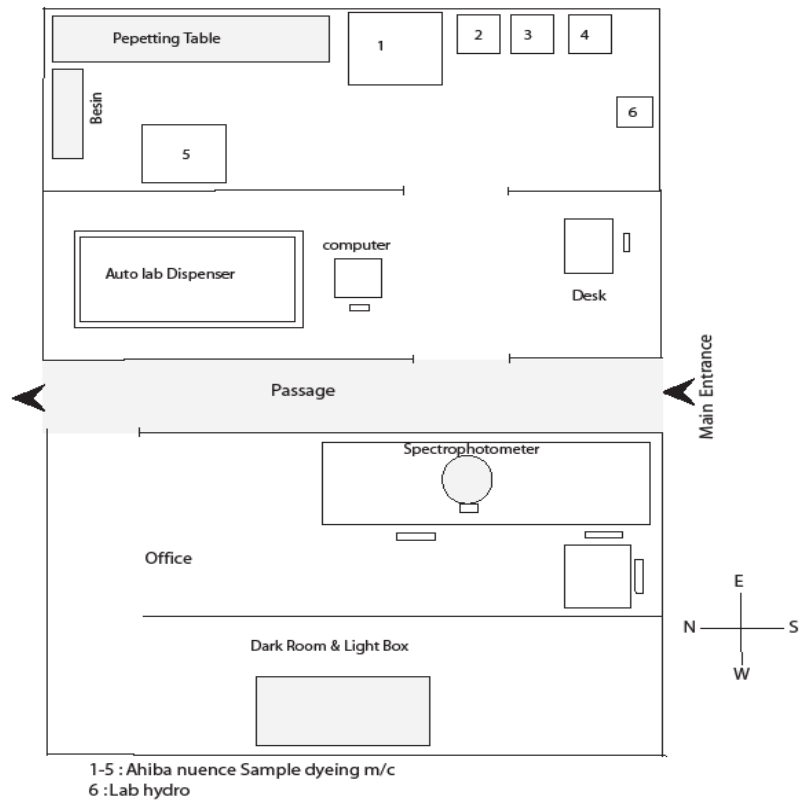


Figure-4:Layout of knit dyeing lab

➤ **Lab Dyeing Machine:**

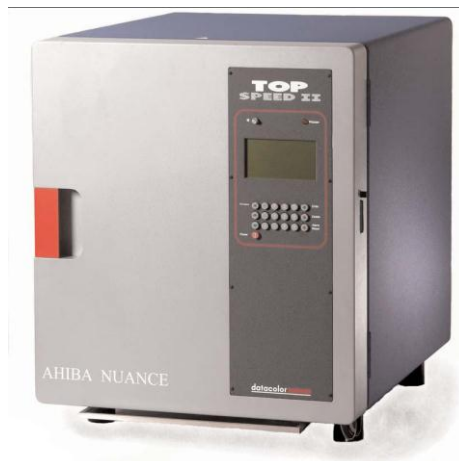


Figure-5: Lab dyeing machine

Feature

- Easy to operate multi-step controller with alpha-numeric program names
- Advanced microprocessor technology controls the heating and cooling system

- Dyeing parameters are constantly monitored during every step of the dyeing process and displayed on the large graphical display
- Memory cards store an unlimited number of processes
- Increased power output ensures reproducible level dyeing
- Suitable for all substrate.

3.4 Description of Dyeing Machines & Mechanism of working

Dyeing Floor:

Knit concern Dyeing floor consists of two separate floors – KCL & KCA.

The Dyeing Machines are all **Winch dyeing m/c** of both atmospheric & high temperature types.

➤ No. of Machines:

<u>Type</u>	<u>capacity</u>	<u>no. of m/c</u>
Sample dyeing machine –	10 kg	3
	20 kg	4
	30 kg	7
	60 kg	3
	100 kg	2
Bulk dyeing machine -	150 kg	5
	200 kg	2
	250 kg	3
	300 kg	2
	400 kg	4
	500 kg	2
	600 kg	2
	750 kg	3
	800 kg	3
	1000 kg	2
	1200 kg	1
	1500 kg	2
2200 kg	1	

In KCL there are mainly two types of dyeing machine - - -

5. Atmospheric machine: these runs in atmospheric pressure.
6. High temperature & High Pressure (HTHP)

➤ Lay out plan of Dyeing sections:

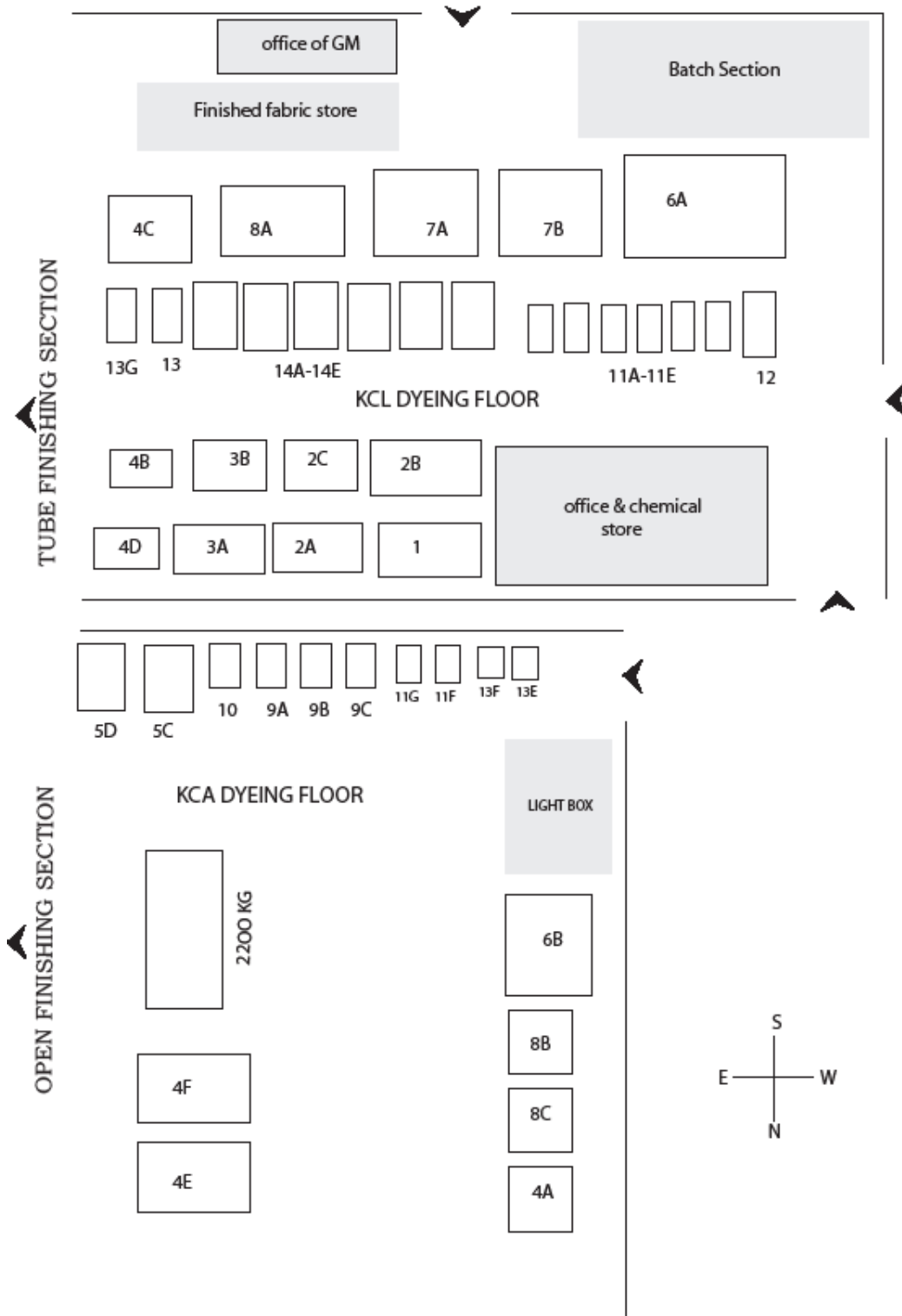


Figure-6: Lay out of dyeing section

➤ **Details of Dyeing Machines in KCL**

➤ **Specification of dyeing machines:**



Figure-7: Fong's HTHP (Jumbo flow) winch dyeing m/c

Sample Machine	Bulk Machine
<p>Machine No: 09 Brand Name: FONGS Model: ALLFIT -6O Serial No: 28015417 Country Of Origin: Honkong Machine Type :HP/HT Machine Capacity: 6O Kg Cycle time: 03 min No of cycle : 12 Main pump speed: 80-150 m/min Winch speed: 250 m/min No of Nozzle: 02 No of motor: 08 Power: 415 V 3 @ 50 Hz Water supply pressure req. : 300 Kpa Compressed Air pressure required : 700 Kpa Steam pressure required : 700 Kpa Design temp. : 140 ° C Year Built : 2003</p>	<p>Machine No: 01 Brand Name: FONGS Model: GN 6-SR -6T Serial No :26012102 Country Of Origin : Honkong Machine Type: HP/HT Machine Capacity: 1200 Kg Cycle time: 03 min No of cycle : 12 Main pump speed: 80-150 m/min Winch speed: 250 m/min No of Nozzle: O6 No of motor: 08 Power: 415 V 3 @ 50 Hz Water supply pressure req. : 300 Kpa Compressed Air pressure required: 700 Kpa Steam pressure required : 700 Kpa Design temp. : 140 ° C Year Built : 2002</p>
<p>Machine No: 10 Brand Name: FONGS Model: ALLFIT -6O Serial No : 26012103 Country Of Origin : Honkong Machine Type :HP/HT Machine Capacity: 100 Kg</p>	<p>Machine No: 2A Brand Name: FONGS Model: GN 6-SR -4T Serial No :26012101 Country Of Origin : Honkong Machine Type: HP/HT Machine Capacity: 800 Kg</p>

Cycle time: 03 min
No of cycle : 12
Main pump speed: 80-150 m/min
Winch speed: 250 m/min
No of Nozzle: 02 N
o of motor: 08
Power: 415 V 3 @ 50 Hz
Water supply pressure req. : 300 Kpa
Compressed Air pressure required: 700 Kpa
Steam pressure required : 700 Kpa
Design temp. : 140 ° C
Year Built : 2001

Machine No: 11 A

Brand Name: FONGS
Model: ALLFIT -30
Serial No :26011959
Country Of Origin: CHINA
Machine Type :HP/HT
Machine Capacity :30 Kg
Cycle time: 03 min
No of cycle : 12
Main pump speed :80-150 m/min
Winch speed: 250 m/min
No of Nozzle : 01
No of motor: 08
Power: 415 V 3 @ 50 Hz
Water supply pressure req. : 300 Kpa
Compressed Air pressure required: 700 Kpa
Steam pressure required : 700 Kpa
Design temp. : 140 ° C
Year Built : 2001

Machine No: 11 B

Brand Name: FONGS
Model: ALLFIT -30
Serial No :29017180
Country Of Origin : Honkong
Machine Type :HP/HT
Machine Capacity :30 Kg
Cycle time: 03 min
No of cycle : 12
Main pump speed: 80-150 m/min
Winch speed: 250 m/min
No of Nozzle: 01
No of motor: 08
Power: 415 V 3 C 50 Hz
Water supply pressure req. : 300 Kpa
Compressed Air pressure required: 700 Kpa

Cycle time: 03 min
No of cycle : 12
Main pump speed: 80-150 m/min
Winch speed: 250 m/min
No of Nozzle: 04
No of motor: 08
Power: 415 V 3 @ 50 Hz
Water supply pressure req. : 300 Kpa
Compressed Air pressure required: 700 Kpa
Steam pressure required : 700 Kpa
Design temp. : 140 ° C
Year Built : 2002

Machine No: 2B

Brand Name: FONGS
Model : GN-18 M-4 T
Serial No :2G011473
Country Of Origin : Honkong
Machine Type :Environmental
Machine Capacity :800 Kg
Cycle time : 03 min
No of cycle 12
Main pump speed :80-150 m/min
Winch speed :250 m/min
No of Nozzle: 04
No of motor: 08
Power: 415 V 3 @ 50 Hz
Water supply pressure req. : 300 Kpa
Compressed Air pressure required: 700 Kpa
Steam pressure required : 700 Kpa
Design temp. : 140 ° C
Year Built : 2001

Machine No: 2C

Brand Name: FONGS
Model: GN-18 M-4 T
Serial No :24010297
Country Of Origin : Honkong
Machine Type :Environmental
Machine Capacity :800 Kg
Cycle time: 03 min
No of cycle : 12
Main pump speed :80-150 m/min
Winch speed :250 m/min
No of Nozzle: 04 No of motor: 08
Power: 415 V 3 @ 50 Hz
Water supply pressure req. : 300 Kpa
Compressed Air pressure required: 700 Kpa
Steam pressure required : 700 Kpa

Steam pressure required: 700 Kpa
Design temp. : 140 ° C
Year Built : 2004

Machine No: 11 C

Brand Name: FONGS
Model: ALLFIT -30
Serial No :29017183
Country Of Origin : Honkong
Machine Type :HP/HT
Machine Capacity :30 Kg Cycle time: 03 min
No of cycle : 12
Main pump speed: 80-150 m/min
Winch speed: 250 m/min
No of Nozzle: 01
No of motor: 08
Power: 415 V 3 @ 50 Hz
Water supply pressure req. : 300 Kpa
Compressed Air pressure required: 700 Kpa
Steam pressure required : 700 Kpa
Design temp. : 140 ° C
Year Built : 2004

Machine No: 11 D

Brand Name: FONGS
Model: ALLFIT -30
Serial No :29017182
Country Of Origin : Honkong
Machine Type :HP/HT
Machine Capacity :30 Kg
Cycle time: 03 min
No of cycle : 12
Main pump speed :80-150 m/min
Winch speed: 250 m/min
No of Nozzle: 0 1
No of motor: 08
Power: 415 V 3 @ 50 Hz
Water supply pressure req. : 300 Kpa
Compressed Air pressure required: 700 Kpa
Steam pressure required : 700 Kpa
Design temp. : 140 ° C
Year Built: 2004

Machine No: 11 E

Brand Name: FONGS
Model: ALLFIT -30
Serial No :29017181
Country Of Origin : Honkong
Machine Type :HP/HT

Design temp. : 140 ° C
Year Built : 2000

Machine No: 3A

Brand Name: FONGS
Model: GN-6 SR-3T
Serial No :26012100
Country Of Origin : Honkong
Machine Type: HP/HT Machine
Capacity: 800 Kg
Cycle time: 03 min
No of cycle : 12
Main pump speed: 80-150 m/min
Winch speed :250 m/min
No of Nozzle: 03
No of motor: 08
Power: 415 V 3 @ 50 Hz
Water supply pressure req. : 300 Kpa
Compressed Air pressure required : 700 Kpa
Steam pressure required: 700 Kpa
Design temp. : 140 ° C
Year Built : 2002

Machine No: 3B

Brand Name: FONGS
Model: GN-18 M-3T
Serial No :24010325
Country Of Origin : Hong kong
Machine Type :Environmental
Machine Capacity :600 Kg
Cycle time: 03 min
No of cycle : 12
Main pump speed :80-150 m/min
Winch speed :250 m/min
No of Nozzle : 01
No of motor: 08
Power: 415 V 3 @ 50 Hz
Water supply pressure req. : 300 Kpa
Compressed Air pressure required : 700 Kpa
Steam pressure required : 700 Kpa
Design temp. : 140 ° C
Year Built : 2000

Machine No: 4A

Brand Name: FONGS
Model: GN-6-2T
Serial No :23009446
Country Of Origin : Honkong
Machine Type :HP/HT

Machine Capacity :30 Kg
Cycle time: 03 min
No of cycle : 12
Main pump speed :80-150 m/min
Winch speed :250 m/min
No of Nozzle : 01
No of motor: 08
Power: 415 V 3 @ 50 Hz
Water supply pressure req. : 300 Kpa
Compressed Air pressure required: 700 Kpa
Steam pressure required : 700 Kpa
Design temp. : 140 ° C
Year Built : 2004

Machine No: 12

Brand Name: FONGS
Model: GN-18
Serial No :24010324
Country Of Origin: CHINA
Machine Type :Environmental
Machine Capacity: 100 Kg
Cycle time: 03 min
No of cycle : 12
Main pump speed :80-150 m/min
Winch speed :250 m/min
No of Nozzle: 0 1
No of motor: 08
Power: 415 V 3 @ 50 Hz
Water supply pressure req. : 300 Kpa
Compressed Air pressure required: 700 Kpa
Steam pressure required : 700 Kpa
Design temp. : 140 ° C
Year Built : 2000

Machine No: 13

Sample Dyeing m/c:
Brand: Ugoloni
Origin : Italy
Capacity: 20 Kg.

Machine No: 08

Brand Name: FONGS
Model: ECO-38-3T
Serial No :28015422
Country Of Origin : Honkong
Machine Type: Environmental Machine
Capacity: 750Kg
Cycle time: 03 min
No of cycle: 12

Machine Capacity :400 Kg
Cycle time: 03 min
No of cycle : 12
Main pump speed :80-150 m/min
Winch speed :250 m/min
No of Nozzle: 02
No of motor: 08
Power: 415 V 3 @ 50 Hz
Water supply pressure req. : 300 Kpa
Compressed Air pressure required: 700 Kpa
Steam pressure required : 700 Kpa
Design temp. : 140 ° C
Year Built : 1998

Machine No: 4B

Brand Name: FONGS
Model: GN-18 M-2T
Serial No :23009199
Country Of Origin : Honkong
Machine Type :Environmental
Machine Capacity :400 Kg
Cycle time: 03 min
No of cycle : 12
Main pump speed :80-150 m/min
Winch speed :250 m/min
No of Nozzle : 01
No of motor: 08
Power: 415 V 3 @ 50 Hz
Water supply pressure req. : 300 Kpa
Compressed Air pressure required : 700 Kpa
Steam pressure required : 700 Kpa
Design temp. : 140 ° C
Year Built : 1998

Machine No: 4C

Brand Name: FONGS
Model: GN-18-2T
Serial No :23009200
Country Of Origin : Honkong
Machine Type: Environmental Machine
Capacity: 400Kg
Cycle time: 03 min
No of cycle : 12
Main pump speed: 80-150 m/min
Winch speed: 250 m/min
No of Nozzle: 02
No of motor: 08

Main pump speed: 80-150 m/min
Winch speed: 250 m/min
No of Nozzle : 02
No of motor: 08
Power: 415 V 3 @ 50 H

Machine No: 7A

Brand Name: FONGS
Model: ECO-38-4T
Serial No :28015424
Country Of Origin : Honkong
Machine Type: Environmental Machine
Capacity: 1000Kg
Cycle time: 03 min
No of cycle: 12
Main pump speed: 80-150 m/min
Winch speed: 250 m/min
No of Nozzle: 02
No of motor: 08
Power: 415 V 3 @ 50 Hz
Water supply pressure req. : 300 Kpa
Compressed Air pressure required : 700 Kpa
Steam pressure required : 700 Kpa
Design temp. : 140 ° C
Year Built : 2003

Machine No: 7B

Brand Name: FONGS
Model: ECO-38-4T
Serial No :28015423
Country Of Origin : Honkong
Machine Type: Environmental Machine
Capacity: 1000Kg
Cycle time: 03 min
No of cycle : 12
Main pump speed: 80-150 m/min
Winch speed: 250 m/min
No of Nozzle: 02
No of motor: 08
Power: 415 V 3 @ 50 Hz
Water supply pressure req. : 300 Kpa
Compressed Air pressure required: 700 Kpa
Steam pressure required : 700 Kpa
Design temp. : 140 ° C
Year Built : 2003

Machine No: 6A

Brand Name: FONGS
Model: ECO-38-6T

Power: 415 V 3 @ 50 Hz
Water supply pressure req. : 300 Kpa
Compressed Air pressure required: 700 Kpa
Steam pressure required : 700 Kpa
Design temp. : 140 ° C
Year Built : 1998

Machine No: 4D

Brand Name: FONGS
Model: ECO-6-2T
Serial No :28015334
Country Of Origin : Honkong
Machine Type: HP/HT
Machine Capacity: 400 Kg
Cycle time: 03 min
No of cycle : 12
Main pump speed: 80-150 m/min
Winch speed: 250 m/min
No of Nozzle: 02
No of motor: 08
Power: 415 V 3 @ 50 Hz
Water supply pressure req. : 300 Kpa
Compressed Air pressure required: 700 Kpa
Steam pressure required : 700 Kpa
Design temp. : 140 ° C
Year Built: 2003

Machine No: 5A

Brand Name: FONGS
Model: GN-6-1T
Serial No :23009447
Country Of Origin : Honkong
Machine Type :HP/HT
Machine Capacity :200 Kg
Cycle time: 03 min
No of cycle: 12
Main pump speed :80-150 m/min
Winch speed :250 m/min
No of Nozzle: 01
No of motor: 08
Power: 415 V 3 @ 50 Hz
Water supply pressure req. : 300 Kpa
Compressed Air pressure required: 700 Kpa
Steam pressure required: 700 Kpa
Design temp. : 140 ° C
Year Built: 1998

Serial No :28014582
Country Of Origin : Honkong
Machine Type: Environmental Machine
Capacity: 1500Kg
Cycle time: 03 min
No of cycle: 12
Main pump speed :80-150 m/min
Winch speed: 250 m/min
No of Nozzle: 02
No of motor: 08
Power: 415 V 3 @ 50 Hz
Water supply pressure req. : 300 Kpa
Compressed Air pressure required: 700 Kpa
Steam pressure required : 700 Kpa
Design temp. : 140 ° C
Year Built: 2003

Machine No: 6B

Brand Name: FONGS
Model: ECO-38-6T
Serial No :28014581
Country Of Origin : Honkong
Machine Type: Environmental Machine
Capacity: 1500 Kg
Cycle time: 03 min
No of cycle : 12
Main pump speed: 80-150 m/min
Winch speed: 250 m/min
No of Nozzle: 06
No of motor: 08
Power: 415 V 3 @ 50 Hz
Water supply pressure req. : 300 Kpa
Compressed Air pressure required : 700 Kpa
Steam pressure required : 700 Kpa
Design temp. : 140 ° C
Year Built : 2003

Machine No: 5B

Brand Name: FONGS
Model: GN-18 M-4 T
Serial No :26011472
Country Of Origin : Honkong
Machine Type :HP/HT
Machine Capacity :200 Kg
Cycle time: 03 min
No of cycle : 12
Main pump speed :80-150 m/min
Winch speed :250 m/min
No of Nozzle: 0 1
No of motor: 08
Power: 415 V 3 @ 50 Hz
Water supply pressure req. : 300 Kpa
Compressed Air pressure required: 700 Kpa
Steam pressure required: 700 Kpa
Design temp.: 140 ° C
Year Built: 1998

➤ **Main Parts of Dyeing Machine:**

1. Main Vessel or Chamber
2. Winch roller or Reel
3. Heat Exchanger
4. Nozzle
5. Reserve Tank
6. Chemical dosing tank
7. Utility lines i.e. water line, drain line, steam inlet etc.
8. Controlling unit or Processor
9. Fabric Plaiter
10. Different types of motors & Valves

➤ **Working Principle of Winch dyeing machine:**

Winch Dyeing machines are most suitable for knit fabric dyeing. Here fabric is dyed in tubular form where fabric runs in endless circular path. Inside the m/c the upper part of the fabric runs through a nozzle & the lower part is immersed into liquor, in the nozzle the liquor is sprayed onto the fabric. The fabric and liquor both circulate by a high pressure pump.

