Faculty of Engineering

Department of Textile Engineering

REPORT ON

Industrial Attachment

At

Knit Concern Group

Water Works Road, Godnail, Narayangonj

Course Title: Industrial Attachment
Course Code: TEX-442
13(A), Titas, Fall-2021

Submitted By

Utpal Sutradhar
ID : TEX-1801013025
Md. Shazib
ID: TEX-1801013143

Academic Supervisor

Kamrul Hasan Bhuiya,
Coordinator & Lecturer

Department of Textile Engineering
Sonargaon University
146 Mohakhali, Wireless Gate, Dhaka.

This report we have presented in partial fulfillment of the requirement for the Degree of Bachelor of Science in Textile Engineering

Duration: From 16th October, 2021 to 19th December, 2021

Letter of Transmittal

Date :
Kamrul Hasan Bhuiya
Co-Ordinator
Sonargaon University (SU)

Subject: Submission of industrial training report.

Dear Sir,

With due respect, we the students of Textile Engineering, Sonargaon University (SU) have successfully completed our industrial training program. In this stage we are submitting our industrial training report as part of our B.Sc. in Textile Engineering Degree requirement that bears three (03) credit hours under your supervision. We are submitting this report for our academic purpose only. Please be kind enough to evaluate this dissertation with your valued suggestions.

Sincerely yours

……..
Utpal Sutradhar
ID: TEX1801013025

Md. Shazib
ID: TEX1801013143

ABSTRACT

For any technical education, practical experience is almost equal important in association with the theoretical knowledge. By means of practical knowledge it's not possible to apply the theoretical knowledge in the practical field.

Industrial attachment is the first step to professional life of student, especially of technical side. It's an indispensable part of study a practically running processing technology of an industrial unit for a student. University education provides us vast theoretical knowledge as well as more practical attachment, in despite of all these industrial attachment helps us to be familiar with technical support of modern machinery and skills about various processing stages.

This internship provides me sufficient practical knowledge about production management, efficiency, industrial management, pattern, cutting, sampling, washing, Finishing, Costing, purchasing, inventory control, utility and maintenance of machineries and their operation techniques etc. which cannot be achieved successfully by means of theoretical knowledge only.

We were able to study on their different sections and their activities practically. Due to some limitation of the factory, we have found store section, cutting section, sewing section, finishing section and maintenance section, costing section washing section. Here we have also found the sample section but this section isn't fully operational as here only the Development sample, size set and production samples are produced.

All the activities of this factory are performed according to the central orders of the company. This company works for Academy buyer and sometimes works for Pritha which is an own buying house of this group of company.

During my internship we got the opportunity to study on some orders, from order receive to the delivery of the order. With the help of my supervisor we have acquired the knowledge of handling an order, the production procedure and the inspection procedure to maintain the quality of these orders. We have also learnt about the office management of this factory.

Acknowledgement

At first our gratefulness goes to Almighty God to give us strength and abilitytocomplete the Industrial Attachment and this report. We have made our life morebountiful.

We would like to express our sincerest gratitude to my respected teacher Kamrul Hasan Bhuiya**, Coordinator & Lecturer ,Department of Textile Engineering, Sonargaon University**, for his valuable suggestions, encouragement constructive criticism and for providing all necessary support to complete our Industrial Attachment. We also would like to express our thanks to him for his continuous guidance about the industrial training and advise to prepare a report about the training.

In Factory,We would also like to thanks **Mr. A.K.M Mohshin, GM, Knit Dyeing & Finishing Unit** for his kind permission for the training. I would like toexpress my thanks to **Mr. Md. Matiur Rahman Matin, DGM, Knitting Section, Knit Concern Ltd., Engr. Khaled Masud Khan, GM, Yarn Dyeing Unit & Mr. Rassel, AGM, Merchandising Department & Mr. Showroar Hossain, Manager, Washing, KNIT CONCERN GROUP** for providing necessary information about thefactory.