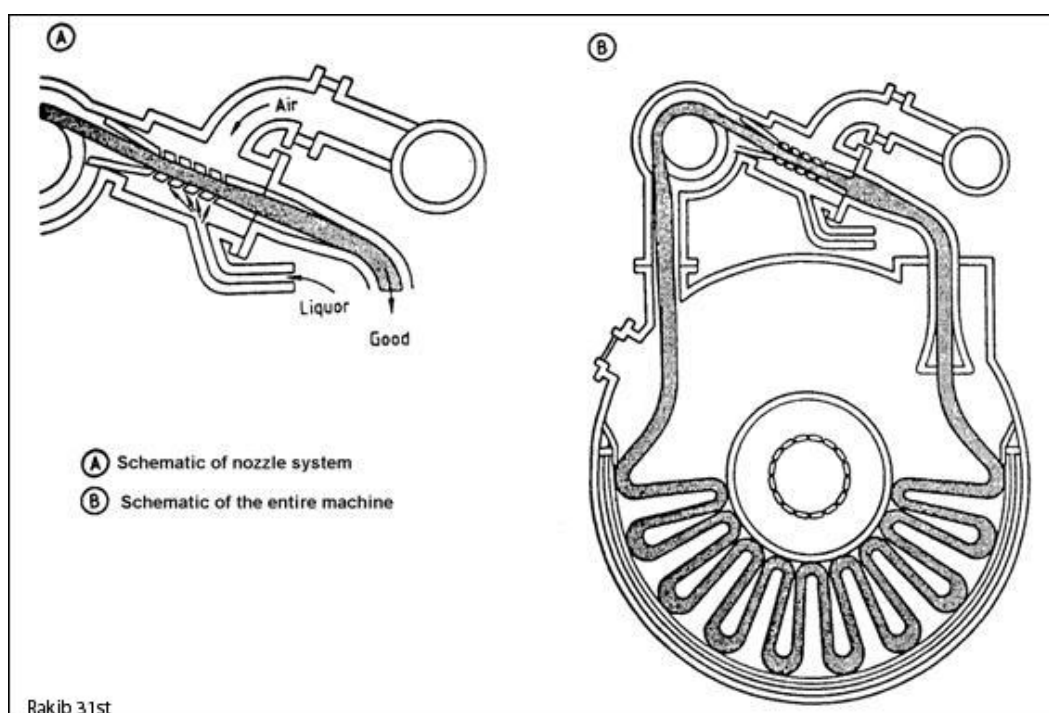


Fig-8: cross-sectional diagram showing fabric path & nozzle in the high pressure winch d/m

The main pump draws the liquor from the bottom of the vessel & passed this liquor through the heat exchanger to the top of vessel into the Nozzle. The winch roller or the reel also helps running the fabric smoothly. The liquor gets heated or cooled by exchanging temperature in the heat-exchanger.

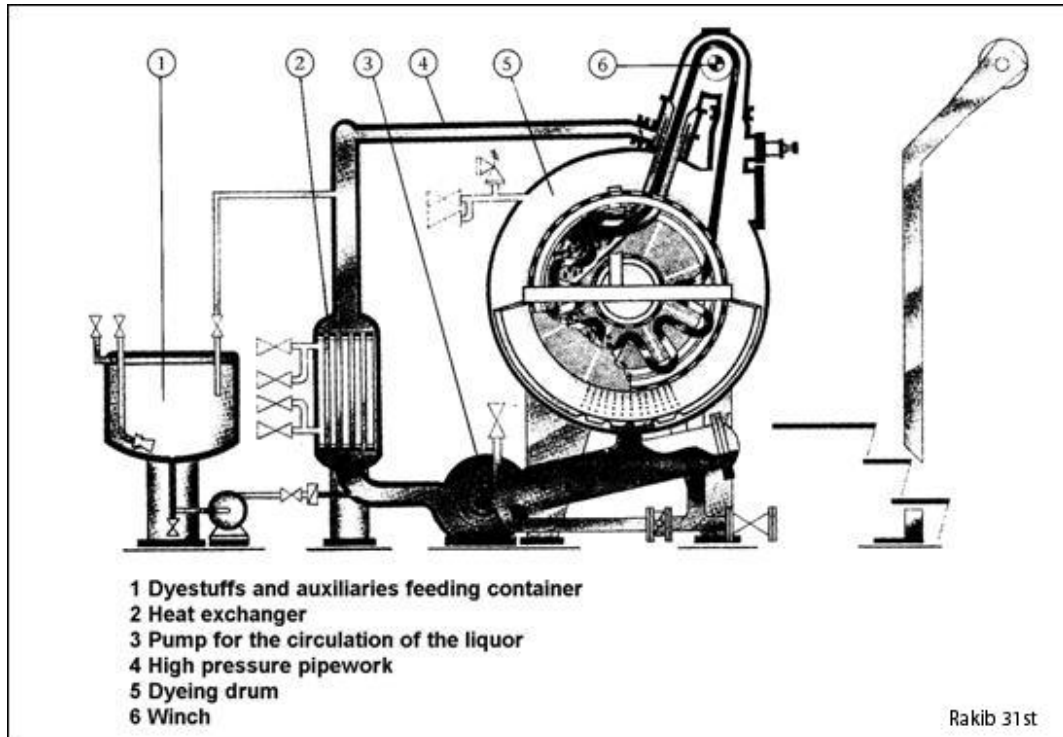


Fig-9: schematic diagram of the circulation system of liquor in a dyeing machine

➤ **General Parameters of Dyeing machines:**

- Capacity per nozzle: theoretically 250 kg but practically not more than 200 kg should be used.
- Nozzle pressure: 4-6 psi
- Steam pressure: 7 bar (inlet of heat exchanger)
- Cold water temp. & pressure: 25 c & 3 bar
- Maximum temp.: 140 for high temp. M/c 100 for atmospheric
- Reel/Winch speed: 150-250 rpm
- Main motor efficiency: 80-85%

3.4 Finishing Section & Machineries

Textile finishing, in a restricted sense, is the term used for a series of processes to which all bleached, dyed, printed & certain greige fabrics are subjected before they are put to market. It's one of the most important operation in knit processing.

➤ **Objectives of Finishing:**

- Improving the appearance,luster, whiteness etc.
- Improving the feel, which depends on the handle of the material & its softness, suppleness, fullness etc.
- Wearing qualities, non- soiling, antcrease, antishrink comfort etc .
- Special properties required for particular uses -water -proofing flame proofing etc .
- Covering of the faults in the original cloth .
- Increasing the weight of the cloth .

➤ **Effects of Finishing:**

- Easy care .
- Crease recovery.
- Dimensional stability
- Good abrasion resistance
- Improved tear strength
- Good sew ability
- Soft or stiff handle
- Shine or luster

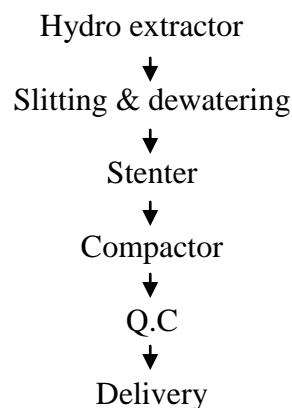
Knit fabrics require finishing process after dyeing. During dyeing all knit fabrics are dyed in tubular form. According to buyers requirement dyed fabrics are finished in either Tubular form or Open-width form.

Depending on which Finishing sections are separated into two sections – OPEN & TUBE section.

3.5.1 Open-finish Section:

Those fabrics which are to be cut in open form in garment section as per buyer requirement are finished in open form in this section.

The flow of process is as follows-



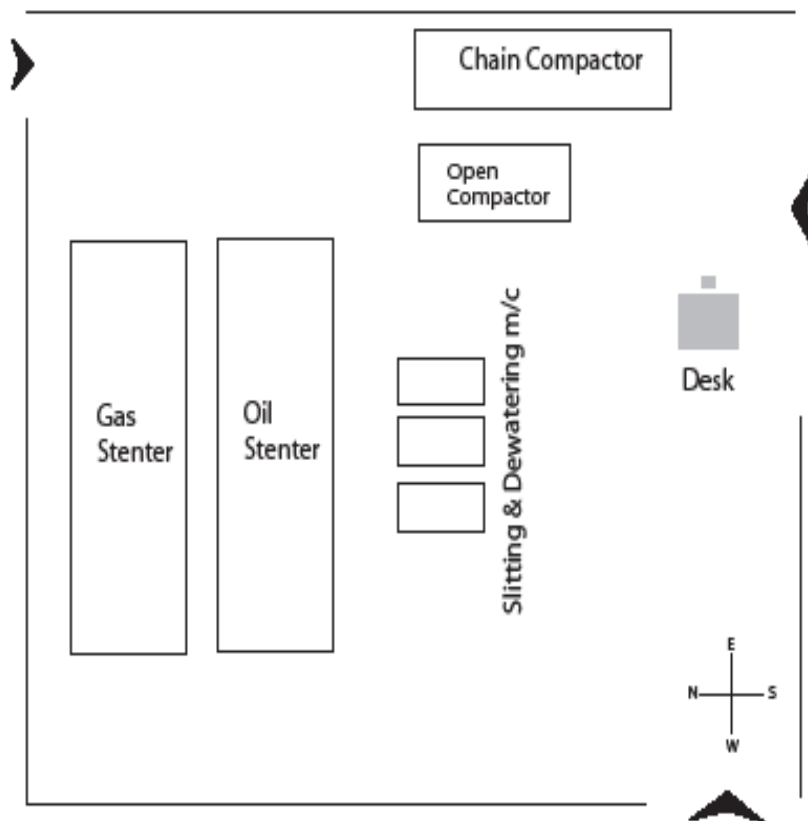
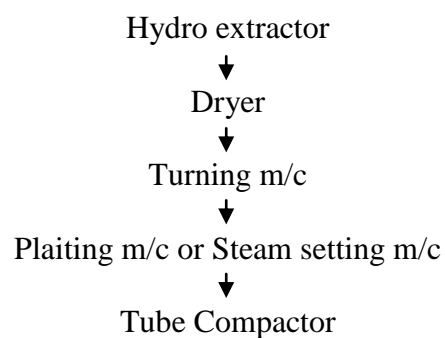


Figure-10: Layout of Open-Finish Section

3.5.2 Tubular Fabric Finish Section:

Tubular fabrics are generally used for Ladies wear & Baby dress. In KCL huge orders of tubular product are manufactured.

The Machines or Finishing Sequence for Tube-Finishing are as following –



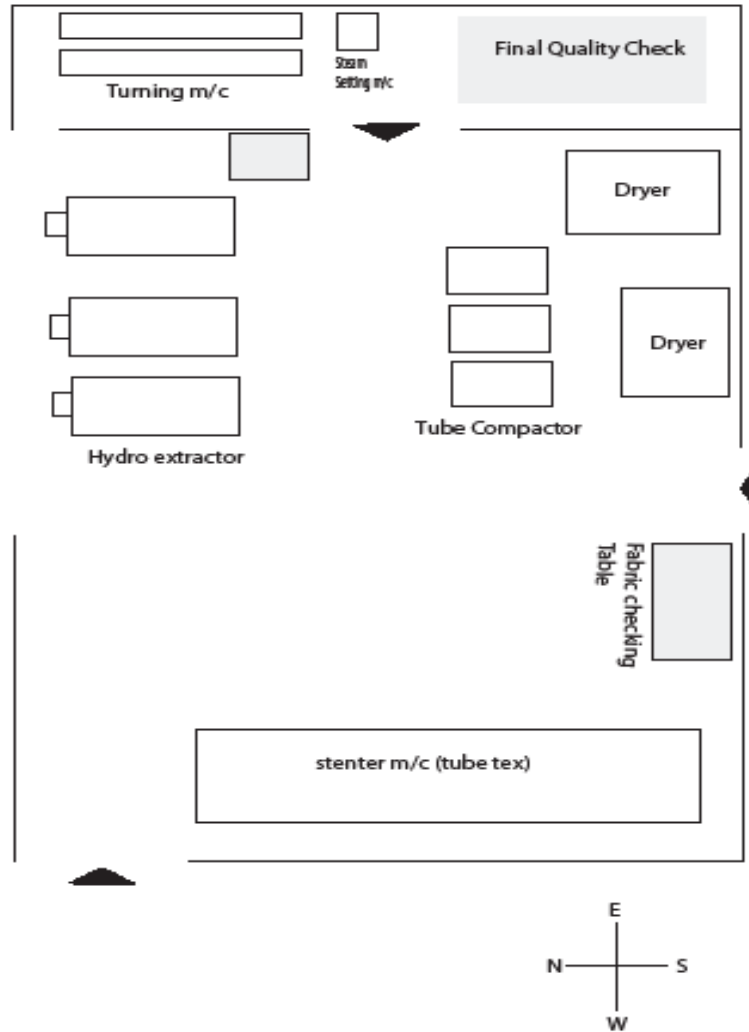


Figure-11: Layout of Tube-Finish Section

➤ **Description of Different Finishing Machines:**

➤ **Hydro-extractor-padder:**

Manufacturer : SANTEX, SWITZERLAND
 No. of m/c : 2

Manufacturer : BIANCO, ITALY
 No. of m/c : 1

Function:

- To remove the excess water inherited by the fabric during Dyeing.
- To clean any unnecessary dirt or hairs of fibers.
- To soften the fabric if required by using softening agent.
- Slight controlling of Dia of tube fabric by using ‘Shaper’.

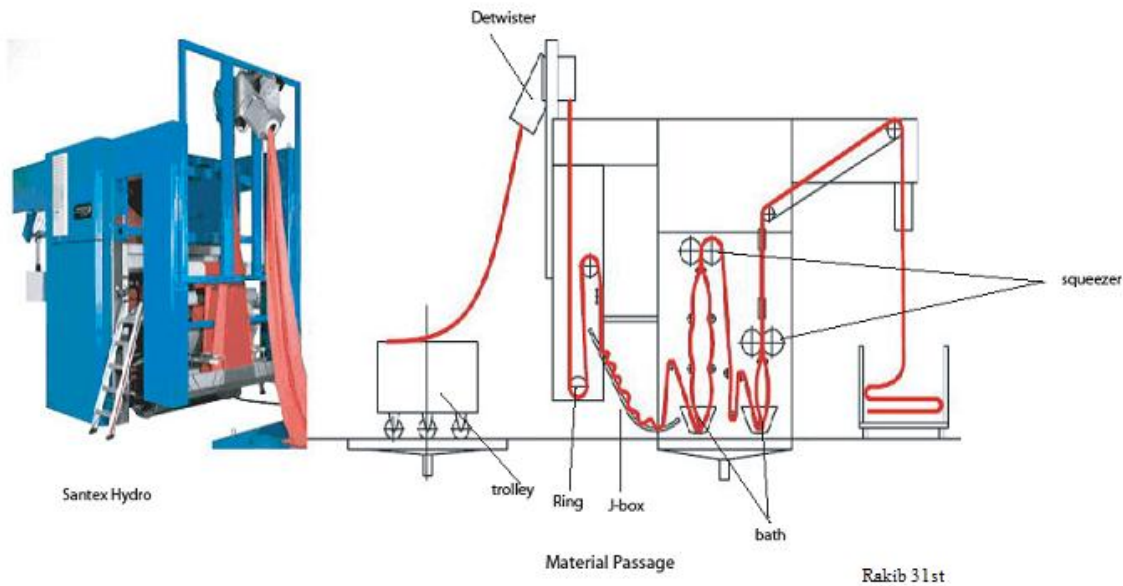


Figure-12: Hydro-Extractor

Important Parts & Zones:

- Detwister : Un-rove the roped form fabric after dyeing by twisting & turning.
- J-Box : Overfeeding zone, which ensures tension-free movement of fabric.
- Water & Softener bath: 1st bath is only water, 2nd one is for softener.
- Padder : Two pairs of padding rollers set at the top of each bath. They squeeze the excess water from the fabric.
- Ring & Ring Pulley: Works as a guide of fabric & maintain required Dia.
-

Technical Parameter:

1. Fabric Passing Speed: Depends on count & gsm.
For low GSM fabric – 60-65 m/min
For Medium - 55- 58 m/min
For High - 50-52 m/min
2. Overfeed regions: J – box, Before Padder 1 & Padder 2
3. Pressure in Padder: Padder 1 – 4-5 bar
Padder 2 – 3.5- 4 bar
4. Types of Softener used: Anionic, Cationic & Silicon softeners are used.
pH of bath should be 4.5-5.0
Concentration of softener – 10 g/l
Bath is changed after every 100 kg fabric.
5. Dia of Shaper: Max. 52 inches

Min. 18 inches

6. Water recovery%: 140-150%

7. Power consumed: 400 v. 50 Hz.

➤ **DRYER:**

Manufacturer : SANTEX, SWITZERLAND.
FONG'S, HONGKONG.

Function:

- To dry the wet fabric.
- Control the shade & gsm slightly.

Main Parts:

- Feed unit; contains conveyor belt & number of rollers.
- Two drying sections – i) upper level (3 chambers)
ii) Lower level (3chambers)
- Heating system associated by STEAM Line & Nozzles.
- Blower, to spread the steam through-out the chambers.
- Exhaust air ventilator.

Technical Parameters:

- Temperature : For colored fabric – Chamber 1 – 140°c
Chamber 2 – 150°c
Chamber 3 – 130°c

For White (bleached) - all chambers - 120°c
- Working width : 3000 mm
- Speed : 8-80 m/min
- Nozzle distance : 35-55 mm
- Power consumption : 140 kw

➤ **TUBE COMPACTOR:**

Manufacturer : SANTEX, SWITZERLAND
No. of m/c – 1
TUBETEX, USA
No. of m/c – 2

Function:

- To control Dimensional stability of fabric.
- Control GSM of fabric.
- Make Shiny effect on fabric surface.

Main Parts of Compactor:

- Feed section – tension control & metal detector.
- Shape – Set according to the dia of fabric
- Steam zone.
- Take out & Plaiter zone
- Compacting Zone: It's a roller & shoe arrangement & the most important zone which consists of two rollers, the **Feed roller** (recarter roller) & the **Retard roller**. They are heated by **Shoe**, into which hot thermo-oil runs through.

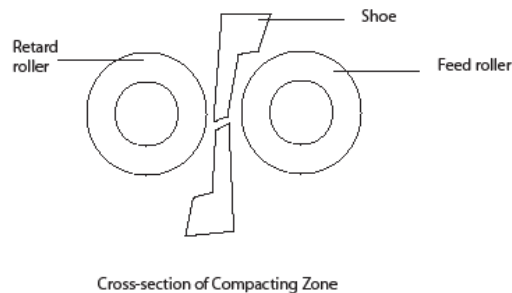


Figure-13: Cross-section of compacting zone

Technical Parameters

- Speed of passing fabric : 22-40 m/min
- Shaper length : according to required Dia
- Overfeed ratio : Edge drive zone – 1.0-1.5
Retard roller – 0.80-0.85
Take-out zone – 0.85-0.90
Conveyor belt – 1.0-1.05
Plaiter – 0.80-0.85
- Compaction% : according to Shrinkage result
S/J – 10-15%
Rib – 10-12%
Interlock – 8-10%
Pique – 7-8%
- Shoe pressure : S/J – large dia – avg. 30 psi
S/J – smaller dia – 10-15 psi
Rib – 10-20 psi

Lycra - <10 psi

- Power consumed : 80 kw
- Thermo-Oil temperature : 90°c

➤ **SLITTING MACHINE**

No. of machines : 3
Manufacturer : BIANCO, ITALY.

Function:

- Slit-cut the tubular fabric through the needle mark.
- Remove excess water.
- Prepare the fabric for next operation.



Figure-14: Slitting Machine

Main Parts:

- Squeezer
- J-box
- Detwister
- Spreader
- Rotary cutting blade
- Auto Centering system
- Conveyor & Plaiter

Technical Parameters:

- Speed : Varies with type of fabric
- Overfeed : In feed zone, cutting zone, Conveyor belt (20-30%)

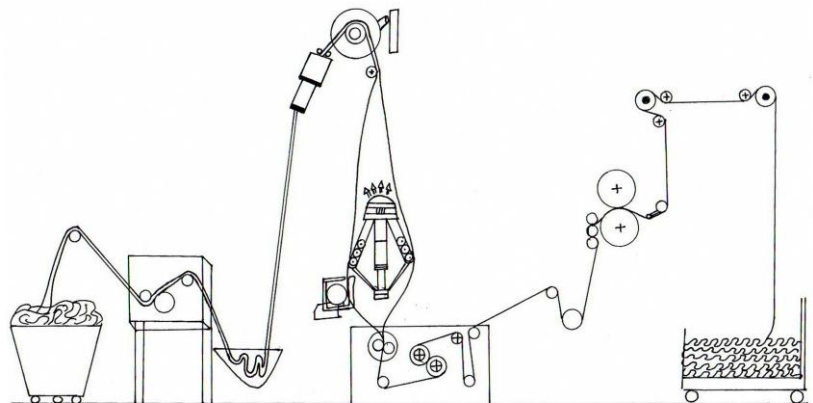


Figure-15: Material Passage (Left to Right)

- Pressure : In Detwister zone-0.5 bar, in Padding – 4-5 bar

➤ **STENTER**

No. of machine : 3
 Manufacturer : BRUKNER, GERMANY (2)
 TUBETEX, USA (1)

Function:

- To dry the fabric.
- Heat-set the synthetic fiber fabric.
- Controlling the width of fabric or maintain dimensional stability.
- Controlling the GSM of fabric.
- Skew ness & Bowing controlling of stripe fabric.
- Spirality & Twisting control.
- Fabric hand-feel modification-like-Softening or Hardening.
- Shade control.
- Gumming & Cutting.



Stenter m/c (full length view)

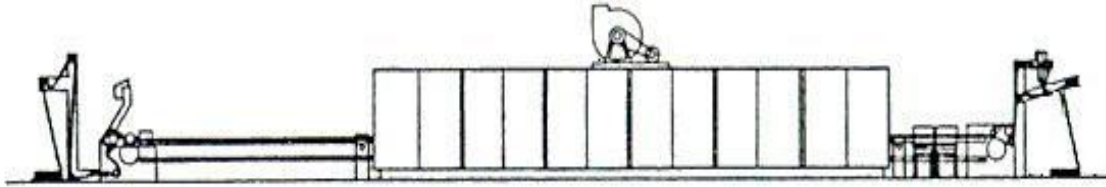
Stenter m/c (chain & clip system)

Figure-16: Stenter machine

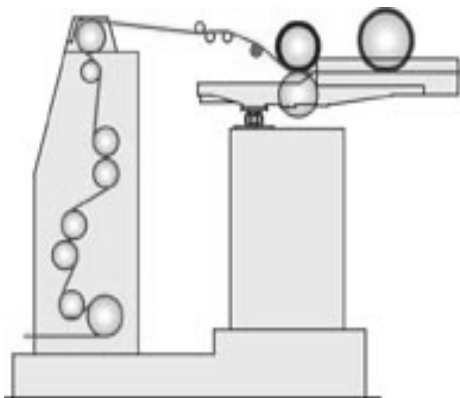
Important Zones & Parts:

- Back Zone
 - Guider
 - Two Baths & Padder or Squeezer
 - Auto centering
- Middle Zone
 - Over feed regions
 - Bianco or Mahlo arrangement.
 - Chain & clip system
 - Chambers (Contains blower, heater, recovery)

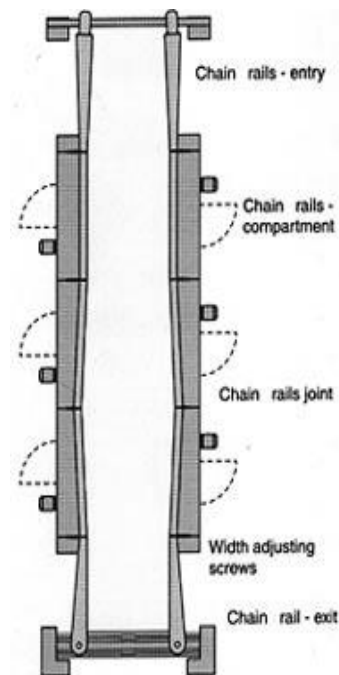
- Front Zone
 - Over feed zone
 - Plaiting
 - Static electricity remover.



Fabric path of stenter



Overfeed & pinning



Fabric in the chain

Figure-17: Different parts of a stenter machine

Extra attachment:

- i) Mahlo attachment for bowing control.
- ii) Selvedge gumming device
- iii) Selvedge cutting device

Technical Parameters

- Fuel used for heating : Gas (for Gas-Stenter)
Thermo-Oil (for Oil-Stenter)
- Working Width : 600-2600 mm
- Total Length : 138 ft
- No. of Chambers : 8

- Chamber length : 10 ft each
- No of Motors : 96
- Padder Pressure : Max. air Pressure – 10 bar (avg. 5-7)
Max. Steam Pressure – 0.7 bar
- Overfeed Ratio : Back Zone – 0-5
Master overfeed – 80% (in case of heat-set 15-20%)
Wheel overfeed – 3%
Feed overfeed – 3-5%
Take-up overfeed – 15-20%
- Temperature : Normal – 130-150°C
Heat-Set – 180-210°C
- Speed of Passing Fabric : Normally 35-40 m/min
Heat set 18-22 m/min
- Width Controlling : S/j +1-2 inches
Interlock/Rib - 1%
Lycra +8-10%
- Padder bath capacity : 250 lit
- Types of Softener used : White, Color, Silicon Softener

Production:

- Capacity: 5 tones/shift
- Actual production: 3.5-4.5 tones/shift

Heating Arrangement:

- For Gas Stenter: Rotamatic Burner
- For oil Stenter: Thermo-oil

Parameters used for different types of fabric:

BRUCKNER

Fabric	Req. GSM	Finish GSM	R	F	B	Temperature	Speed m/min	Over feed
S/J	140	-	68"	71"	67"	140	14	80%
"	160	150/52	56"	64"	60"	150	20	80%
"	180	170/72	54"	56"	54.5"	110	12	60%
"	190	188/90	58"	61"	57"	110	15	80%
H/J	280	270/75	64"	67"	62"	110	7	80%
Loop back	280	255/60	74"	78"	75"	110	9	80%
Fleece	260	260/65	74"	80"	75"	110	9	80%
1x1 rib	240	224/26	72"	75"	74"	110	10	80%
Bolton stripe	330	340/45	62"	67"	65"	130	10	80%

➤ **OPENWIDTH COMPACTOR**

M/C quantity	:	01
Brand	:	Brukner, Germany
Maxm line speed	:	60 m/min
Useable line speed	:	30 m/min Maxm dia :95 "
Workable dia	:	90"
Steam box temp.	:	80° C
Feed R/L temp.	:	105° C
Over feed (%)	:	upto 50 %
Shoe pressure	:	Max-18 Min-5
Sensor Position	:	-Shoe pressure (One shoe) -Retard Roller ratio -Pliater Ratio -Right-Left roller pressure

Function of the Machine:

1. To compact the fabric
2. To control the shrinkage
3. To maintain proper width and G.S.M

Heating system: Steam

Main parts of the machine:

1. Heating chamber
2. Blower (2, one at the entry chain zone for uncurling and another at the entry of compacting zone)
3. Synthetic blanket as a conveyor,
4. Folder
5. Exhaust fan
6. Unpinning cylinder (-40%→+40%)
7. Belt cylinder (-40%→+40%)
8. Uncurling device at entry of compacting zone.
9. sensor
10. brush roller

Additional attachment:

- i) Selvedge cutting
- ii) Selvedge safety
- iii) Pinning safety
- iv) Selvedge unrolling

Production: Capacity: 5 tones/shift or 10 tons/day
Actual production: 4 tones/shift.

Utility: Steam Electricity, Compressed air.

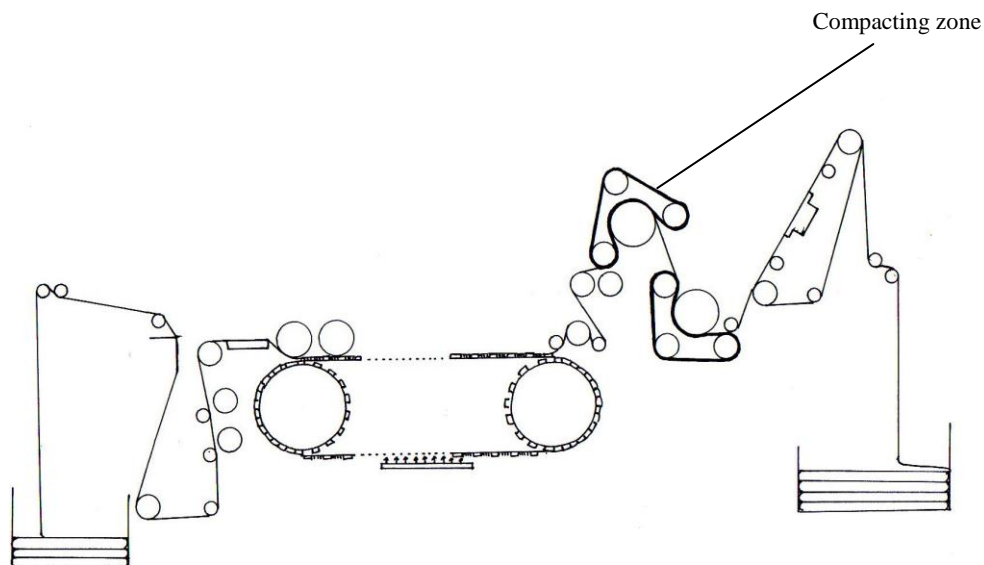


Fig-18: Material Passage in a compacting machine

- **Special Finishing Machines:**
- **Sueading or Carbon Finishing or Pitch Finishing:**

No. of m/c: 2

Manufacturer: LAFER, ITALY

Function

- Make the surface of fabric Smooth
- Improve heat insulation properties.
- Good Hand feel.

Technical Parameters

- Types wires – Carbon
- Fabric speed – S/J : 8-11 rpm
Rib/Interlock: 9-10 rpm
Terry fleece: 10-11 rpm
- Tension – 10-16 kg-wt
- Drum rpm – 20-25 rpm

Specification:

No of motor: 08
Winch speed: 10-30m/min
Machine speed: 50m/min (max)
Drum speed: 30-35-50 rpm (Max 70)
Pile roller no: 06
Pile made of Plastic
Plaiter tension: 6kg
Taker in tension: 20kg
Fabric return driver Tension: 25kg
Material Passage
Drum Tension: 50kg
Speed range: 10-40 m/min
No of cylinder/drum:
2 for double cylinder
1 for single cylinder
No of pin roller: $24 \times 2 = 48$
 $24 \times 1 = 24$
Cylinder r.p.m (General): 100
Tension: 3 kg

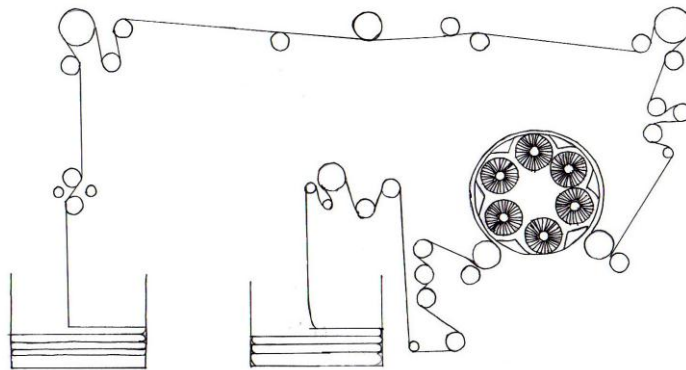


Figure-19: Sueding Machine

➤ Raising or Brushing:

M/C quantity : 01
Brand -GEMATEX
Model: KRM 6725
Origin-Germany
Year of manufacture-1999
Voltage - 400 V
Nominal Current -63 A
No of Pile :12
No of Counter-Pile :12

Function

- To raise or tear-out the extra thread loops on the back-side of fabric
- Increase the warmth of fabric.

➤ Singeing

No. of m/c- 1

Manufacturer- OSTHOFF – SENGE, GERMANY

Function

- To remove the hairs form fabric surface by burning in extremely heated flame.

Technical parameters

- Flame temperature : 100-110°C
- Fabric speed : max 90 m/min

Remarks:

Knit Concern ltd. is a well-equipped industry. It contains machinery of well-known brands like Bruckner, Bianco, Santex, etc. The availability of these machines is helpful to increase the productivity of the industry. The arrangement of machines is very beautiful and there is enough space for movement of the workers.

3.6 Raw Materials

➤ Raw Material for Knitting:

The raw material for knitting is the yarn. Different types of yarn of wide range of count are used. In yarn store section we had the chance to know about different yarns of different count used in knitting. We also have known different yarn manufacturer/suppliers name for this knitting section i.e. sources of yarn. Both carded and combed yarn is used for knitting.

<u>Generally used yarn and their count:</u>	
Cotton	24 ^S , 26 ^S , 28 ^S , 30 ^S , 32 ^S , 34 ^S , 40 ^S
Polyester	75D, 100D
Spandex yarn	20D,40D, 70D
Grey Mélange (C_	24 ^S , 26 ^S
Ecreu Mélange (C-85% V-15%)	24 ^S , 26 ^S , 28 ^S
PC (65%Polyester & 35% cotton)	24 ^S , 26 ^S , 28 ^S , 30 ^S
CVC	24 ^S , 26 ^S , 28 ^S , 30 ^S

➤ **Raw Materials For Dyeing:**

In the industry the raw materials used for production are:

1. Grey fabrics
2. Dyes
3. Chemicals.

Grey Fabrics:

Following types of gray fabrics are dyed:

1. Single jersey
2. Single jersey with Lycra
3. Polo pique
4. Single lacoste
5. Fleece
6. Interlock
7. Interlock with Lycra
8. Rib
9. Rib with Lycra
- 10.1X1 rib
- 11.2X2 rib
12. Different types of collar & cuff

Dyes:

The following dyes are used:

- 1.Reactive
- 2.Dispers

Name of Dyes	Origin	Supplier
Cibacron Yellow - F4G	Singapore	Swiss color
Cibacron Yellow FN2R	Singapore	Swiss color
Cibacron Orange - FNR	Singapore	Swiss color
Cibacron Scarlet -F3G	Singapore	Swiss color
Cibacron Red-FN3G	Singapore	Swiss color
Cibacron Red-FNR	Singapore	Swiss color
Cibacron Red-FN2BL	Singapor	Swiss color
Cibacron Scarlet -FN6G	Singapore	Swiss color
Cibacron Navy -WB	Singapore	Swiss color
Cibacron Red -WB 150 %	Singapore	Swiss color
Cibacron Red -HDN 200 %	Singapore	Swiss color
Cibacron Turquoise -HGN	Singapore	Swiss color
Bezactive Red SLF	Swisterland	RH corporation
Bezactive Yellow S-MAX	Swisterland	RH corporation
Bezactive Blue S-GLD	Swisterland	RH corporation
Bezactive Blue SLF	Swisterland	RH corporation
Bezactive Red S-3B	Swisterland	RH corporation
Bezactive Red S-MAX	Swisterland	RH corporation
Bezactive Yellow S-8G	Swisterland	RH corporation
Terasil Black SRL-O1	Singapore	Swiss color

Terasil Black W-NS	Singapore	Swiss color
Terasil Blue BGE-01	Singapore	Swiss color
Terasil Blue WBLS	Singapore	Swiss color
Terasil Navy GRLC	Singapore	Swiss color
Terasil Red WRS	Singapore	Swiss color
Terasil Violet BL-01	Singapore	Swiss color
Terasil Yellow W-4G	Singapore	Swiss color
Remazol Blue-RR	German	Dyester
Remazol Yellow-RR	German	Dyester
Remazol Red -RR	German	Dyester
Remazol Brilliant Yellow - 3GL	German	Dyester
Remazol Tarquise Blue-G	German	Dyester
Livafix Rubina CA	German	Dyester
Livafix Red CA	German	Dyester
Livafix Blue CA	German	Dyester
Livafix Yellow CA	German	Dyester
Livafix Amber CA	German	Dyester
Livafix Orange CA	German	Dyester
Livafix Bri Yellow CA	German	Dyester
Reactive Black GRC	China	LC
Reactive Black B	China	LC
Reactive Red 3RS	China	LC
Sumifix Yellow EXF	China\ Indonesia\ Japan	Fakir dyes
Sumifix Red EXF	China\ Indonesia\ Japan	Fakir dyes
Sumifix Blue EXF	China\ Indonesia\ Japan	Fakir dyes
Sumifix T. Blue GN	China\ Indonesia\ Japan	Fakir dyes
Sumifix Red 3BS	China\ Indonesia\ Japan	Fakir dyes
Sumifix Yellw 3RS	China\ Indonesia\ Japan	Fakir dyes
Sumifix Yellw GR	China\ Indonesia\ Japan	Fakir dyes
Sumifix Blue BRF	China\ Indonesia\ Japan	Fakir dyes
Terasil Yellow - F4G	Singapore	Swiss color
Terasil Orange - FNR	Singapore	Swiss color
Terasil Scarlet -FN6G	Singapore	Swiss color
Terasil Red-FN3G	Singapore	Swiss color

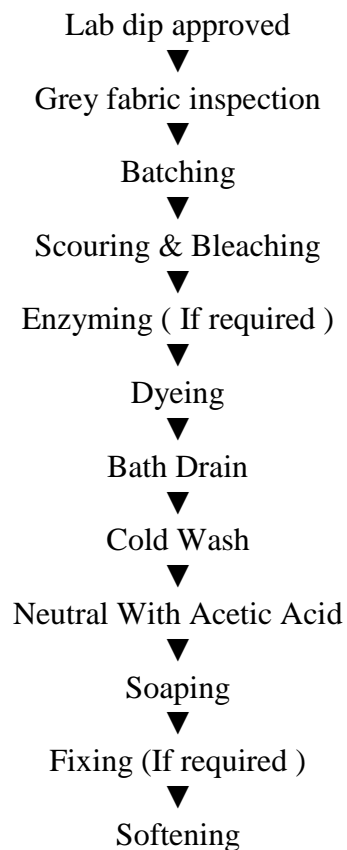
Chemicals:

Chemicals Name	Supplier	Price (Tk/Kg)	Mode of Action
Kappasol AF 200	Kappachem	371	Antifoam
Kappwet BOS	Kappachem	350	Wetting (Detergent)
Kappquest FE	Kappachem	147	Sequestering
Kappazone H53	Kappachem	142	Peroxide stabilizer
Kappasoft BD	Kappaachem	283	Cationic Softener
Kappasoft SM	Kappachem	284	Silicon Softener
Kappatex R98	Kappachem	345	Reducing Agent
Invatex PC	CIBA	139	Peroxide Killer
Silvatol FLN	CIBA	467	Anti Oil

Cibecel DBC	CIBA	176	Leveling gent
Anti per R	Gentec	210	Peroxide Killer
Anti per PRB	Gentec	211	Peroxide Killer
Eriopon OS	CIBA	573	Reducing agent
Invatex AC	CIBA	180	Core neutralizing
Cibafix ECO	CIBA	396	Fixing
Tinofix FRD	CIBA	316	Fixing
Irgasol DAM	CIBA	271	Fixing Remover
Cibatex AB45	CIBA	188	High Temp. pH Stabilizer
Univadine DIF	CIBA	468	DisperseLevelingAgent
Romapon 173	Dystar	88.53	Anticrease
Uni enzyme 1000	Hunan	290	Enzyme
Acetic Acid	Taiwan	89	Acid
Soda Ash	China	26	Alkali
Glaubar Salt	China	16.28	Electrolyte
Caustic Soda	China	52.34	Alkali
Hydrogen peroxide 50%	India	45.4	Bleaching Agent
Oxalic Acid		75	Acid

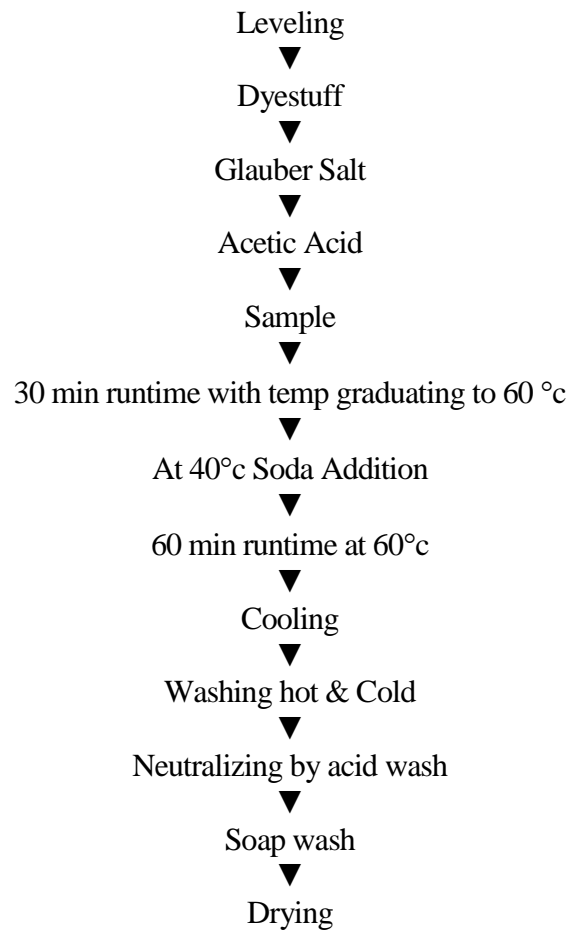
3.7 Production Process & Sequences

➤ Sequence of operation

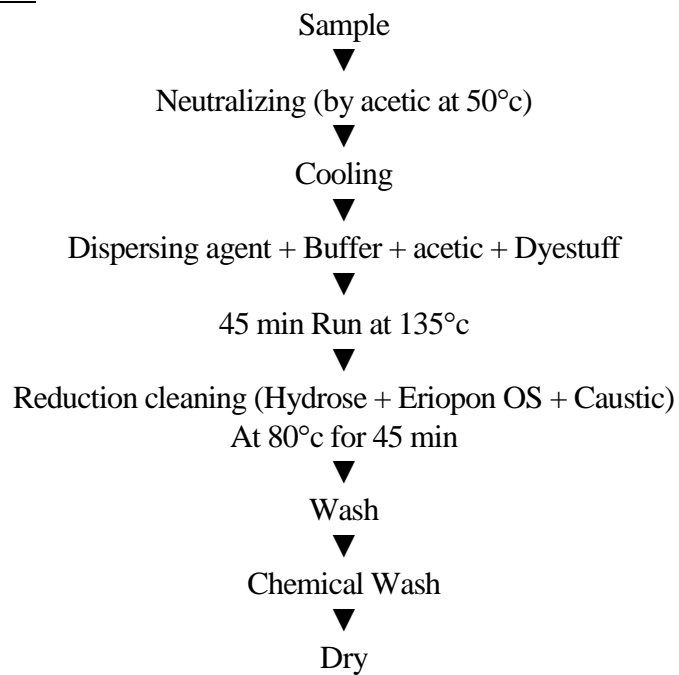


➤ **Dyeing Process For Lab**

Cotton Dyeing in Lab



Polyester Dyeing in Lab

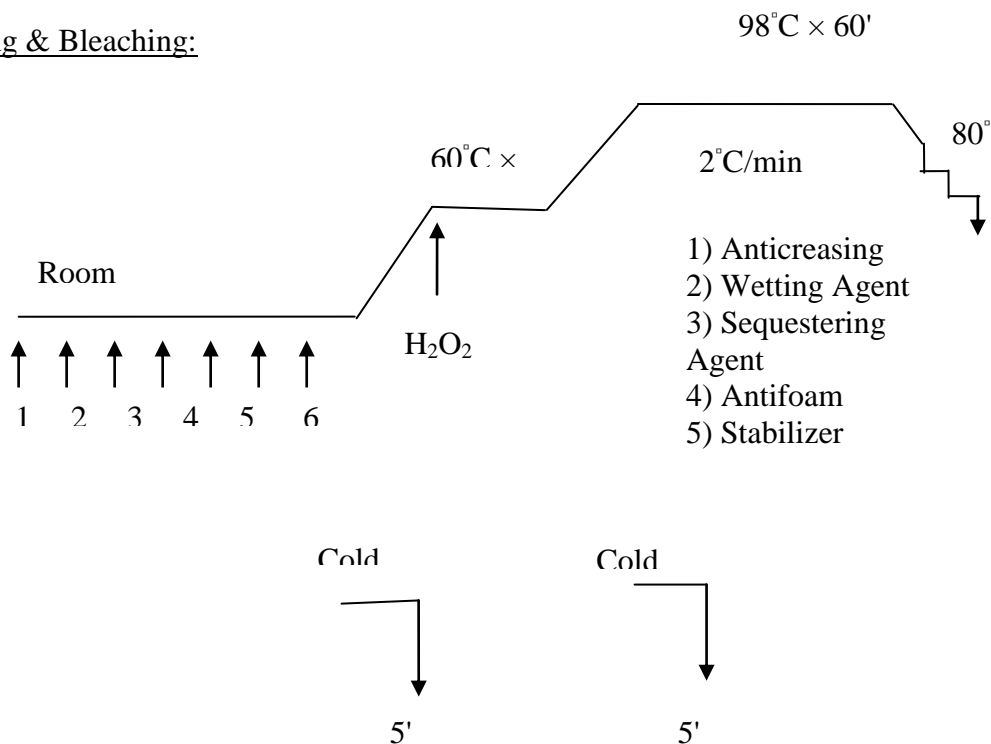


➤ **Dyeing Parameters For Bulk Production:**

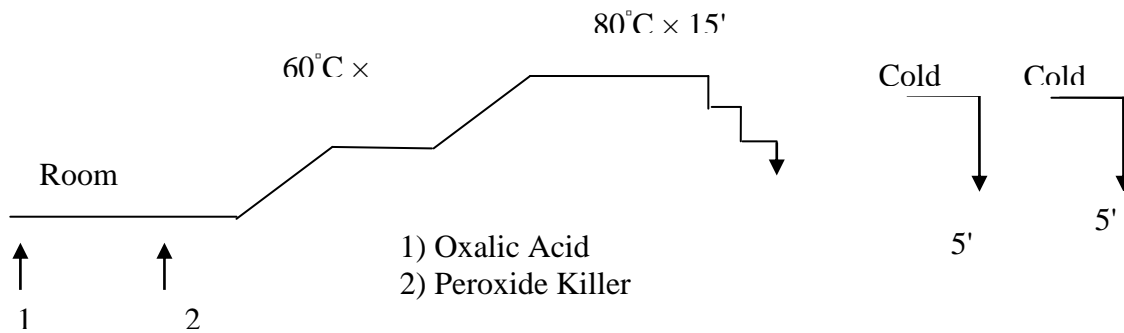
Process	Temp(°C)	pH	Time min	M : L ratio
Scouring - Bleaching	98	11.5-12	60'	1:6 or 1:8
Enzyme Wash	55	4.5-5	60'	1:8
Enzyme Deactivation	70	--	10'	--
Reactive Dyeing (Light Shade)	60	10.2-10.8	60'	1:8
Reactive Dyeing (Dark Shade)	60	10.9-12	60'	1:8
White Shade	98	10.5-11.5	20'	1:8
Turquoise color dyeing	80-90	10.9-12	90'	1:8
Polyester dyeing	130	4-4.5	45'	1:8

➤ **General process for Pre-treatment**

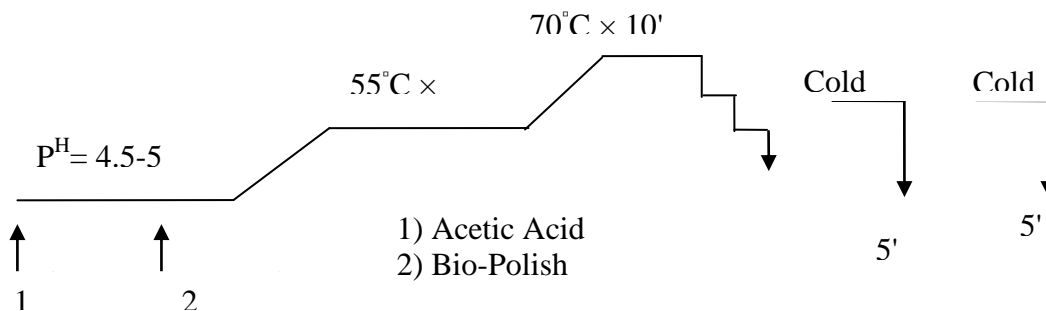
Scouring & Bleaching:



Chemical Wash:



Bio Polishing/Enzyme Wash:



➤ General process for Dyeing

- Auxiliaries are added at 50° C
- Salt added by dosing system (time : 10-20')
- pH maintained at 6.5-7
- Color dosing at 60° C for 20'

Exhaustion & Fixation :

- After 30' soda ash added by dosing for 30-35'
- pH checked & maintained at 10.5
- Dye bath is kept at 60° C for 40-60'
- After every 10' the sample is checked fixation occurs during this time.
- Rinse for 10' & the bath is drained.