We would like to express our thanks to all Production Officer and Senior ProductionOfficer& all officers of Knitting, Dyeing & Finishing and Garments Section, for therevaluable technicalsupportduringthetrainingperiod.

Last but not least, thanks go to our precious family for their never ending love andinspire atevery stages of ourlife.Withouttheir continuous supportWe realize thatWe wouldnotbeapersonWearerightnow.

Index

Contents	Page No
Introduction	01-02
ProjectDescription	03-12
Manpower Management	13-16
Raw Materials used in different sections	17-25
Knitting Section	26-38
Inspection Section	39-43
Central Lab	44-56
Knit Dyeing Section	57-78
Finishing Section	79-93
Yarn Dyeing Section	94-124
Quality Testing, Control & Assurance System	125-133
Washing section	134-140
Maintenance	141-143
Utility Section	144-153
Stores & Inventory Control	154-156
Marketing Activities	157-159
Conclusion	160-161

Chapter One

Introduction

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 GROUP** 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 GROUP is truly integrated undertaking. The KNIT CONCERN GROUP. has the capability to offer a complete product range for the export textile markets. The goal of KNIT CONCERN GROUP. 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 GROUP has the potential to make an important contribution to the nation's growing ready-made garments export sector.

Chapter Two

Project Description

COMPANY PROFILE

Knit Concern Group is a composite Knitting, Dyeing, Finishing, and Garments factory. It is located at Godnail, Narayangang, 9-km north side of Dhaka-Chittagong Highway and free from all kinds of pollution, crowd like mid-city. The project was established in 1998. The project is equipped with modern technology machinery and experienced technicians are engaged here to ensure the quality and buyers‟ satisfaction. They can produce international standard fabric and garments of ant quantity and quality. Since its inception, **Knit Concern** has never stopped growing - in quality, quantity, and everything in between. Over the last couple of years, conceding to its growth requirement, using most contemporary machines and equipment of German, Swiss, USA, Japan, Italy, China and UK origin, it has nearly doubled its capacity.

There are many indicators that may sketch the profile of **Knit Concern Group** business success but, perhaps, the increase of its export alone, from merely US$1.03 million in 1992 to about US$ 60 million in 2010, would show the degree of its exponential growth as a one-stop apparel supplier from Bangladesh.



In Details:

Name of the factory	:KNIT CONCERN GROUP
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
Project Cost	: 300,00,00,000 BDT.
Annual Turnover	: US$ 70 million (2011). :