Neutralization :

- The material should be neutralized to remove alkaline condition at room temperature by acid wash for 15 min & rinsing will be carried on for 10 min.

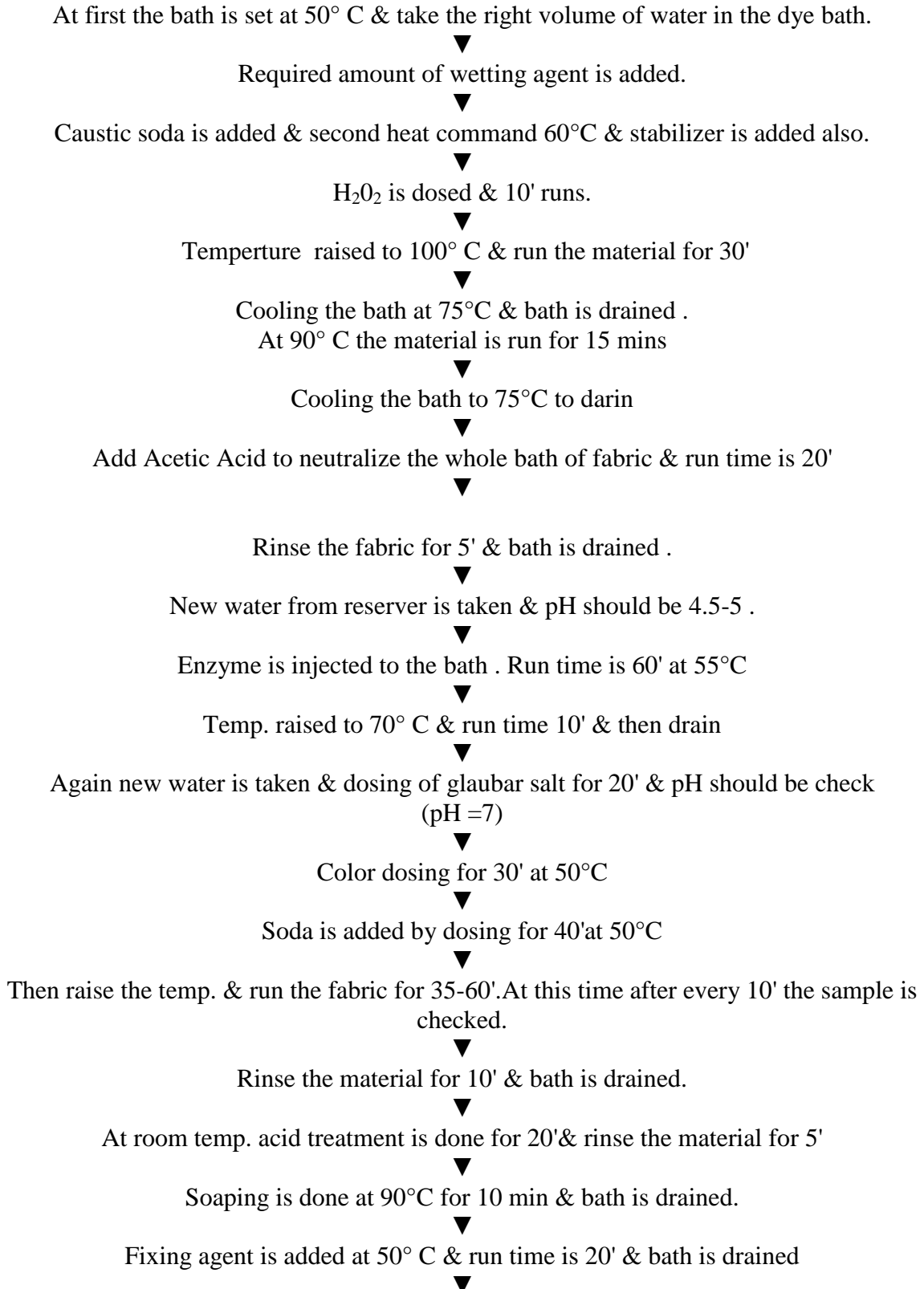
Soaping :

- Then soaping agent is added & temperture raised to 90°-100°C for 10 min.
- The bath is cooled 7 rinsed for 10 min.
- Dye bath temperature then cooled to 60° C.

Softening:

Softener is applied to soften the fabric as well as it improves the hand feel. The material is treated at 60°C for 20 mins. Then rinsing again & material unload.

Procedure:



Softening is done at 60° C for 20' & bath is drained.



Finally the fabric is unloaded.

Process for White Shade:

At first Scouring bleaching chemicals are added to the bath & they are treated at 98° C for 60'



Temp. lowered at 80° C & OBA is added. Run time is 10'.

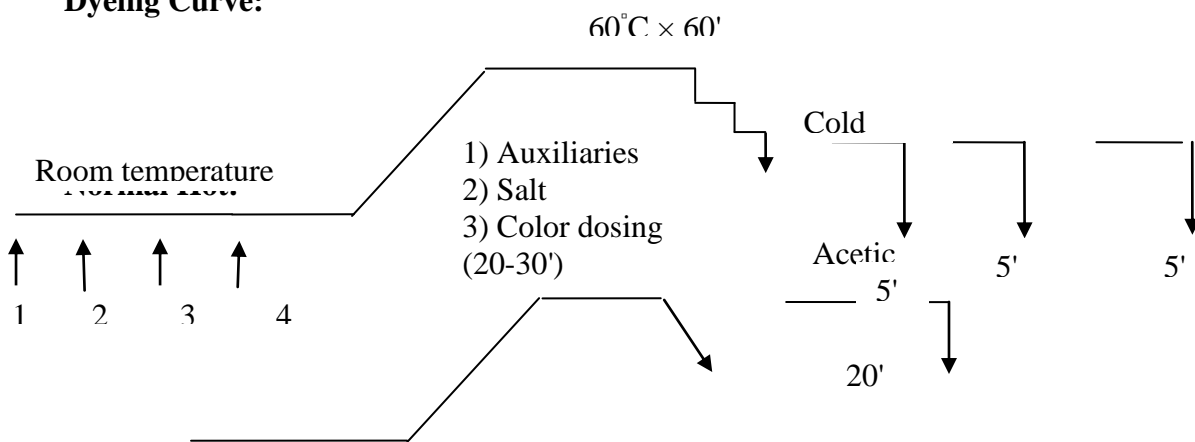


Temp. raised to 98° C & Run time is 20'.

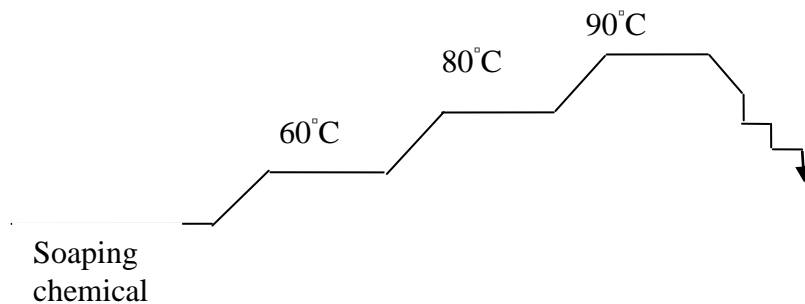


Then enzyme treatment is applied & then softening occurs

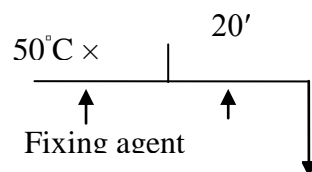
Dyeing Curve:



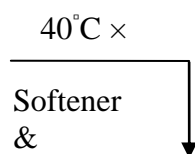
Soap wash (Hot):



Fixing (if dark shade):



Softening:



➤ Some Dyeing Recipe used in Bulk dyeing process

Knit Dyeing Recipe#1

Color : 10-100-White
M: L : 1:8
Material Type : 100% Cotton

Sample:

Auxiliaries/Chemicals	Amount (g/l)	Amount (%)
SCOURING & BLEACHING		
Kappasol AF -2000 (Antifoam)	0.15	-
Polymer ECO (Anticreasing)	0.50	-
Tino Wine (Multi Functional)	3.00	-
Caustic	2.00	-
H₂O₂ (50%)	8.00	-
PHYSICAL BLEACHING		
Bluton BVB (OBA)	-	0.23
NEUTRALIZATION		
Oxalic Acid	1.00	-
Denquest HYN (Sequestering)	0.20	-
ENZYMATIC CLEANING		
Acetic Acid	0.80	-
Unizyme 1000L (Enzyme)	0.60	-
FINISHING		
Softener E-31	-	10
Denquest HYN (Sequestering)	0.20	-

Knit Dyeing Recipe#2

Color : (Pink)
 M: L : 1:7
 Material Type : 100% Cotton

Auxiliaries/Chemicals	Amount (g/l)	Amount (%)
SCOURING & BLEACHING		
Kappasol AF -2000 (Antifoam)	0.10	-
Kappawet BOSS (Detergent)	0.60	-
Polymer ECO (Anticreasing)	0.70	-
Denquest HYN (Sequestering)	0.40	-
Fistol AWP (Stabilizer)	0.40	-
Caustic	1.50	-
Soda	0.80	-
H₂O₂ (50%)	2.50	-
NEUTRALIZATION		
Oxalic Acid	0.50	-
ENZYMATIC CLEANING & PEROXIDE REMOVAL		
Antiper R (Peroxide Killer)	0.50	-
Acetic Acid	0.80	-
Polymer ECO (Anticreasing)	0.30	-
Unizyme 1000L (Enzyme)	0.60	-
DYEING BATH		
Kappasol AF -2000 (Antifoam)	0.10	-
Polymer ECO (Anticreasing)	0.50	-
Albatex – DBC (Levelling)	1.00	-
Bezactive Yellow – SMAX	-	0.182
Bezactive Red – S3B – 300%	-	0.28
Glauber Salt	30	-
Soda	10	-

NEUTRALIZATION		
Acetic Acid	0.50	-
SOAPING		
Kappaquest A41 (Soaping)	0.50	-
AFTER TREATMENT		
Softener SA -1000	-	10
Invatex –AC (Core Neutralizer)	0.40	-

Knit Dyeing Recipe#3

Color : Gris Moyen
M: L : 1:8
Material Type : 100% Cotton

Auxiliaries/Chemicals	Amount (g/l)	Amount (%)
SCOURING & BLEACHING		
Kappasol AF -2000 (Antifoam)	0.10	-
Kappawet BOSS (Detergent)	0.50	-
Polymer ECO (Anticreasing)	0.70	-
Denquest HYN (Sequestering)	0.40	-
Fistol AWP (Stabilizer)	0.40	-
Caustic	1.50	-
Soda	0.80	-
H ₂ O ₂ (50%)	2.50	-
NEUTRALIZATION		
Oxalic Acid	0.50	-
ENZYMATIC CLEANING & PEROXIDE REMOVAL		
Antiper R (Peroxide Killer)	0.50	-
Acetic Acid	0.80	-
Unizyme 1000L (Enzyme)	0.30	-
DYEING BATH		
Kappasol AF -2000 (Antifoam)	0.10	-
Biavin – 109 (Anticreasing)	0.50	-
Albatex – DBC (Levelling)	0.50	-
Remazol Ultra Yellow RGB	-	0.8060
Remazol Ultra Red RGB	-	0.6160
Remazol Navy RGB	-	1.060

Glauber Salt	50	-
Soda	15	-
NEUTRALIZATION		
Acetic Acid	0.50	-
SOAPING		
Kappaquest A41 (Soaping)	1.00	-
AFTER TREATMENT		
Softener SA -1000	-	1
Invatex –AC (Core Neutralizer)	0.20	-

Knit Dyeing Recipe#4

Color : 902-Noir (43517) Black
M: L : 1:8
Material Type : 100% Cotton

Auxiliaries/Chemicals	Amount (g/l)	Amount (%)
SCOURING & BLEACHING		
Kappasol AF -2000 (Antifoam)	0.10	-
Kappawet BOSS (Detergent)	0.50	-
Polymer ECO (Anticreasing)	0.30	-
Denquest HYN (Sequestering)	0.30	-
Caustic	0.30	-
H₂O₂ (50%)	2.00	-
	2.00	-
NEUTRALIZATION		
Acetic Acid	0.30	-
ENZYMATIC CLEANING		
Acetic Acid	0.80	-
Unizyme 1000L (Enzyme)	0.80	-
DYEING BATH		
Kappasol AF -2000 (Antifoam)	0.10	-
Polymer ECO (Anticreasing)	0.20	-
Albatex – DBC (Levelling)	1.00	-
Reactive Yellow 3R	-	1.10
Sunfix Red MF – 3BD	-	0.550
Reactive Starfix Black - GR	-	7.0
Glauber Salt	80	-
Soda	20	-

Caustic	2	-
NEUTRALIZATION		
Acetic Acid	1.00	-
SOAPING		
Kappaquest A41 (Soaping)	1.00	-
Kappaquest A41 (Soaping)	0.50	-
AFTER TREATMENT		
Softener SA -1000	-	10
Invatex –AC (Core Neutralizer)	0.40	-

Knit Dyeing Recipe#5

Color : Royal blue
M: L : 1:8
Material Type : 100% Cotton

Auxiliaries/Chemicals	Amount (g/l)	Amount (%)
SCOURING & BLEACHING		
Kappasol AF -2000 (Antifoam)	0.15	-
Kappawet BOSS (Detergent)	0.70	-
Polymer ECO (Anticreasing)	0.30	-
Denquest HYN (Sequestering)	0.50	-
Fistol AWP (Stabilizer)	0.40	-
Caustic	2.00	-
Soda	1.00	-
H ₂ O ₂ (50%)	3.00	-
NEUTRALIZATION		
Oxalic Acid	0.50	-
ENZYMATIC CLEANING & PEROXIDE REMOVAL		
Antiper R (Peroxide Killer)	0.50	-
Acetic Acid	0.30	-
Unizyme 1000L (Enzyme)	0.60	-
DYEING BATH		
Kappasol AF -2000 (Antifoam)	0.40	-
Polymer ECO (Anticreasing)	0.30	-
Denquest HYN (Sequestering)	0.40	-
Albatex – DBC (Levelling)	1.20	-
Dychufix Yellow -3R-XF 150%	-	0.02
Dychufix Red – EC	-	0.05
Remazol Brilliant Blue RSPL	-	1.60

Glauber Salt	40	-
Soda	15	-
NEUTRALIZATION		
Acetic Acid	0.80	-
SOAPING		
Fistol RS (Soaping)	0.50	-
AFTER TREATMENT		
Softener SA -1000	-	10
Invatex –AC (Core Neutralizer)	0.40	-

Knit Dyeing Recipe#6

Color : Teal (Turquoise)
M: L : 1:8
Material Type : 100% Cotton

Auxiliaries/Chemicals	Amount (g/l)	Amount (%)
SCOURING & BLEACHING		
Kappasol AF -2000 (Antifoam)	0.15	-
Kappawet BOSS (Detergent)	0.70	-
Polymer ECO (Anticreasing)	0.30	-
Denquest HYN (Sequestering)	0.50	-
Caustic	0.40	-
Soda	1.00	-
H ₂ O ₂ (50%)	3.00	-
NEUTRALIZATION		
Oxalic Acid	0.50	-
ENZYMATIC CLEANING & PEROXIDE REMOVAL		
Antiper R (Peroxide Killer)	0.50	-
Acetic Acid	0.80	-
Unizyme 1000L (Enzyme)	0.30	-
DYEING BATH		
Kappasol AF -2000 (Antifoam)	0.40	-
Polymer ECO (Anticreasing)	0.30	-
Albatex – DBC (Levelling)	1.20	-
Dychufix Yellow - 4GL	-	0.1680
Synozol Turq. Blue HF-G 266%	-	1.40
Synozol Blue K-BR	-	0.75
Glauber Salt	40	-

Soda	15	-
NEUTRALIZATION		
Acetic Acid	0.80	-
SOAPING		
Kappaquest A41 (Soaping)	0.50	-
AFTER TREATMENT		
Softener SA -1000	-	10
Invatex –AC (Core Neutralizer)	0.40	-

Knit Dyeing Recipe#7

Color : 09-090 Black
M: L : 1:8
Material Type : CVC (60-40)

Auxiliaries/Chemicals	Amount (g/l)	Amount (%)
SCOURING & BLEACHING		
Kappasol AF -2000 (Antifoam)	0.10	-
Kappavon CL (Anticreasing)	0.70	-
Invatex –CRA (Detergent)	0.60	-
Fistol DM	0.30	-
Fistol AWP (Stabilizer)	0.30	-
Caustic	2.25	-
H ₂ O ₂ (50%)	2.00	-
NEUTRALIZATION		
Acetic Acid	0.80	-
ENZYMATIC CLEANING		
Acetic Acid	0.80	-
Unizyme 1000L (Enzyme)	0.30	-
POLYESTER PART DYEING		
Kappasol AF -2000 (Antifoam)	0.10	-
Kappavon CL (Anticreasing)	0.50	-
Fistol DM (Sequestering)	0.50	-
Univadine DIF (Dispers Levelling)	1.00	-
Albatex – AB45 (Acid Buffer)	2.00	-
Acetic Acid	0.30	-
Terasil G. Yellow W -3R	-	0.025
Terasil Red WRS	-	0.15
Terasil Black WNS	-	2.50
REDUCTION CLEANING		
Hydrose	3.00	-

Caustic	2.00	-
Eriopon OS (Dispers Soaping)	2.00	-
NEUTRALIZATION		
Acetic Acid	0.80	-
COTTON PART DYEING		
Kappasol AF -2000 (Antifoam)	0.10	-
Fistol DM (Sequestering)	0.50	-
Kappavon CL (Anticreasing)	0.50	-
Albatex – DBC (Levelling)	1.00	-
Reactive Yellow 3R	-	0.28
Sunfix Red MF – SB	-	0.62
Novacron Super Black G	-	4.95
Glauber Salt	80	-
Soda	20	-
Caustic	01	-
NEUTRALIZATION		
Acetic Acid	0.80	-
SOAPING		
Acetic Acid	0.80	-
Kappaquest A41 (Soaping)	1.00	-
Kappaquest A41 (Soaping)	0.50	-

Knit Dyeing Recipe#8

Color : Aqua (5186-C)
M:L : 1:10
Material Type : Viscose

Auxiliaries/Chemicals	Amount (g/l)	Amount (%)
SCOURING & BLEACHING		
Viscocolor (Multifunctional)	4.00	-
Felosan NOF (Detergent)	0.50	-
Kappasol AF -2000 (Antifoam)	1.00	-
Kappaquest FE (Sequestering)	0.20	-
	0.30	-
PEROXIDE REMOVAL		
Invatex-PC (Peroxide Killer)	1.50	-
Acetic Acid	0.30	-
DYEING BATH		
Kappasol AF -2000 (Antifoam)	0.30	-

Kappavon CL (Anticreasing)	1.00	-
Vibatex –HKN	0.50	-
Albatex – DBC (Levelling)	1.00	-
Cibacron Yellow H4GN	-	0.036
Cibacron Navy H2G	-	0.14
Synozol Turq. Blue HF-G 266%	-	0.70
Glauber Salt	30	-
Soda	10	-
NEUTRALIZATION		
Acetic Acid	1.20	-
SOAPING		
Kappaquest A41 (Soaping)	1.00	-

Machine Wash

Recipe:

-First of all these two chemicals are taken & treated in normal temperature for 30 min.

Soda ash = 0.5 g/L

Bleaching powder = 0.5 g/L

Then Direct drain is done.

for white - - -

First of all these two chemicals are taken & treated in normal temperature for 30 min.

Soda ash = 0.5 g/L

Bleaching powder = 0.5 g/L

Then Direct drain is done.

-After that these two chemicals are taken & treated with fabric at 98°C for 60 min.

Hydrose = 1-2 g/L

Caustic Soda = 1-2 g/L

Add hydrose (6 g/L) & caustic Soda (6 g/L)

▼
Run 20' at 110° C

▼
Run 10' at 95° C

▼
Run 10' at 80° C

▼
Run 10' at 60° C

▼
Run 10' at 40° C

▼
Drain

➤ **pH check in different point in dyeing processes:**

<u>Name</u>	<u>Range</u>
Bio-Polish =====	4.5-5.0
Leveling =====	6.5-6.8
Salt =====	6.0-6.5
Soda =====	10.5-11.5
Dye bath =====	10.5-11.5
Soaping =====	6.0-6.5
Softener =====	4.5-5
Fixing =====	5.0-5.5

3.8 Quality Assurance

The quality assurance department is assigned to maintain consistently uniform quality of the material in process & various stages of its manufacturing.

➤ **Objects of quality control**

1. Research
2. Selection of raw material
3. process control
4. Process development
5. Product testing
6. Specification test

➤ **Quality Assurance Procedure:**

Knit Concern Ltd. assures the quality of their products in the following three steps:

1. In laboratory.
2. In dyeing section
3. In finishing section

The quality assurance procedures are described below:

In Laboratory:

- Swatch card from buyer according to their requirement is received.
- Recipe prediction for sample dyeing using CCMS.
- Sample dyeing until matching with the swatch card. Acceptable color difference is less than 1.
- If matching is OK, then it is sent to the buyer for approval.

In Dyeing section:

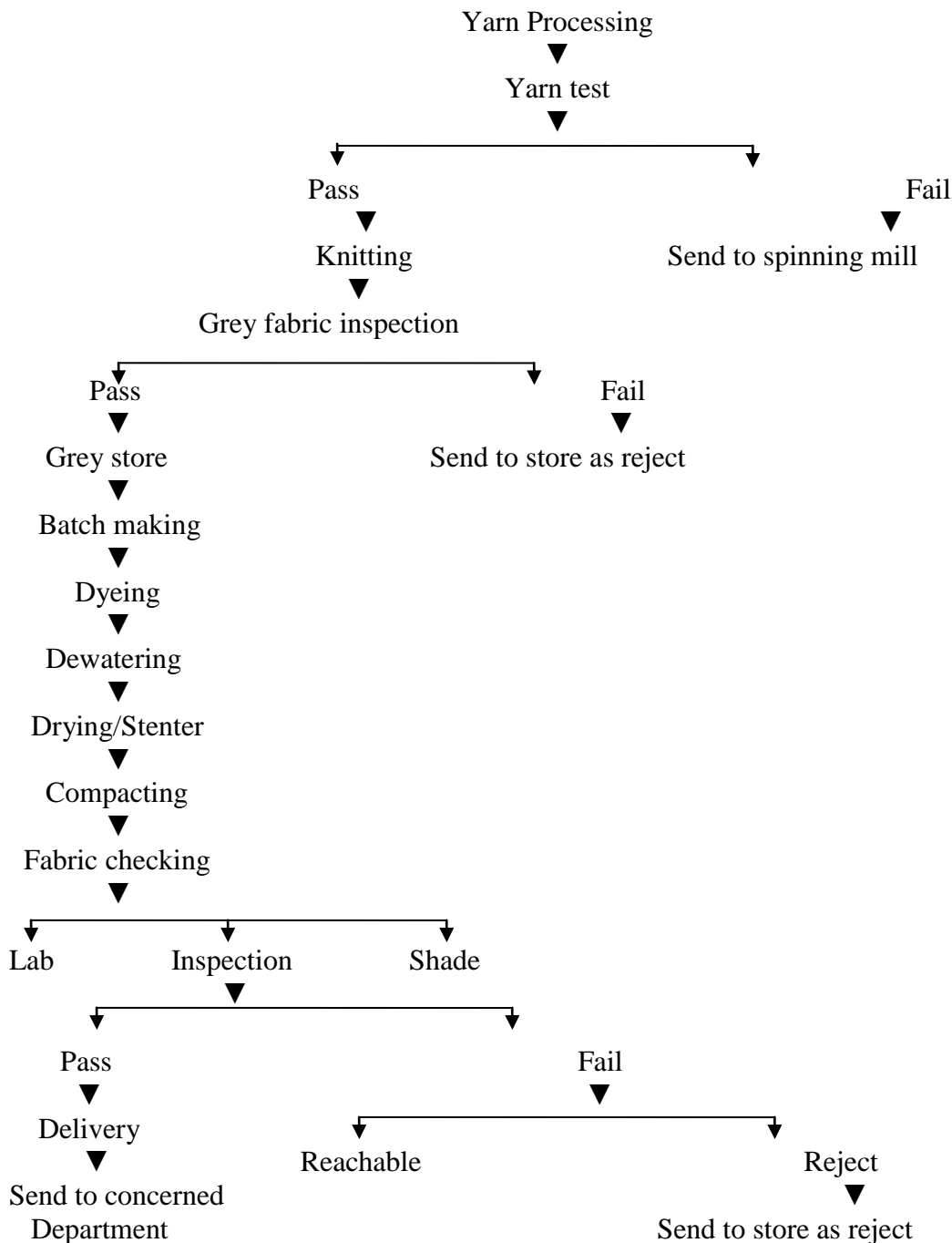
- After approval form the buyer, sample dyeing is done in dyeing m/c, in dyeing shed & again matched with the approved sample.
- If result is OK, then balk production is commenced.
- During dyeing process, before the final acid wash, samples are taken and checked for accurate shade matching.

- After dyeing sample is collected & matching is done.
- Rubbing and wash fastness tests are carried out.

In finishing section:

- Correctly dyed, after treated & matched fabrics are allowed for finishing.
- By using a series of finishing machines correct width, softness & appearance are maintained according to requirements.
- Then sampling is done several times to test GSM, Shrinkage & fastness properties.
- Finally fabric is inspected & prepared for delivery.

In KCL following flow diagram is followed:



➤ **Physical test of fabric:**

- Fabric weight
- Dimensional Changes in lengthwise
- Dimensional Changes in widthwise
- Seam Slippage
- Spirality test
- Pilling Resistance
- Softness test
- Hairiness test

➤ **Chemical test of fabric:**

- Fastness to rubbing
- Fastness to washing
- Fastness to perspiration

Besides these, for the best qualified production these Chemical Test should be performed-

- Fastness to light
- Fastness to heat
- Fastness to sea water
- Fastness to chlorinated water
- Fastness to actual laundering

➤ **Problems Encountered in Dyeing**

▪ Uneven Dyeing:

1. It can be caused due to rapid addition of dyes and chemicals. For this purpose the dosing of soda ash should be maintained properly.

2. Pressure difference.
3. Over loading in the m/c.
4. Yarn lot mixing.
5. Improper control of temperature.
6. Less amount of leveling agent.
7. Improper pretreatment.

▪ Rope to Rope Uneven Shade:

1. Improper rope length in each chamber.
2. Improper fabric flow speed in each nozzle.

▪ Off Shade:

1. Improper M: L ratio.
2. Lower amount of auxiliaries.
3. Improper mixing of dyestuffs.

▪ Dye Spots:

This is most common fault caused by operator not correctly mixing and thoroughly dissolving dyestuffs in the right amount of water

- Batch to Batch Shade Variation:

If any of parameters of dyeing are changed then it will produce problems in batch to batch consistency. In order to avoid this defect the following steps should be followed-

1. Maintain the same liquor ratio.
2. Check that the fabric has the same dye affinity.
3. Use the same standard program procedures for each batch.
4. Make sure that the operators add the right batch of chemicals at the same time & temperature in the process.
5. Check the water supply daily especially p^h , hardness & Na_2CO_3 content.

- Crease Mark:

Crease marks are produced due to the lower concentration of anti-creasing agent and improper cooling rate (defective cooling gradient). This is encountered by increasing the concentration of anti-creasing agent and proper adjustment of cooling rate.

- Running Marks:

Running marks are frequently related to the material construction and are caused by poor opening of the fabric rope.

1. Reducing the machine load and running at a slightly higher nozzle pressure, or using the next largest available nozzle size, may also help.
2. Either presetting or pre relaxation of the fabric before dyeing can avoid this problem.
3. Running and crack marks can also be a result of incorrect process procedures. A higher fabric speed, combined with slower rates of rinse and cooling will often correct the problem.
4. Care should be taken to check that bath draining temperatures are not very high especially viscose blends are involved.
5. Shock cooling of static material will also cause crack marks.

- Intensive Foaming:

In case of intensive foaming, which is caused when, the pumps try to pump a mixture of air and water. This results in the loss of nozzle pressure & floating of flake. If the foaming is severe it is better to drop the bath & restart the process, after adding an anti-foaming agent to the new bath.

- Patchy Dyeing:

It is caused, if dye solution is not correct and also scouring is improper.

- Miscellaneous Problems:

Batch to batch processing may vary due to the improper calculation of dyes and chemicals and improper strength of salt soda and H₂O₂ etc. Beside hardness of water and caustic may lead to an improper shade.

➤ **Finished fabric Inspection :**

The final product should pass against the norms given by the buyer. The following tests are done-

- Shade check
- Gsm test
- Width or diameter test
- Shrinkage test
- Crocking test
- Pilling resistance test
- Color fastness to test
- Color fastness to perspiration
- Dimensional stability

For final inspection , Inspection table & Inspection m/c is used .

The 4-point system is given below-

Size of Defect	Penalty point
Less than 3 inches	1
3-6 inches	2
More than 6- 9 inch	3
More than 9 inch	4

Size of holes & opennings-

1 inch or less	2
More than 1 inch	4

Some general rules of the inspection are-

1. Not 1 metre of cloth is penalized more than 4 points.
2. Cloth is inspected on face side only unless specified.

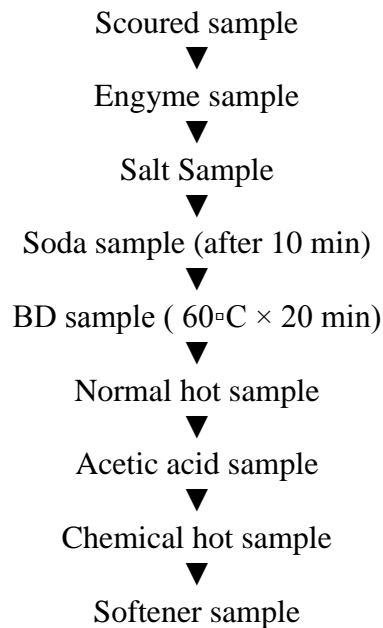
If the total defect parts per 100 yards of fabric are 40 or more the fabric will be rejected. But it may be changed according to buyer's requirements

Shade check :

The shade achieved is to be checked several times while in process & at finished state to ensure the customers demand under recommended light source .Generally the shade is checked at the following stage

- After dyeing
- After drying
- After trial for finishing
- After finishing

During dyeing period in QC there is a shade matching sequence:



For this the following equipments are used :

1. Verivide light box

Manufacturer: Cundy building , frog island Origin : England

Light Source :

D-65 (artificial day light)

TL-84 (Shop light)

F (florescent light)

UV (Ultraviolet Blue light)

➤ **Procedure of GSM measurement by GSM cutter :**

1. Cut the fabric with the G.S.M cutter.

2. Weight the fabric with the electric balance .

3. The cut sample is 100 sq.cm. The weight of the cut sample is multiplied by 100.

4. The result is the G.S.M of that particular fabric .

Suppose ,

The weight of the fabric is 2.51 gm. That means the G.S.M of the fabric is 251 gm.

Specification of GSM cutter :

Name: G.S.M CUTTER

Manufacturer: James H.Heal & Company limited.

Origin : England

Width or diameter test :

After finishing the fabric diameter or width is measured by a measuring tape. If the width is more or less compactor is used to set the required width If width is more ,then lengthwise tension is increased And if width is less it is increased by shape .

Shrinkage test :

The shrinkage properties is one of the most important properties to be checked for the knitted fabric

For this the equipment used :

Name: Electrolux Washcator

Manufacturer: James H.Heal & Company limited.

Origin : England

There is a water label in m/c . Automatically water entered up to this label Then detergent (10 gm) is added for per garment The useable program for Washcator are

Temperature (°C)	Time (min)
40	60
45	64
50	81

The washing methods:

Based on ISO 6330 ,3759 , 5077 .

Rubbing fastness test :

Rubbing fastness is tested by crock meter .

Name : Electronic Crock meter

Manufacturer: James H.Heal & Company limited. Origin : England

Test method : ISO 105 x 12. Dry & Wet rub is including in this method.

Pilling Resistance Test :

Name : ICI Pilling Test

Manufacturer: James H.Heal & Company Ltd.

Origin : England

Test method : EN ISO 12945-2

Description : For wool / wool Blends / Elasthane Blends

-7200 revolutions

-1 revolution / sec

For other type of fabric

-14400 revolution

-1 revolution / sec

➤ **Fastness Testing**

➤ Color Fastness to Wash:

"Color Fastness " is the resistance of the color to fade or bleed by washing ,light ,water dry-cleaning chlorine perspiration & ironing .

Test method : ISO 6330,3759,5077.

Equipment Used:

Rota Wash

M:L = 1:50

Multifilament Size = 10*4 cm

Sample Size = 10*4 cm

Temp. = 50°C

Time = 30 min

Chemical Used : Detergent ECE (4 g/1),Na-per borate (1 g/1)

Shade change is measured by color change scale & staining scale.

➤ Color Fastness to perspiration :

Test Method : ISO -105 E04

Temp = 37 ±2°C

Time : 4 hr

Dry Temp = 60° C

M:L = 1: 50

Wet Time: 30 min

Multifilament Size = 10*4 cm

Sample Size = 10*4 cm

pH :8-5.5

Chemical Used:	Alkali (g/l)	Acid (g/1)
1-histadine mono hydrochloride	0.5	0.5
Sodium Chloride	5	5
Di-sodium Hydrogen Orthophosphate	2.5	2.2
pH	8	5.8
Distilled water	1000 ml	1000 ml

Dimensional Stability:

This is checked by spirality test . Equipment Used :

Quick wash m/c

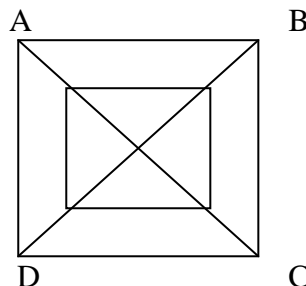
Template Size :

- 38 "x 38"

- 25" x 25"

Temp.= 50° C

Time = 12 ' (Wash & Dry)



$$\text{Spirlity (\%)} = \frac{2*(AC*BD)}{(AC + BD)} \times 100$$

The standard Spirlity % is 5% after the domestic wash .

Remark :

In this modern world the buyer requirement is increasing day by day. And they are conscious about Quality of product more To fulfil this QC department has a lot to do Online. QC also check the following fault- Hole, Fly yarn, Dye stain, Chemical Stain, Uneven shade , Meter to meter Variation, compactor Crease, Patchy dyeing, Yam contamination, Sinker mark, dyeing Crease etc.

So QC department is very much important in dyeing section .

CHAPTER-4

YARN DYEING Unit

4.1 Project Description:

➤ Product mix:

- 100 % cotton
- CVC (Chief Value Cotton) (60/40)
- Grey melange
 - * 5 % Viscose & 95% Cotton
 - * 10 % Viscose & 90% Cotton
 - * 15 % Viscose & 85 % Cotton
- Ecro melange (2%)
- Camel melange (1%, 2%)
- PC (52/48)
- Sewing thread.
- Poly acrylic threads (NOT 100%).

➤ Project Cost: 50 core Taka (Approximately).

Yarn dyeing section:

AREA: 1 LAKH sq. fit. Floor: MULTI-STORED FLOOR (25,000 sq.ft/floor).

PRODUCTION: **15 TONS** (Approximately). It has two lifts, two cranes of capacity=10 tons. There is a Bas Bar (have no wire) system to facilitate production.

➤ Different Departments:

Production Oriented Department:

- Yarn store
- Planning & Control
- Batching
- Chemical store
- Winding section
- Dyeing Section
- Finishing Section
- Dyeing lab section
- Wet lab
- Quality Control
- Maintenance
- Utility
- Water treatment plant
- Effluent treatment plant

Supporting department:

- Procurement
- Merchandising
- Marketing
- IT
- HRD
- Finance & accounting
- Medical
- Personnel Administration
- Security

➤ Remarks:

It's a wonderful project. Though it's a new project but profitable for it's strong management The main draw back was there is no Effluent treatment But within some days The Effluent treatment plant will be completed.

4.2 Different Sections:

4.2.1 Winding Section:

Soft winding section:

Total no. of m/c : 07
Total no of spindle : 510

➤ Machine Specification

M/c identification	: 01	Type	: PS6-W
Brand	: SSM	M/c no	:
Origin	:	883.0429/06	:
Switzerland, EU	:	Manufacture year	: 2007
Type	: TW2-W	U	: 400V
M/c no	:	I _{max}	: 32A
856.0130/06	:	F	: 50Hz
M/A No	:	No. of spindle	: 60
38937	:		
U	: 400V		
I _{max}	: 38A	M/c identification	: 03
F	: 50Hz	Brand	: SSM
No. of spindle	: 78	Origin	: Switzerland,
		EU	
M/c identification	: 02	Type	: PS6-W
Brand	: SSM	M/c no	: 883.0429/06
Origin	: Switzerland,	Manufacture year	: 2007
EU		U	: 400V
		I _{max}	: 32A

F : 50Hz
No. of spindle : 60

M/c identification : 04
Brand : SSM
Origin :
Switzerland, EU
Type : PS6-W
M/c no :
883.0429/06
Manufacture year : 2007
U : 400V
I_{max} : 32A
F : 50Hz
No. of spindle : 60

M/c identification : 05
Brand : SSM
Origin : Switzerland,
EU
Type : PS6-W
M/c no :
883.0429/06
Manufacture year : 2007
U : 400V
I_{max} : 32A
F : 50Hz
No. of spindle : 60

M/c identification : 06
Brand : FADIS
Origin : Italy
Type : SINCRO-T-
FT. P300
Plate no : G0022
Manufacture year : 2008
Power Kw : 12
Volt : 440
Ampere :
16
No. of spindle : 96

M/c identification : 07
Brand : FADIS
Origin : Italy
Plate no : G0022
Manufacture year : 2008
Power Kw : 12
Volt : 440
Ampere :
16
No. of spindle : 9

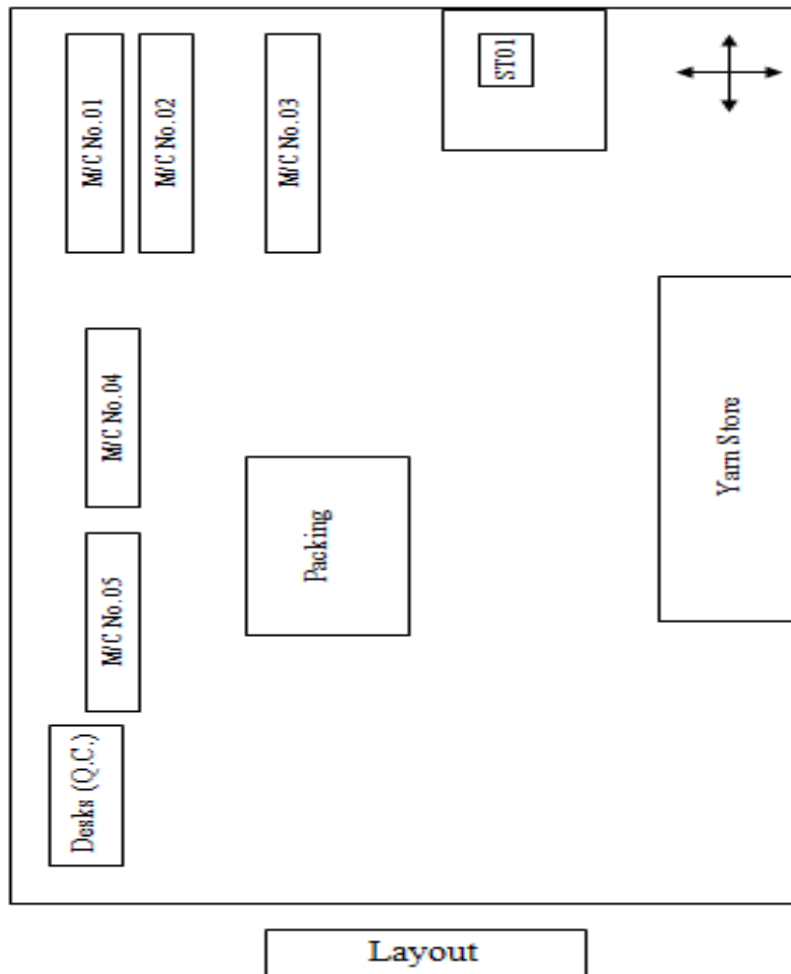


Figure-20: Layout of yarn dyeing unit

Controlling Parameters:

Traverse Length	:	For cotton-generally 14.7 cm Maximum 15 cm
Weight of yarn in each package	:	For polyester-generally 14 cm For cotton-generally 1100 gm For polyester-generally 800gm
Types of winding	:	2 types-DIGI & Precision
Length of yarn in each package	:	Depends on yarn count
Feeder	:	In SSM-10 to 35 (increases with the
fineness		of yarn) In Fadis-generally 30% (independent of count)
Tension	:	Decreases with fineness of yarn
Diameter of full package	:	generall-16 cm maximum-17 cm

Package density Calculation

Empty bobbin diameter, d_e : 6.5 cm
Full bobbin diameter, d_f : 17 cm
Traverse length, l : 15 cm
Weight of yarn in a package : 1100 gm

$$\begin{aligned}\text{Volume of yarn in a package} &= \pi(d_f/2)^2h - \pi(d_e/2)^2h \\ &= 3.14 * 15 * \{(17/2)^2 - (6.5/2)^2\} \\ &= 2905.48 \text{ cm}^3\end{aligned}$$

$$\begin{aligned}\text{Package density} &= \frac{\text{weight of yarn in a package}}{\text{volume of yarn in a package}} \\ &= \frac{1100.00}{2905.48} \\ &= 0.379 \text{ gm/cm}^3\end{aligned}$$

Production Calculation

M/c speed : 1000rpm
Total no. of spindle : 510
Efficiency : 85% (assume)
Count (Ne) : 30 (assume)

$$\begin{aligned}\text{Production} &= \frac{\text{m/c speed} * 60 * 24 * \text{no.of spindle} * \text{efficiency} * 1.09}{840 * \text{count (Ne)} * 2.2024} \\ &= \frac{1000 * 60 * 24 * 510 * 0.85 * 1.09}{840 * 30 * 2.2024} \\ &= 12260 \text{ Kg/day}\end{aligned}$$

Hard Winding Section

Total No. of Machine : 5

➤ Machine Specification

M/c identification	:	01	M/c no	:	
Brand	:	SSM	863.0029/07	:	
Origin	:	Switzerland,	U	:	400V
EU	:		I _{max}	:	28A
Type	:	CW2-W	F	:	50Hz
M/c no	:		No. of spindle	:	96
863.0029/07	:			:	
U	:	400V	M/c identification	:	04
I _{max}	:	28A	Brand	:	FADIS
F	:	50Hz	SPA	:	
No. of spindle	:	96	Origin	:	Italy
	:		Type	:	SINCRO-T-
M/c identification	:	02	FT/RT	:	
Brand	:	SSM	Manufacture year	:	2008
Origin	:		Power Kw	:	12
Switzerland, EU	:		Volt	:	440
Type	:	CW2-W	Ampere	:	:
M/c no	:		16	:	
863.0029/07	:		No. of spindle	:	96
U	:	400V	M/c identification	:	05
I _{max}	:	28A	Brand	:	FADIS
F	:	50Hz	SPA	:	
No. of spindle	:	96	Origin	:	Italy
	:		Manufacture year	:	2008
M/c identification	:	03	Power Kw	:	12
Brand	:	SSM	Volt	:	440
Origin	:	Switzerland,	Ampere	:	:
EU	:		16	:	
Type	:	CW2-W	No. of spindle	:	96
	:			:	
M/c identification	:	Sewing Thread Winding			
Brand	:	HACOBA			
Origin	:	Switzerland,			
Year	:	2007			
U	:	400V			
I _{max}	:	68A			
F	:	50-60 Hz			
No. of spindle	:	12			