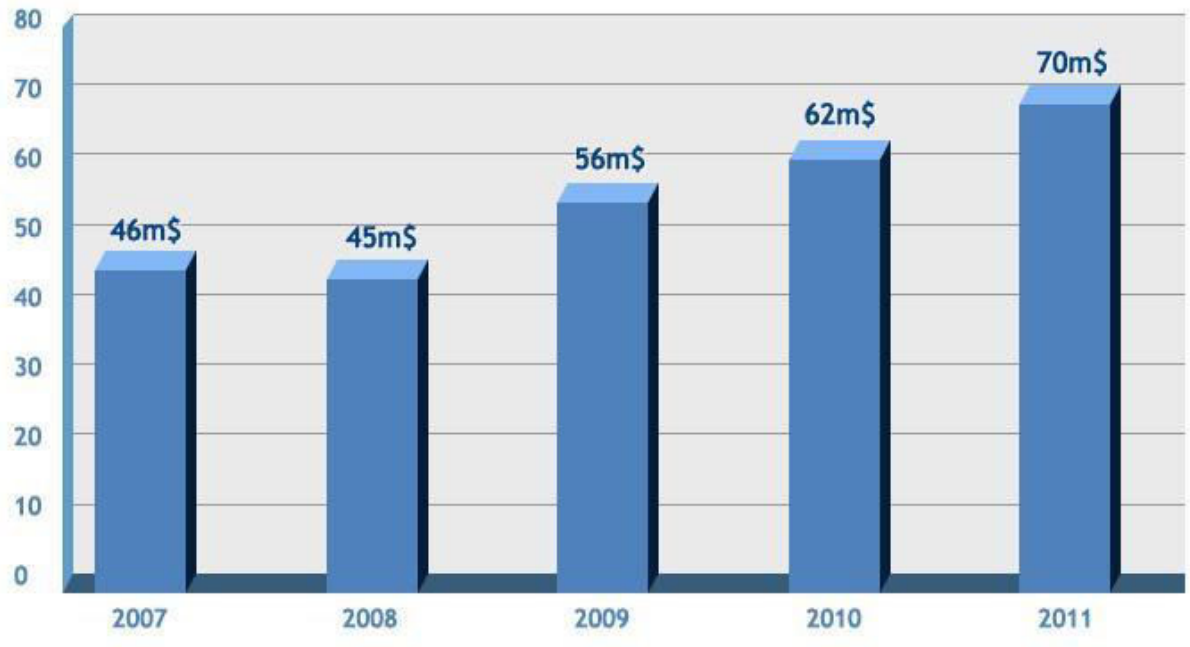


Figure: Annual Turnover

VISION & MISSION OF KNIT CONCERN GROUP

Vision:



The vision of Knit Concern Group is to emerge as a premier manufacturer and exporter of knitwear in the world market.

Mission:



The broad mission of Knit Concern Group is to provide its customers the best possible satisfaction and value for their money facilitating them with one-stop knitwear sourcing services.

HISTORY OF THE KNIT CONCERN LIMITED:

Knit Concern Limited home base is Narayangonj- a city with the largest river port of Bangladesh. It launched its very humble journey in 1990 from a rented building at Nayamati. That potential embryo, by virtue of futuristic enterprising, dedication to quality, commitment to excellence, adoption of state-of-the-art technology, and keen focus on customers' satisfaction, it could very rapidly metamorphose into a large corporate entity, in its most modern sense, just by 1998.

Its production has branched out into four full-fledged factories at three location- Godnail & Chasara at Narayangonj and Mirpur in Dhaka. Knit Concern Limited at present has a daily production capacity of over 20 ton of knitted fabric, 30 tons of dyed fabric and 60,000 pieces of garments.

Knit Concern Limited became one of the few garments in Bangladesh that implemented ISO 9001:2000 Quality Management System. The government of Bangladesh also recognized its excellence by awarding the status of a Commercially Importance Person (CIP) to its Chief Executive, Mr. Joynal Abedin Mollah, the founder Managing Director of KCL, since 1995 without break.

Achievement

Knit Concern now is having Oeko Sustainable Textile,i.e.Oeko-Tex Standard 100, which, as you know, entrusts it to produce apparels using organic cottons cultivated and traded conforming to eco-friendly standards all through.

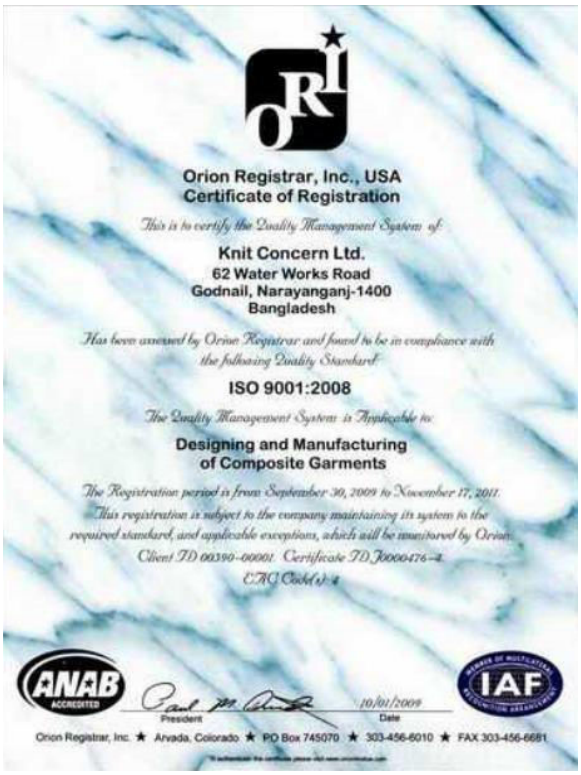
Knit Concern is also certified by CONTROL UNION.INDIA to manufacture garments using organic cotton yarn under the prestigious coverage of scope CERTIFICATE.