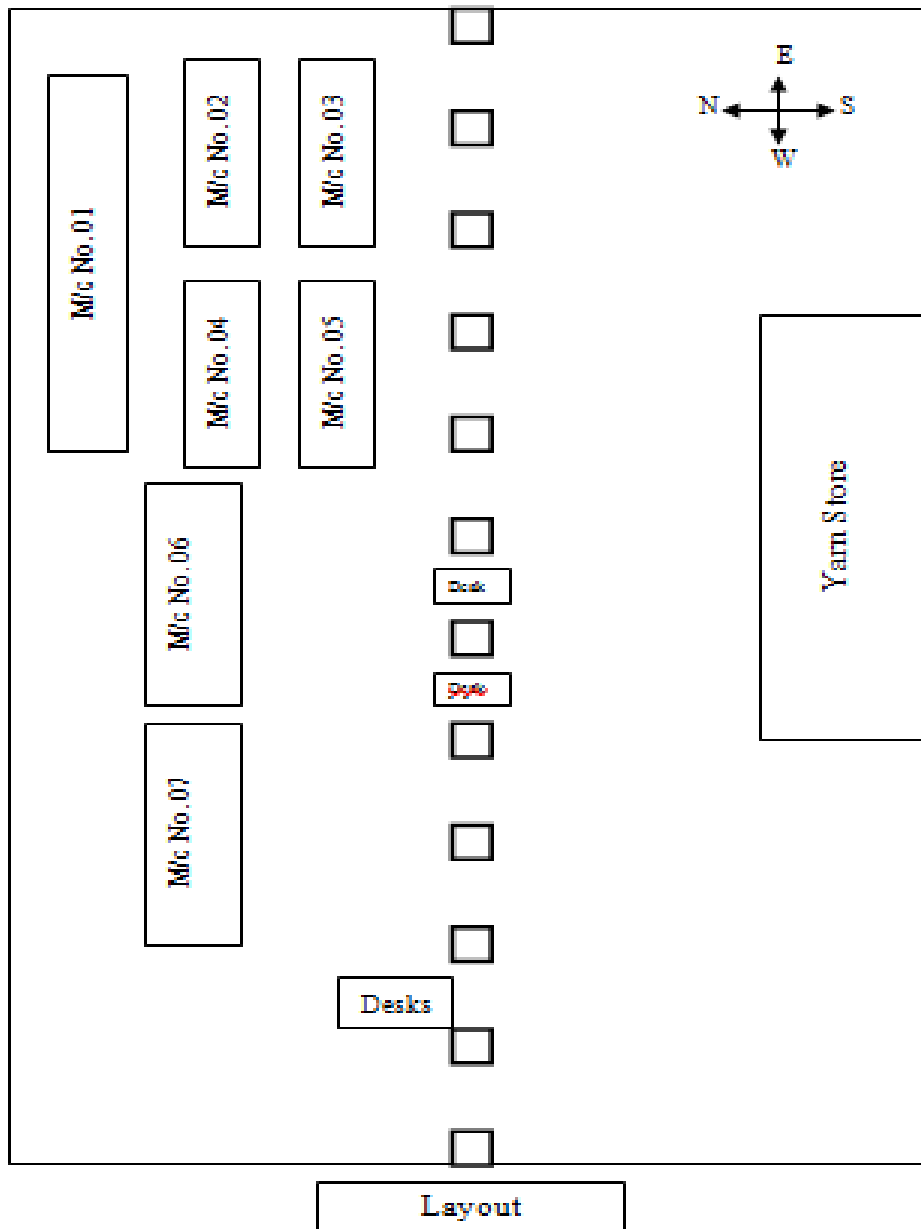


Figure-21: Layout of hard winding section

Controlling Parameters:

For m/cs 1-5

- Winding speed : 800 m/min
- Initial Traverse : 157 mm
- Tension : 5-6 gm

For Sewing Thread winding m/c

- Winding speed : 1000 m/min
- Traverse length : 105 mm
- Yarn length : 4000m
- Full bobbin dia : 70mm

4.2.2 Laboratory

➤ Main Responsibility

- Accepting the 'Swatch' from the buyer and analyze the color & Dyes.
- Preparing the Recipe accurately matching the required color.
- Storing & maintain the dyes to be used for dyeing.
- Producing self-shades & storing it into the computer.
- Record & analysis of chemicals & dyes quality.
- Making plans for bulk dyeing.
- Following the color coding system given by the distinctive buyer & also prepare own color bank.
- Testing the dyed goods.

➤ Lay-out

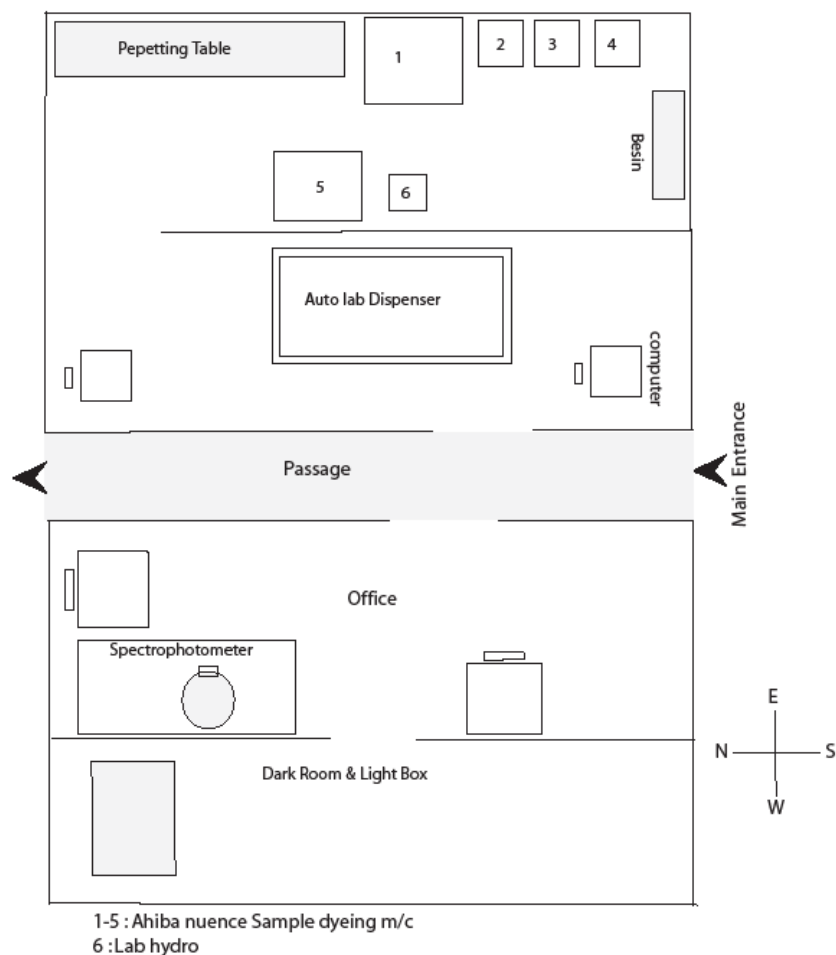


Figure-22: Layout of yarn dyeing lab

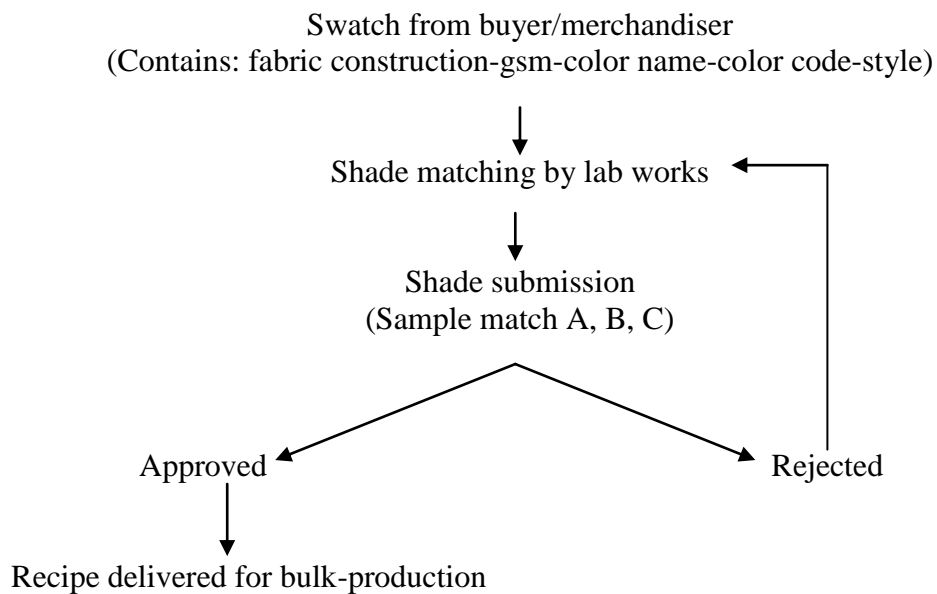
➤ **List of Machines in Yarn Lab:**

1. Sample yarn dyeing m/c
2. Sample dryer
3. Data color Spectrophotometer
4. Auto Lab dispenser
5. Computer



Figure-23: Auto Lab Dispenser

➤ **Flow of work:**



4.2.3 Dyeing Section:

Dyeing Machine Specification:

- Brand: Fong's International co.
- Made in Hong-Kong, China.
- Total number of Dyeing Machine: BULK – 14 SAMPLE – 6
- Total Production Capacity – approx. 12~13 tons/day



Figure-24: Yarn dyeing floor

- Bulk machine: Brand: Fong's International co.

Design parameters: (according to layout plan)

Dyeing Machine No-01

M/c No.:all win -43-6A

CAPACITY:30 KG

YEAR OF MANUFACTURE :2007

DESIGN PRESSURE (Kpa):520

TEMP.(⁰C):140

HYDROULIC TEST

PRESSURE(kpa):800

TEST DATE:2007

SAFETY VALVE SET(kpa):520

M/c No.:all win -53-6A

CAPACITY:53 KG

YEAR OF MANUFACTURE :2007

DESIGN PRESSURE (Kpa):520

TEMP.(⁰C):140

HYDROULIC TEST

PRESSURE(kpa):800

TEST DATE:2007

SAFETY VALVE SET(kpa):520

Dyeing Machine No-02

Dyeing Machine No-03

M/c No.:all win -53-8A

CAPACITY:53 KG

YEAR OF MANUFACTURE :2007
DESIGN PRESSURE (Kpa):520
TEMP.(⁰C):140
HYDROULIC TEST
PRESSURE(kpa):800
TEST DATE:2007
SAFETY VALVE SET(kpa):520

Dyeing Machine No-04
M/c No.:all win -70-9A

CAPACITY:100 KG
YEAR OF MANUFACTURE :2006
DESIGN PRESSURE (Kpa):520
TEMP.(⁰C):140
HYDROULIC TEST
PRESSURE(kpa):800
TEST DATE:2006
SAFETY VALVE SET(kpa):520

Dyeing Machine No-05

M/c No.:all win -85-9A
CAPACITY:200 KG
YEAR OF MANUFACTURE :2007
DESIGN PRESSURE (Kpa):520
TEMP.(⁰C):140
HYDROULIC TEST
PRESSURE(kpa):800
TEST DATE:2007
SAFETY VALVE SET(kpa):520

Dyeing Machine No-06

M/c No.:all win -85-9A
CAPACITY:200 KG
YEAR OF MANUFACTURE :2007
DESIGN PRESSURE (Kpa):520
TEMP.(⁰C):140
HYDROULIC TEST
PRESSURE(kpa):800
TEST DATE:2007
SAFETY VALVE SET(kpa):520

Dyeing Machine No-07

M/c No.:all win -120-9A
CAPACITY:400 KG
YEAR OF MANUFACTURE :2007
DESIGN PRESSURE (Kpa):520
TEMP.(⁰C):140
HYDROULIC TEST
PRESSURE(kpa):800
TEST DATE:2007

SAFETY VALVE SET(kpa):520

Dyeing Machine No-08
M/c No.:all win -120-9A

CAPACITY:400 KG
YEAR OF MANUFACTURE: 2007
DESIGN PRESSURE (Kpa):520
TEMP.(⁰C):140
HYDROULIC TEST
PRESSURE(kpa):800
TEST DATE:2007
SAFETY VALVE SET(kpa):520

Dyeing Machine No-09
M/c No.:all win -145-9A.

CAPACITY:400 KG
YEAR OF MANUFACTURE: 2007
DESIGN PRESSURE (Kpa):520
TEMP.(⁰C):140
HYDROULIC TEST
PRESSURE(kpa):800
TEST DATE:2007
SAFETY VALVE SET(kpa):520

Dyeing Machine No-10
M/c No.:all win -145-9A

CAPACITY:600 KG
YEAR OF MANUFACTURE: 2007
DESIGN PRESSURE (Kpa):520
TEMP.(⁰C):140
HYDROULIC TEST
PRESSURE(kpa):800
TEST DATE:2007
SAFETY VALVE SET(kpa):520

Dyeing Machine No-11
M/c No.:all win -145-9A

CAPACITY:600 KG
YEAR OF MANUFACTURE :2007
DESIGN PRESSURE (Kpa):520
TEMP.(⁰C):140
HYDROULIC TEST
PRESSURE(kpa):800
TEST DATE:2007
SAFETY VALVE SET(kpa):520

Dyeing Machine No-12

M/c No.:all win -145-12A

CAPACITY:800 KG
YEAR OF MANUFACTURE :2007
DESIGN PRESSURE (Kpa):520
TEMP.(⁰C):140
HYDROULIC TEST
PRESSURE(kpa):800
TEST DATE:2007
SAFETY VALVE SET(kpa):520

Dyeing Machin No-13

M/c No.:all win -166-12A

CAPACITY:1000 KG
YEAR OF MANUFACTURE :2007
DESIGN PRESSURE (Kpa):520
TEMP.(⁰C):140
HYDROULIC TEST
PRESSURE(kpa):800
TEST DATE:2007
SAFETY VALVE SET(kpa):520

Dyeing Machine No-14

M/c No.:all win -205-12A

CAPACITY:1600 KG
YEAR OF MANUFACTURE :2007
DESIGN PRESSURE (Kpa):520
TEMP.(⁰C):140
HYDROULIC TEST
PRESSURE(kpa):800
TEST DATE:2007
SAFETY VALVE SET(kpa):520

➤ **SAMPLE MACHINE**

Dyeing Machine No-01 (2 m/cs – a,b)

M/c No.: microwin -1

CAPACITY: 300 gm.
YEAR OF MANUFACTURE: 2007
DESIGN PRESSURE (Kpa): 520
TEMP. (⁰C): 140
HYDROULIC TEST PRESSURE (kpa):
800
TEST DATE: 2007
SAFETY VALVE SET (kpa): 520

Dyeing Machine No-02

M/c No.:LAB win 12-K1.

CAPACITY: 14gm
YEAR OF MANUFACTURE: 2007
DESIGN PRESSURE (Kpa): 700
TEMP. (⁰C): 170
HYDROULIC TEST PRESSURE (kpa):
1200
TEST DATE: 2007
SAFETY VALVE SET (kpa): 700

Dyeing Machine No-03

M/c No.: LAB win 12-K1.

CAPACITY: 14gm
YEAR OF MANUFACTURE: 2007
DESIGN PRESSURE (Kpa): 520
TEMP.(⁰C):140
HYDROULIC TEST PRESSURE (kpa):
800
TEST DATE: 2007
SAFETY VALVE SET (kpa): 520

Dyeing Machine No-04

M/c No.: LAB win 6-K0.

CAPACITY: 7 kg
YEAR OF MANUFACTURE: 2007
DESIGN PRESSURE (Kpa): 520
TEMP. (⁰C):140
HYDROULIC TEST PRESSURE (kpa):
800
TEST DATE: 2007
SAFETY VALVE SET (kpa): 520

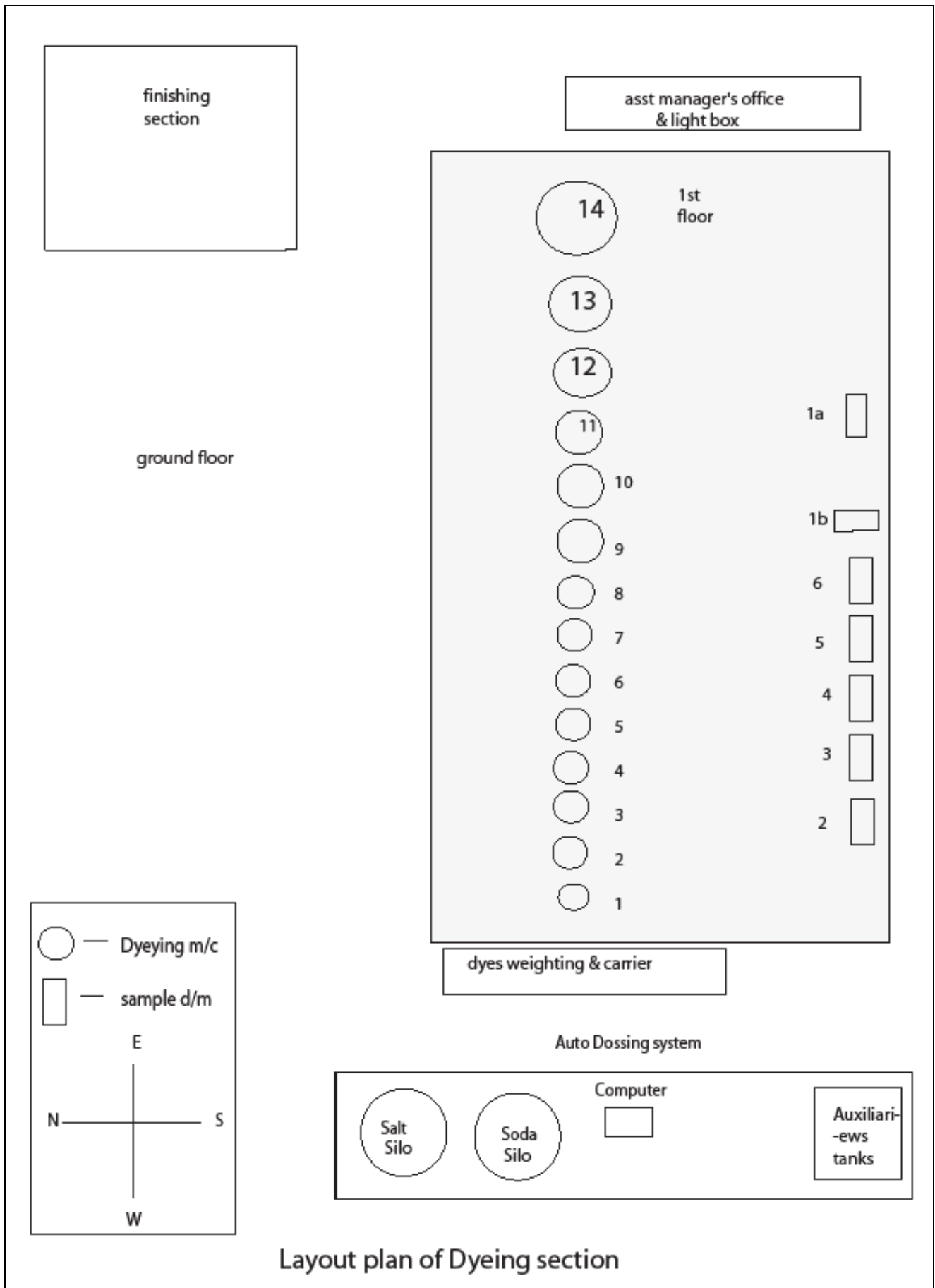
Dyeing Machine No-05

M/c No.: LAB win 6-K0.

CAPACITY: 7 kg
YEAR OF MANUFACTURE: 2006
DESIGN PRESSURE (Kpa):520
TEMP.(⁰C):140
HYDROULIC TEST PRESSURE (kpa):
800
TEST DATE: 2006
SAFETY VALVE SET (kpa): 520

➤ Detailed capacity of dyeing machines:

M/C CAPACITY	NO. OF CARRIER	NO OF PACKAGE PER CARRIER	TOTAL NO. OF PACKAGE (each 1.1 kg)	TOTAL WEIGHT (Kg)
1600	108	12	1296	1425
1000	69	12	828	910
800	54	12	648	715
600	54	9	486	534
400	36	9	324	356
200	18	9	162	178
100	9	9	81	89
60	6	8	48	53
50	6	6	36	39
30	4	6	24	26



Layout plan of Dyeing section

Figure-25: Layout plan of dyeing section

Working Mechanism of Dyeing m/c

- Type of Dyeing m/c: Fong's High Temperature High Pressure Package dyeing m/c.
- Package type: Loosely wound Cone (from soft winding)



Vertical Yarn Dyeing Machine

Rakib 31st

➤ Main Parts:

1. Main vessel:
 - large vertical metal alloy vessel, specially designed to withstand high temperature & pressure.
 - connected with several lines & pipes from different sections like from auto dosing, manual dosing tanks, steam lines, exhaust pressure line etc.
 - vessel contains number of spindles & package carriers (as shown in figure below)



2. *Perforated bobbins & mechanical load-unload system:*

The soft wound packages are wound into a perforated steel bobbin tube by which the liquor can be spread from inside the bobbins. The figure shows related operations.



3. Preparation tank & manual dosing tanks:

- One large preparation tank, which is used to transfer the liquor from the main vessel when necessary for e.g. during shade checking. It's also used for mixing salts or soda solution directly from auto-dosing lines. It contains separate steam & cold water lines.
- Two small separate dosing tanks used for optional purpose & for dyes dosing.

4. Motors & Valves:

- Different types of motors used in dyeing m/c. For example,

1. Stirrer motor.
2. Circulation pump.
3. feed-pump.
4. Dosing pump.
5. Preparation tank pump.

- Different types of valves are used in the dyeing m/c. for example,

1. steam inlet
2. water inlet
3. cooling water inlet
4. overflow
5. drain
6. condensate outlet
7. main fill
8. exhaust valve

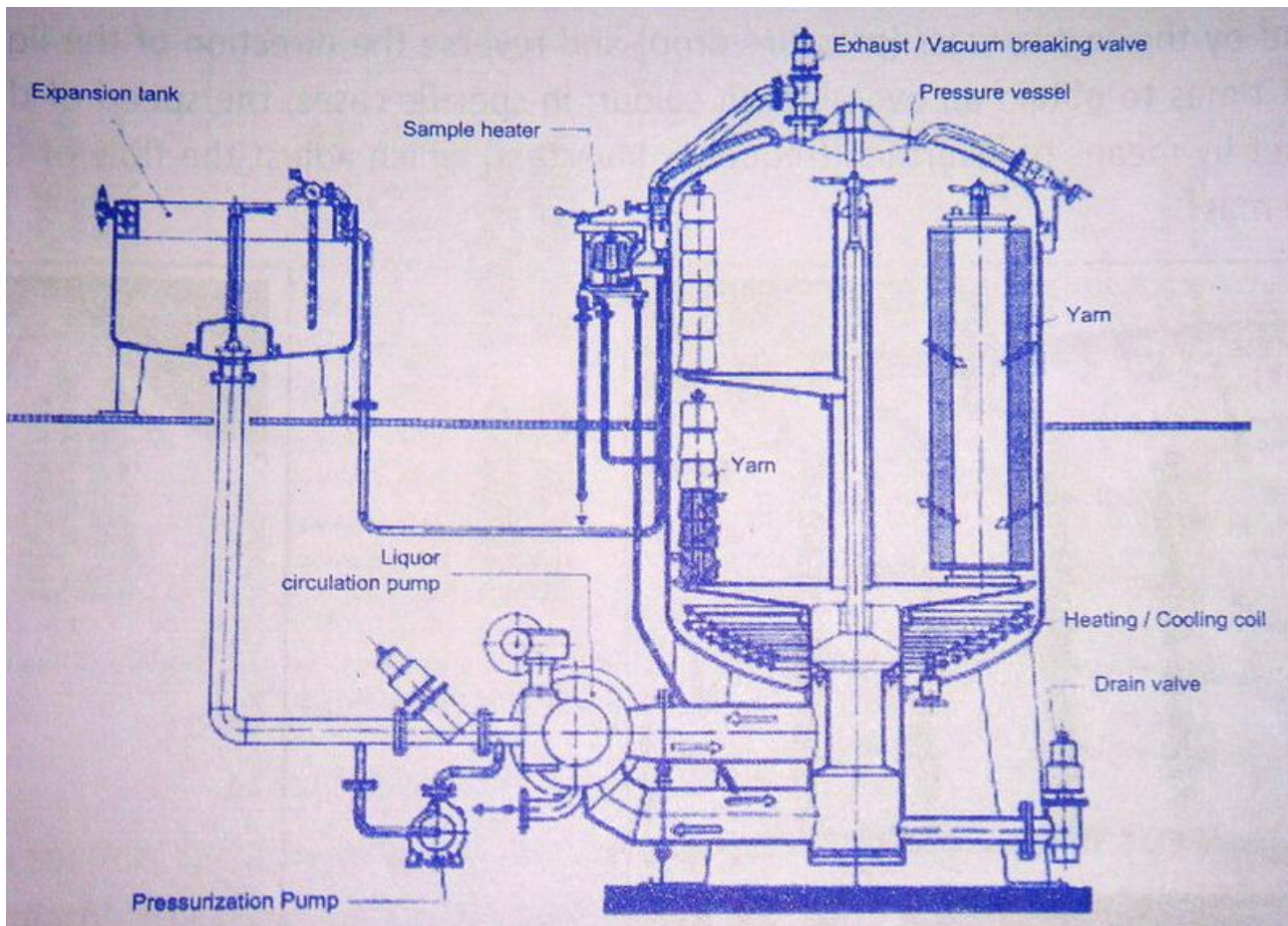


Fig-27: a schematic view of vertical yarn dyeing m/c

5. Heat-exchanger & Liquor Circulation System:

Heat-exchanger is the most important part of dyeing machine. Here, two separate inlet & outlet line of steam & cold water. These are used alternatively for heating & cooling the liquor temperature.

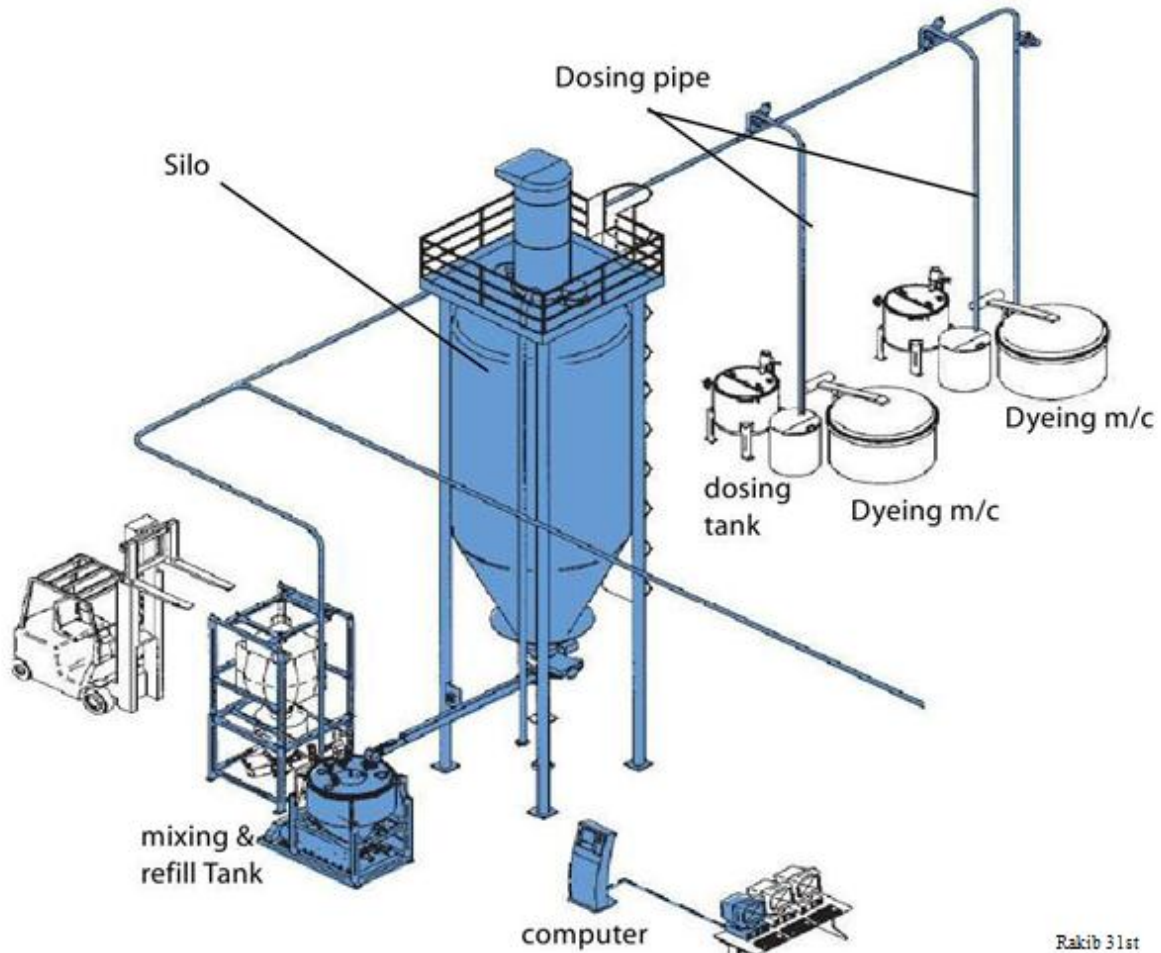
Liquor is pumped & sucked by the main circulation pump alternatively. Thus the heated or cold liquor circulates from 'in-out' or 'out-in' path through the perforated packages alternatively. These ensure maximum contact of the liquor with the substrate. This alternate process is done by a special type electronically controlled actuator

4.2.4 Auto dosing system

- All the chemicals required for dyeing operation are mixed in the dye bath automatically from "auto dosing system"
- It is an integrated system controlled by computer which involves all the calculation required for exact amount of chemicals needed for dyeing a particular recipe.
- No. of tanks:- 17

Two large tanks (**SILO**) for Salt & Soda – Soda tank: 16 ton
 Salt tank: 31 ton
 Salt & Soda are made solution in the mixing tanks before storing into Silos. There are 3 mixing tanks-

- a) Common mixing tank for both soda & salt – 1000 li.
- b) Salt mixing tank – 1000 lit – 1.5 lit water per kg of salt.
- c) Soda mixing tank – 1000 lit – 2.5 lit water per kg of soda



Layout plan for Salt or Soda silo auto-dosing system

8. Chemical Tanks -total: 15

- a) 14000 lit – 1 tank – Hydrogen Per Oxide Solution
- b) 2000 lit – 2 tanks – Acetic Acid & Softeners
- c) 1200 lit – 12 tanks –
 1. Demineralization & Sequester.
 2. Antifoam
 3. Soaping agent
 4. Detergent.
 5. Deaerating agent.
 6. Sequester.
 7. Stabilizer.
 8. Anti-creasing
 9. Sequester 2.

- 10. Stabilizer 2
- 11. Detergent 2
- 12. Caustic Soda



Figure-29: Chemical dosing storage tanks

4.2.5 Finishing Section

➤ Radio frequency dryer:

No. of m/c : 3
 Manufacturer : STRAYFIELD, England. (2) 2007
 STALAM, Italy. (1)

Radio Frequency Dryer allows the drying of natural and man-made fibers in staple, hank, cone, package and top form normally immediately after hydro-extraction. The result is good uniformity and better final handling.

Advantages

- Uniform drying at low temperature
- Selective heating that only the humid parts are heated
- Energy saving (1.2 kg water per kW/hr high frequency power)
- Power consumption directly proportional to humidity contents
- Improved fiber quality and softness
- Residual humidity controlled within 1%
- Constant and repeatable drying level
- Space saving and possibilities of automation
- Time saving
- Instant controls and adjustments



A 40W STRAYFIELD RF dryer

Strayfield:

- a) Maximum capacity: 3600 kg
- b) Supply voltage: 380-420 v. 230 KVA
- c) Conveyor belt speed: Cotton – 8-12 m/hr Polyester – 13-16 m/hr
- d) Two drying chambers
- e) RF power: 100 KW

Stalam:

- a) Capacity: 4000 kg
- b) Installed power: 250 KVA
- c) Conveyor belt speed: 8-9 m/hr
- d) Two chambers
- e) RF power: 150 KW

➤ Hydro extractor:

- No. of m/c : 2
- Manufacturer : DETTIN, Italy. 2007
- Capacity : 108 kg
- Rotation Speed: 1470 rpm
- Power : 16 KW
- Package holder: 96
- Centrifugal chamber: 2
- Duration of Rotating: 8 min



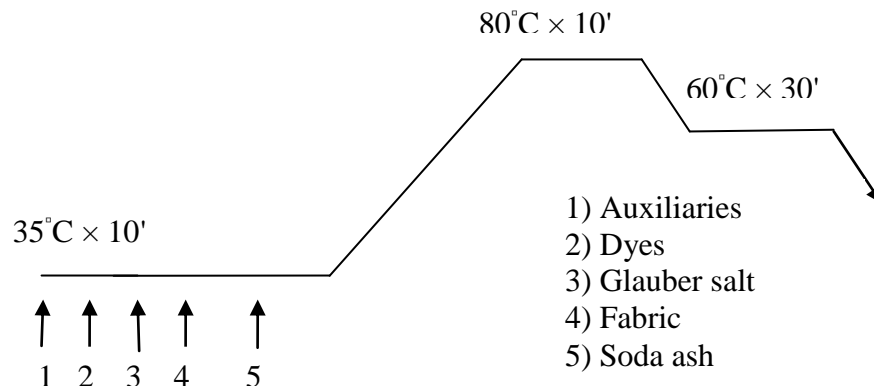
Figure-31: Package arrangement in dyeing machine

4.3 Production Process

Laboratory:

Lab is the heart of the textile industry Higher precision lab can aid easily to achieve the goal of the organization Before bulk production a sample for the approval from industry is sent to the buyer As per the requirement of the buyer the shade is prepared in a lab considering the economic aspects .

Laboratory standard dyeing curve for cotton:



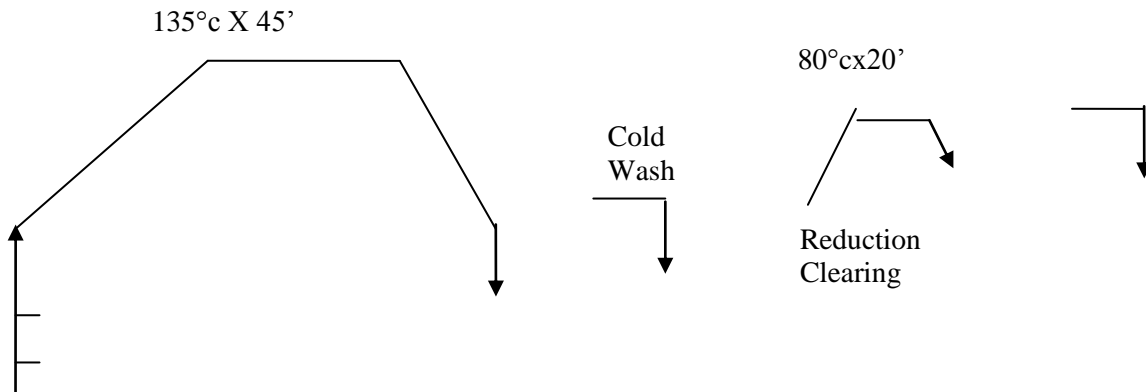
Salt Alkali & acid requirement:

Dyestuff	%	<0.5	0.6 -1.0	1.10-2.0	2.10-3.0	3.10-5.0
Glauber Salt	g /L	20	30	40	50	60
Soda ash	g /L	10	10	15	15	20
Acetic Acid	ml	0.5	0.5	0.5	0.5	0.5

Amount of Caustic:

Dye	Shade %	Amount(g/L)
Black	6-7	1
Red	>5	0.5-1

Laboratory standard dyeing of polyester:



Chemicals	Limit (g/L)
UNIVADINE DIF	1
CIVATEX -AB- 45	1
Acetic Acid	1
pH	4-4.5
Time	45 min
Temp.	130°C

For Reduction Cleaning:

Chemicals	%	Medium Shade	Dark Shade
Detergent	g/L	0.5	0.5
Caustic Soda	g/L	1	2
Hydrose	g/L	2	4
Acetic Acid	g/L	0.5	0.5

Lab line:

1. Standard sample:

The buyer to the merchandising section of the industry gives the order by colored swatch or by using PANTONE BOOK CODE. This is called Standard sample. The sample is measured by the CCM to get the recipe. The most recipes are chosen by metamerism value under three light source, price & dyestuff availability. Naturally up to 0.5 is accepted Sometimes some buyer supply the reflectance curve & reflectance % of different wavelength from 400 -700 nm. Data are input to the computer, most recipes are chosen by same way.

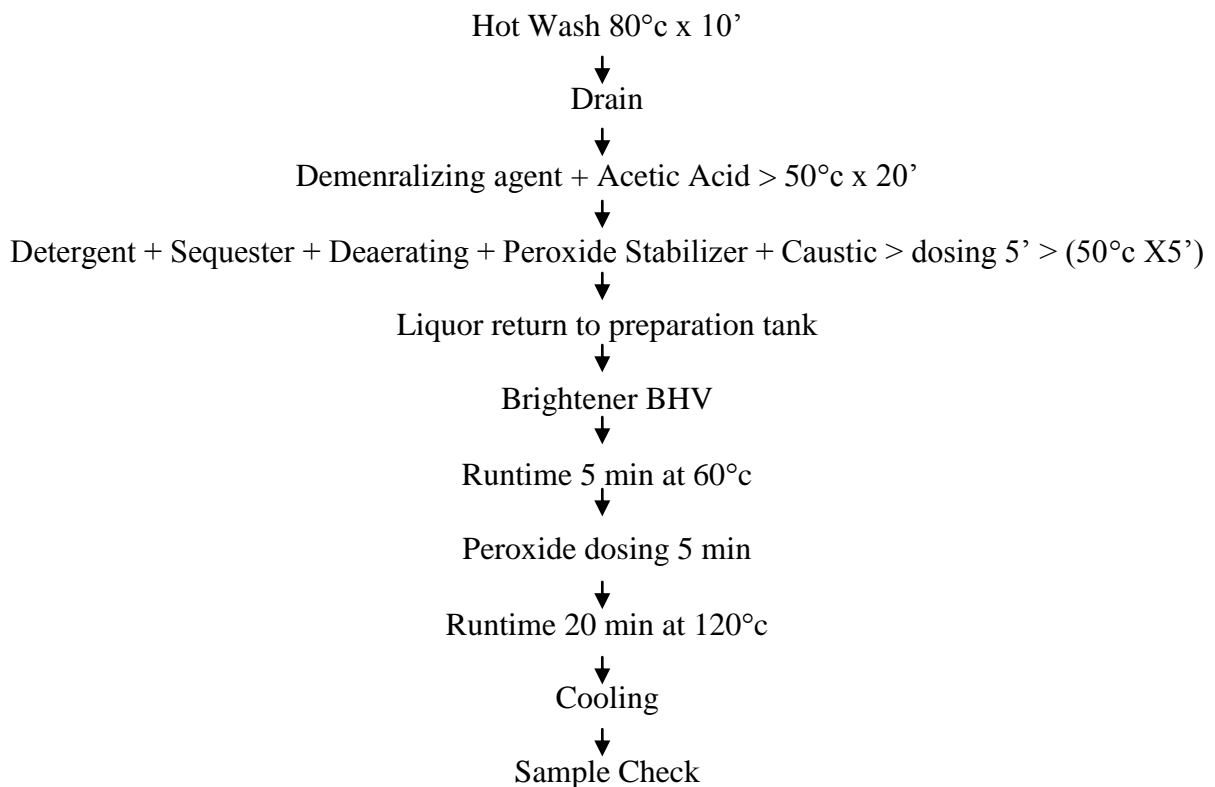
2. Lab trial:

Getting the recipe the lab officer produce lab trial & match with standard according to buyer requirement Lab trial is made by the AHIBA dyeing machine.

PROGRAM NO	TEMPERATURE (°C)	TIME (min)
01	100	60
02	90	60
03	80	60
04	60	60
05	130	45
06	98	45

Bulk Dyeing Process

Process for White Shade:



➤ Process follow-up:

Yarn dyeing recipe #1

Shade : 55-006 (Pink)
Yarn Type : 40/1, Comb

	Auxiliaries/Chemicals	Amount (g/L)	Amount (%)
P	Demineralization		
	Sirrix 2UD (Sequestering)	1.0	-

R	Acetic Acid	0.3	-
E	Scouring & Bleaching		
T	Kappawet BOS (Detergent)	1.5	-
R	Kappaquest FE (Sequestering)	0.5	-
E	Parmagen NF (Deaerating)	0.2	-
A	Kappazon H53 (Stabilizer)	1.0	-
T	Caustic Soda	2.0	-
M	H ₂ O ₂ (50%)	3.0	-
E	Hot wash with Peroxide Killer		
N	Chromalese PQ	0.3	-
T	Neutralization after Bleaching		
DY	Acetic Acid	0.5	-
E	Dyeing		
I	Cibacell DBC (Levelling)	1.5	-
NG	Kappaquest FE (Sequestering)	0.5	-
	Parmagen NF (Deaerating)	0.25	-
	Imcozin Red E3BF	-	0.52716
	Imcozin Orange E2R	-	0.05344
	Imcozin Blue ENR	-	0.0057
	Glauber Salt	25	-
	Soda	15	-
A	Neutralization after dyeing		
F	Acetic Acid	1.0	-
T	Soaping		
E	Albatex AD (Washing off)	1.0	-
R	Finishing		
T	Permafix RD (Fixing)	-	0.5
R	Tubingal 1112 (Softener)	-	1.5
E	Oiling CT-200 (Softener)	-	1.5
A			
T			
M			
E			
N			
T			

M:L :
1:7

YARN DYEING RECIPE #2

SHADE : Grass Green
 YARN TYPE : 30/1, COTTON
 M:L : 1:7

Auxiliaries/Chemicals		Amount (g/L)	Amount (%)
P R E T R E A T M E N T	Demineralization		
	Sirrix 2UD (Sequestering)	1.0	-
	Acetic Acid	0.3	-
	Scouring & Bleaching		
	Kappawet BOS (Detergent)	1.5	-
	Kappaquest FE (Sequestering)	0.5	-
	Parmagen NF (Deaerating)	0.2	-
	Kappazon H53 (Stabilizer)	1.0	-
	Caustic Soda	2.0	-
	H ₂ O ₂ (50%)	3.0	-
	Hot wash with Peroxide Killer		
	Chromalese PQ	0.3	-
	Neutralization after Bleaching		
	Acetic Acid	0.5	-
D Y E I N G G A F T E R T R E A T M E N T	Dyeing		
	Cibacell DBC (Levelling)	2.0	-
	Kappaquest FE (Sequestering)	0.5	-
	Parmagen NF (Deaerating)	0.25	-
	Synozol Yellow KHL	-	0.368
	Synozol Red KHL	-	0.0215
	Synozol Blue KRL	-	0.2419
	Glauber Salt	25	-
	Soda	15	-
		Neutralization after dyeing	
	Acetic Acid	1.0	-
	Soaping		
	Albatex AD (Washing off)	0.3	-
	Finishing		
	Permafix RD (Fixing)	-	0.5
	Tubingal 1112 (Softener)	-	1.5
	Oiling CT-200 (Softener)	-	1.5

Yarn Dyeing Recipe #3

Shade : 9ul Turquoise
Yarn Type : 24/1, Comb
M:L : 1:6.67

	Auxiliaries/Chemicals	Amount (g/L)	Amount (%)	
P R E T R E A T M E N T	Demineralization			
	Sirrix 2UD (Sequestering)	1.0	-	
	Acetic Acid	0.3	-	
	Scouring & Bleaching			
	Kappawet BOS (Detergent)	1.5	-	
	Kappaquest FE (Sequestering)	0.5	-	
	Parmagen NF (Deaerating)	0.2	-	
	Polydye ST 1133 (Stabilizer)	1.0	-	
	Caustic Soda	2.0	-	
	H ₂ O ₂ (50%)	3.0	-	
	Hot wash with Peroxide Killer			
	Chromalese PQ	0.3	-	
	Neutralization after Bleaching			
	Acetic Acid	0.5	-	
	D Y E I N G	Dyeing		
		Cibacell DBC (Levelling)	2.0	-
		Kappaquest FE (Sequestering)	0.5	-
Parmagen NF (Deaerating)		0.25	-	
Bezaktiv Yellow S3R		-	0.00288	
Bezaktiv Blue SLF		-	0.79	
Bezaktiv Turquoise H-A		-	1.94	
Glauber Salt		60	-	
Soda		20	-	
A F T E R T R E A T M E N T		Neutralization after dyeing		
	Acetic Acid	1.0	-	
	Soaping			
	Albatex AD (Washing off)	1.0	-	
	Finishing			
	Permafix RD (Fixing)	-	1.5	
	Tubingal 1112 (Softener)	-	1.5	
	Oiling CT-200 (Softener)	-	1.5	

Quality assurance system

Quality is always a vital parameter for customers' satisfaction. No matter what is the job you perform, but your contribution is also a matter of fact. Here the top management is concerned about that & thus build up a reasonable "Quality Control" department.

Task(s) of Q.C. Department

- Initial check (checking of yarn quality)
- Final check (checking of yarn properties after dyeing, finishing & hard winding)

Initial check

- Strength
- Count (specially of melange)
- T.P.I (specially of melange)

Final Check

- Strength
- Shade (both of yarn & fabric)
- Fastness (wash & rubbing)
- Evenness of dyeing
- Layer check
- Waxing check

CHAPTER-5 UTILITY SECTION

5.1 Water Treatment Plant:

WATER

The major concern for any kind of wet process industry is 'Water' because it is the quality of water which determines the quality of dyeing. Water quality generally vary in different areas, also depends on the level or height of water level beneath the ground. In Narayangonj water level is around 130-140 ft but Knit Concern dyeing water is lifted from about 600 ft deep by submergible pumps.

- There are three pump units available here –
 1. Knit Dyeing – 3 pumps
 2. Yarn Dyeing – 2 pumps
 3. Printing – 2 pumps
- Quality of Water found in the raw water here –

total Hardness	– 250-300 ppm
pH	– 8-9
TDS	– 2000-3000 ppm

- Quality of water required for Dyeing:

	<u>Hardness</u>	<u>Iron content</u>	<u>TDS</u>	<u>pH</u>
<u>Knit dyeing</u> -	<70	0.02 ppm	<500	6.5-7
<u>Yarn dyeing</u> -	<50	0.02 ppm	<500	6.5-7

- Water Treatment Plant:

Three Water Treatment Plants in Knit concern.

Plant 1&2	:	KCL Knit dyeing	–	Capacity	250000 lit/hr
Plant 3	:	KCL Yarn dyeing	–	Capacity	150000 lit/hr

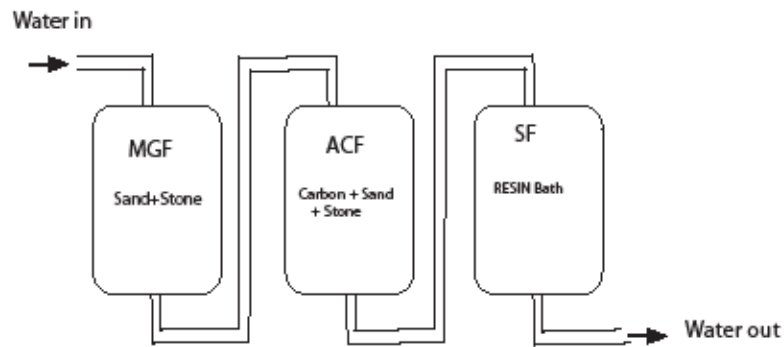
In plant 1&2: Raw water tank capacity – 288222 lit & 660000 lit

Treated water Reserve tank capacity – 960000 lit

- Plant Description: **Demineralization by Resin treatment**

Three vessels system –

Vessel – 1	– Multi-Grade Filter (MGF) – For Iron Removal
Vessel – 2	– Activated Carbon Filter (ACF) – For TDS removal
Vessel – 3	– Softener Filter (SF -Resin) – For Hardness removal



Water Demineralization Treatment Plant



Figure-32: WTP

➤ Water distribution system:

- By booster pump treated water is supplied to the dyeing m/c pipe line, where, 4 kg pressure is always kept constant by automatic controlling of booster pumps.
- Total 3 sets of booster pumps each contain 6 pumps.
- Water is drawn by the m/c by centrifugal pumps.

5.2 Steam Boiler:

Steam:

Steam is an important utility for dyeing section. Steam produced by the boiler Supply water is simply treated in the boiler section by the two softener tank Then water reserves to the feed water tank & this feed water tank warms the water Then water passes to the boiler which produces steam & that steam supplies to the factory .

Main parts of the boiler :

- Gas Chamber
- Blower
- Gauge glass
- Safety valve
- Burner

No of boiler : 03
Type of boiler : Horizontal, Fire tube boiler
Brand : LOOSE INTERNATIONAL (Germany)



Figure-33: Steam Boiler

Capacity : 10 ton/hr
Fuel : natural gas,Diesel.
Steam Consumption : 2300 kg/hr for 1200-1500 products.
Steam pressure : 7-8 bar
Water pressure : 3-4 bar
Steam temp : 180°-190°C
Boiler Temp : 300°C
Chemical Used : For antiscalant, Tandex SD 15
Tandex BWS
Tandex BWT
For Wash, Sulphuric acid+Para sulphates+Caustic+Nelbross+Nalco
Feed water Quality : pH – 7-8
TDS – 430-530
Hardness - <2 ppm
Power Consumption : 40

5.3 ELECTRICITY/GENERATOR:

- Total Generator: 4
- Types : Diesel Generator – CAT (USA) – capacity – 1710 KW
Gas Generator – WAVKESHA – Capacity – 1100 KW (2) & 900 KW

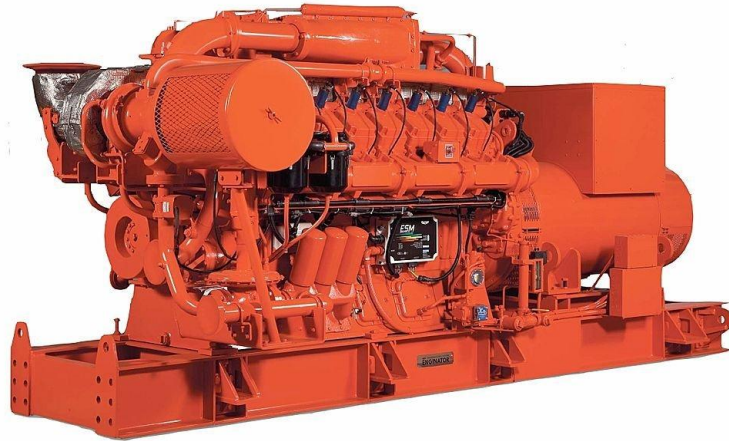


Figure-34: Gas Generator

- Total Requirement – 2-2.5 MW/day (3500-4000 kAmp current)
- Total Output of Three Gas generators – 2100-2500 kw
- Pressure required for Gas generators – 222 kpa for 1100 kw & 145 kpa for 900 kw.
- Line Pressure – 13 to max 145 kpa

5.4 Compressed Air/Compressor:

Natural gas is drawn by pipe through the filter above the compressor & the air is compressed. In such a case the air becomes slightly hot. Hence cold water is drawn to reduce the temperature of compressed air. Thus the cold water becomes slightly hot & goes through outlet pipe to the overhead reservoir. Then the water falls slowly through a compressed air along with some vapors are transferred to the reservoir where the vapours are condensed & outlets drop by drop.

The moist compressed air is transferred to the dryer & a slight warm compressed air is delivered to require sections of KCL.

Source : Natural Air

M/C Name: Compressor

Brand: BOGGE (Germany)

CECATTO (ITALY)

No of m/c : 04

Capacity : 27,0001/hr, 1800 1/hr.

Unloading pressure : 7.2 bar

Loading pressure : 5.6 bar

Chemical Used: Grease, Oil AMERIL

5.5 Effluent Treatment Plant:

- Type Of Plant – Biological
- Approximate Area – 20 katha
- Set up completed by Italian Technology

▪ Project Description:

Tank/Unit	Function
1. Screen Brush	Big particle & materials remover.
2. Lifting Pump Unit	Automatic flow lifter with level-sensored pumps.
3. Storage & Homogenizing Tank	<ul style="list-style-type: none"> - mixing by air circulation - reduce temperature - convert dissolved particles into suspension - storing for 24 hrs - pH 11-12
4. Nutralization tank	<ul style="list-style-type: none"> - to nutralize the alkalinity by dozing sulphuric acid (98%) - pH 7-9
5. Distributor tank	<ul style="list-style-type: none"> - Passes & store the nutralized effluent water. - Sludge return
6. Biological & Oxidation Tank	<ul style="list-style-type: none"> - different types of micro-organisms are cultured. - Suspension of effluents - Destroy toxic chemicals - Separate organic, inorganic & synthesized particles - Dye particles are eaten by micro-organisms - pH 7-8.5
7. Sedimentation feeding tank	Decoloration of existing color particles & feed to sedimentation curve.
8. Sedimentation curve	Three section- -separator -clarifier -scrapping bridge
9. Sludge return pump slump	Sludge is thickened & resedue passed into distributor tank.
10. Sludge thickener	Sludge condensed & made cake.

Chemical used in different Section:

- | | | |
|----------------------------------|---|-----------------------------|
| 1. Antifoam | - | Biological tank |
| 2. Decolorant | - | Sedimentation feeding tank. |
| 3. Nutrient Salt
(Urea & TSP) | - | Biological Tank |
| 4. Polyelectrolyte | - | Sludge Thikener |
| 5. Sulphuric acid | - | Nutralization tank |
| 6. Na(OCl) | - | Biological tank |

Function of different chemicals:

- ✓ 98% H₂S₀₄ -Neutralize the water by controlling pH
-It is auto dispensed in the neutralization tank.
- ✓ Polyelectrolyte -Used for sedimentation/sludge coagulation
- It is used auto/manually in sludge thickener tank.
- ✓ Decolorant -Used for removing color.
-It is used auto/manually in sludge thickener tank.
- ✓ Anti-foaming agent -Used for reducing/controlling foam.
-It is used auto/manually in the oxidation tank.
- ✓ Sodium hypochlorite -It is used to killing harmful bacteria/insect.
-It is used in the Biological Oxidation tank.
- ✓ Nutrients -when bacteria become weak it is added to a certain quantity
-It is added in the oxidation tank.

Standard Testing Parameters:

Parameter	Govt. Tolerance (ppm)	Inlet (before etp) (ppm)	Outlet (ppm)
BOD	50	281	23
COD	200	356	200
TDS	2100	3200	1580
TSS	150	204	36
ELECTRIC CONDUCTIVITY	1200	6430	3160
DO	4.5-8	0.1	4.6
CHLORIDE	600	-	>200
PHOSPHATE	8	2.6	2.2
NITRITE	50	0.8	0.5
pH	6-9	10.3	8.1
Temp.	40-45	50	35

CHAPTER-06 STORES & INVENTORY CONTROL

6.1 Scope of Inventory Control:

1. Raw materials →
 - a) Dye store
 - b) Other chemicals
 - c) Gray fabric
2. Finished fabric
3. Spare parts

6.2 Frequency of Inventory Update:

1. Monthly inventory control
2. Annual inventory control

6.3 Inventory Control System for Raw Materials:

Dye store & other chemicals store →

- Both of these are received by the store in charge.
- First he sends these to quality in-charge for inspection. If they are found to be of required quality then they are taken to store by the storekeeper.
- Store in-charge supplies these when required and records the date, type of material, quantity and section in which supplied, in his register book.

Grey fabric store →

- Grey fabric is usually stored in another storeroom, which is separate from dyeing shade.
- Grey fabric is first sent to the QC department for quality assurance and then taken to the storeroom.
- Grey fabric is received by fabric store in-charge.
- He supplies the fabric as per requirement and records the date, type of material, quantity and section in which supplied, in his register book.

6.4 Inventory Control System for Finished fabric:

- Finished fabric from the compactor or stenter goes to inspection team. Here inspection is done by a four points system.
- Required GSM, width (diameter), shrinkage, Spirality, wash fastness, rubbing fastness etc are tested from the lab before packaging.
- After finishing the fabric is kept in package before their transfer to the garments department.
- It is controlled by the finishing in-charge who keeps a list of total finished product. He also keeps a list of delivery products.
- He supplies the fabric as per requirement and records the date, type of material, quantity and section in which supplied, in his register book.

6.5 Inventory Control System for Spare Parts:

- Spare store officer keeps the spare parts in store and makes a list of spare parts.
- If the spare parts are little in stock he gives requisition to maintenance manager.
- Maintenance manager gives requisition to head office. Head office imports spare parts or buys from local market as per requirement.
- As new spare parts arrive to store officer, he receives and catalogues them.
- He supplies the spare parts as per requirement and records the date, type of material, quantity and section in which supplied, in his register book.



Figure-35: ETP Plant

Remark:

Knit Concern Ltd. has individual stores for raw materials, finished goods and spare parts. The store of dyestuff and chemicals are not so clean. There is not enough space to store the finished goods. It requires increasing the store area.

CHAPTER-07

MARKETING

ACTIVITIES

Marketing

Marketing plays a vital role in the field of displaying/showing the good criteria of the products to the buyer & to communicate with the buyer .there about 30 people in the marketing section of the industry.

7.1 Marketing Strategy:

Marketing strategy is a very important factors to sale the products to the buyers If the marketing strategy Is not so developed it will be very hard to reach the goal In case of garments marketing the dealings with the buyer is a very important factor.

Mainly senior marketing officers, merchandisers & higher officials deal with the buyer there are some fixed buyers of the industry. The buyers give their orders continuously all over the year. The

Marketing officers & by both side understanding the rate & the order quantity are fixed.

7.2 Duties & Responsibilities Of Marketing Officer:

Dealing with the buyer & convince the buyer is the main duty of the marketing officer. A marketing officer has some also other duties The main duties & responsibilities of a marketing officer are given below :

- To prepare cost sheet by dealing with buyer .
- To take different steps by discussing with the high officials & merchandisers .
- To maintain a regular & good relationship between commercial officers & merchandisers .
- To maintain a regular communication with the buyers & buying houses .
- Communicate with the new buyers .
- Display the better criteria of the products .

Actually the responsibilities & duties of marketing officer begins from getting order of buyer & ends after receiving goods by the buyer So he should be always smart energetic & sincere.

Importing Countries:

Knit Concern *Ltd.* is a 100% export oriented industry. All the goods produce in this industry are exported to various country .

- Europe Countries like UK France Germany etc
- U.S.A.
- Japan

Product Label:

Product label differs from fabric to fabric. The product labels are prepared according to the quality & the buyer requirements .

Local Market:

Knit Concern Ltd is a 100% export oriented industry. All the goods produced in this industry are exported into various foreign countries . So, goods are not supplied into local market.

By both side understanding the rate & the order quantity are fixed.

#Buyer:

KCL is 100 % export oriented industry. All the goods produced in this industry are exported into various foreign countries. Name of the main buyers of this mill are given below:

- H&M
- OKAIDI
- CAMAIEU
- CARREFOUR
- JULES
- DECATHLON
- SPRIT
- QUICK SILVER
- BIZBEE
- KNIT LINE
- S.OLIVER
- AMS INTERNATIONAL
- RIPCURL
- BETTER BARCLAY

REMARKS:

KCL has a well learned marketing & merchandising team. They always communicate with the buyers KCL has some fixed buyers The marketing section also looks for the quality & quantity of buyers .

CHAPTER-08

MAINTENANCE

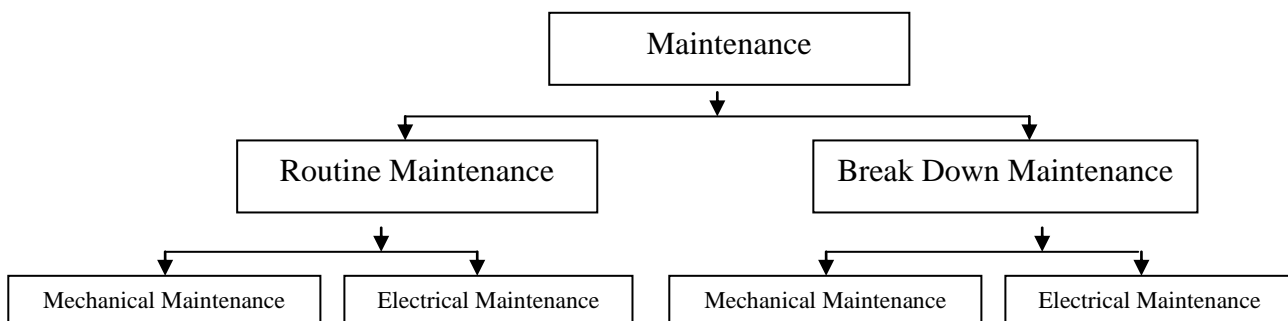
SECTION

8.1 Maintenance of Machinery:

Maintenance of machinery is very essential mechanical effort for achieving smooth running of different machines. Maintenance is a process by which equipment is looked after in such a way that trouble free services and increased machine life can be ensured and specific product quality required by the customers is sustained. On time maintenance increase m/c lifetime & ensures trouble free services.

2 types of maintenance are done:

1. Break down maintenance
2. Routine maintenance



1. Break down maintenance: Break down maintenance is done instantly when problem arises in machine. In this case, repairs are made after the equipment is out of order and it cannot perform its normal functions.

2. Routine maintenance: After a particular period of operation, the machines are cleaned & reordered, that is routine or schedule maintenance. The maintenance department does it once in a month. Schedule maintenance varies, time in time & also depends on situation according to types of machines, because maintenance is directly related to production.

Most of the time, all the screws, nuts, bolts & levers are checked, lubrication is also done. Workers inform about the problem areas of the machines. Depending on their information maintenance is done. Maintenance engineer analyze the records and take steps according to requirement.

Routine:

Maintenance is a necessary task in any industry. But the degree and interval of maintenance is dependent upon the age of the machineries. Landmark Textile Mills Ltd. has relatively new machineries, which are very modern and state-of-the-art. Due to this reason a relatively less amount of maintenance is needed to be carried out in Landmark Textile Mills Ltd. Never-the-less, routine maintenance of the machineries of the dyeing section is carried out once a week.

As the dyeing section remains closed in Friday, the routine maintenance is carried out in Friday. As for break down maintenance (very few break down cases occur), proper steps are taken to rectify the problem.

8.2 Manpower Setup for Maintenance:

Post	Number of Employees
Mechanical Engineer	1
Electrical Engineer	2
Mechanical Fitter	1
Electrical Supervisor	1
Asst. Mechanic	2
Electrician	1
Asst. Electrician	2

8.3 Maintenance Procedure:

Maintenance: Mechanical

Machine: Dyeing Machines

Sl. No.	Item needed to be checked & Serviced
1.	Greasing of the winch bearing
2.	Complete cleaning of machine
3.	Cleaning of drain valves, replace seals if required
4.	Checking of air supply filter, regulators, and auto drain seals
5.	Cleaning of filter elements
6.	Greasing of unloading roller bearings
7.	Checking and cleaning (if required) of addition tank level indicator
8.	Checking the oil level of pump bearing and refill if required
9.	Checking the function of heat and cool modulating valves
10.	Checking of all belts and belt tension
11.	Check circulation, reel and other pumps
12.	Checking of all door seals

Maintenance: Mechanical

Machine: Stenter Machine

Sl. No.	Item needed to be checked & Serviced
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1.	Removal of gas burnt deposits from chains
2.	Checking of gas burners
3.	Cleaning of softener application unit
5.	Checking and cleaning of steam pipe lines
4.	Checking and cleaning of gas pipe lines
5.	Grinding of fabric gripping pins
6.	Cleaning of ventilation duct
7.	Cleaning of m/c cabinet
8.	Checking of motors

Maintenance: Mechanical

Machine: Dewatering Machine

Sl. No.	Item needed to be checked & Serviced
1.	Cleaning of softener application unit
2.	Checking of rotating device of rotating trolley unit
3.	Checking of pneumatic pressure valves
4.	Checking and replacement (if necessary) of rubber pads of stretching unit
5.	Checking of plaiting device
6.	Checking of speed regulating unit

Maintenance: Mechanical

Machine: Tensionless Dryer

Sl. No.	Item needed to be checked & Serviced
1.	Checking of gas pipe lines
2.	Checking of gas burners
3.	Checking of belt conveyor system
4.	Checking of plaiting device
5.	Checking of speed regulating unit
6.	Cleaning of ventilation duct

7.	Cleaning of m/c cabinet
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Maintenance: Mechanical

Machine: Compactor Machine

Sl. No.	Item needed to be checked & Serviced
1.	Checking of Steam pipe lines
2.	Checking of pneumatic pressure valves
3.	Checking of belt conveyor system
4.	Checking of plaiting device
5.	Checking of speed regulating unit
6.	Checking and replacement (if necessary) of compacting shoe
7.	Cleaning of compacting shoe

Maintenance: Mechanical

Machine: Raising Machine

Sl. No.	Item needed to be checked & Serviced
1.	Checking of Gearing system and replacement of faulty gears
2.	Cleaning of fiber deposits from the pile and counter pile rollers
3.	Grinding of pins of pile and counter pile rollers
4.	Lubrication of gearing system

Maintenance: Mechanical

Machine: Boiler

Sl. No.	Item needed to be checked & Serviced
1.	Checking of gas pressure and gas supply line
2.	Dosing of softening chemicals to supply water
3.	Checking of all steam lines
4.	Cleaning of burner tank (after six month interval)
5.	Checking and replacement of valves
6.	Cleaning of feed water tank

7.	Checking and replacement of filters
8.	Cleaning of sight glass

Maintenance : Electrical

SL NO.	Items needs to be checked & serviced
1	Check main panels
2	Check panel cooling fan & clean its filter
3	Clean main pump inverter & its cooling fan
4	Check all circuit breaker ,magnetic conductors & relays
5	Check current setting of all circuit breaker & motor over load
6	Visual checking of all power & control cables
7	Check ail motor's terminals
8	Check & clean fluff & dirt at all motor fan covers
9	Check DC drive of kneel motors
10	Check all pressure switches
11	Check calibration of main vessel & all addition tank
12	Check all signal isolators
13	Check setting & operation of lid safely switches
14	Check setting of tangle sensors
15	Check all pneumatic solenoids
16	Check all indicating lamps
17	Check calibration of heating/ cooling modulating valve
18	Check all on/off switches

Maintenance Tools and Equipment:

Sl. No.	Maintenance tools/equipments	Functions
1.	Adjustable wrench	Used for setting nut & bolts
2.	Pipe Spanner	For pipe fitting
3.	Spanner	Fixed Spanner for nut & bolts fitting
4.	Socket spanner	Handle system for nut & bolt fitting
5.	Hammer	To apply load where required
6.	Screw driver	To release any screw
7.	Punch	Used to fit any worn out shaft
8.	Lock opener	To open the clip of bearing
9.	Hack saw	To cut any metallic thing
10.	Outside calipers	To measure outside dia
11.	Inside calipers	To measure inside dia
12.	Slide calipers	To measure very small dia
13.	Vernier scale	To measure very small dia

14.	Chain ton	To lift heavy load
15.	Welding machine	To join metallic parts
16.	Grinding machine	To make the smooth fabrics
17.	Tester	To test electric circuit
18.	Pliers	To grip anything & cut anything
19.	Avometer/Voltmeter	To measure voltage
20.	Steel tape	To measure length, width & height
21.	Chisel	To cut any metal
22.	File	To smooth the rough surface

Remarks:

The maintenance department of Knit Concern Ltd. is well equipped. It has sufficient maintenance manpower including mechanical and electrical engineers. They perform maintenance tasks of the machines during the holidays and vacations. Otherwise, they perform breakdown maintenance, which as stated earlier is very rare in Knit Concern Ltd. To increase the lifetime of the machineries and ensure the proper running of the machines, the task of this department is very important.

CHAPTER-9

CONCLUSION

9.1 Conclusion:

We have completed our industrial attachment successfully by the grace of Almighty.

Industrial attachment sends us to the expected destiny of practical life. The completion of the two months Industrial Attachment at Knit Concern Limited, we have got the impression that the factory is one of the most modern export oriented knit composite in Bangladesh. Though it was established only a few years ago, it has earned "very good reputations"

For its best performance over many other export oriented textile mills.

Mill is settled with utility to give all convenient supports to the productions for twenty-four hours. KCL has its own water pre-treatment plant & 26,300 cubic feet water reservoirs in its Godnail campus. The Godnail premises has its own power generation plant where 1,900 kw power generators guarantee smooth & uninterrupted power supply to its every operation.

However, there are some points to be mentioned:

- During the transport of the fabric in the dyeing floor & also during the loading of the machine, fabrics are soiled for the contact with floor. This makes the fabric/part of the fabric dirty. It may require more scouring/bleaching agent or may create stain making it faulty. The dyeing floor is watery most of the time. It should be cleaned all the time.
- Many times the dosing pipelines are clogged due to the careless dosing of the chemicals. The supervisors should supervise the floor more sincerely.
- The machine stoppage time should be analyzed & minimized. The maintenance should be carried out when the machine is out of action (wherever possible).

Our Apology :

- The management of KCL are very helpful Our respective seniors gave us time when ever they got .
- Due to secrecy act, all the data on costing & marketing activities has not been supplied & hence this report excludes these chapters.
- Some of the points in different chapter are not described as these were not available.
- The whole process is not possible to bind in such a small frame as this report, hence our effort spent on summarizing them.
- But it must be said that KCL is a best place to get the practical knowledge about the dyeing as they have lot of production of all quality .

Special Thanks:

We are enough fortunate that we have got an opportunity of having a training in this mill During the training period we are received co-operation & association from the authority full & found all man , machines & materials on appreciable working condition All stuffs & officers are very sincere & devoted there duties to achieve their goal .

Special Thanks to those whom we are so grateful - - -

- Engr. Ontu (P.O. Knit dyeing)
- Engr. Shimul(P.O. Knit dyeing)
- Engr. Nahid (P.O Knit dyeing)
- Engr. Miraz (Sr.P.O Knit dyeing)
- Engr. Sunny (Asst.Manager, Knit dyeing)
- Engr. Real (Asst.Manager, Knit dyeing)
- Engr. Sagar (P.O Knit finishing)
- Engr. Sabuj (P.O Knit finshising)
- All other personnel who helped us lot to learn so many things.