On May 1, 2010, the Ministry of Labor, Government of Bangladesh, has honored Knit Concern with the May Day Award 2010 for the top order ranking as a labor-friendly knit factory in the country.

Besides numerous local and overseas top order business as well as CSR awards and recognitions, many of those - such as the 'Premium Quality Supplier' etc - being offered by its valued buyers and some business and financial publication houses highly noted in the country, the government also has awarded Knit Concern the national trophies several times for performing as the top and the best exporter of knit apparels.

On its way towards success, **Knit Concern** implemented ISO- 9001:2008 Quality Management System back in 2002.

BGMEA	
BKMEA	
OEKO-TEX	


Orion Registrar, Inc., USA
Certificate of Registration

This is to certify the Quality Management System of:

Knit Concern Ltd.
62 Water Works Road
Godnail, Narayanganj-1400
Bangladesh

Has been assessed by Orion Registrar and found to be in compliance with the following Quality Standard:

ISO 9001:2008

The Quality Management System is Applicable to:

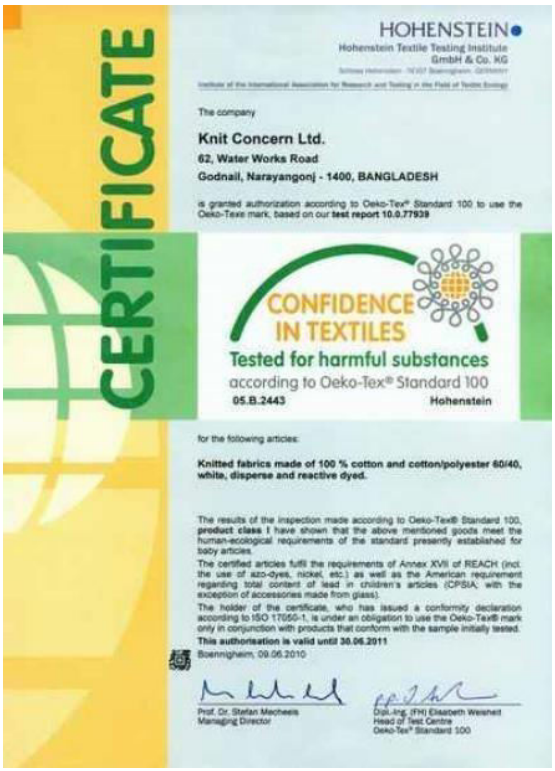
Designing and Manufacturing of Composite Garments

The Registration period is from September 30, 2009 to November 17, 2011.
This registration is subject to the company maintaining its system to the required standard, and applicable exceptions, which will be monitored by Orion.
Client ID 00390-00001 Certificate ID 10000476-4
CAQ Code(s): 4

ANAB ACCREDITED — President — 10/01/2009 Date — IAF

Orion Registrar, Inc. ★ Arvada, Colorado ★ PO Box 745070 ★ 303-456-6010 ★ FAX 303-456-6681

ISO Certificate


CERTIFICATE

HOHENSTEIN
Hohenstein Textile Testing Institute GmbH & Co. KG

The company

Knit Concern Ltd.
62, Water Works Road
Godnail, Narayangonj - 1400, BANGLADESH

is granted authorization according to Oeko-Tex® Standard 100 to use the Oeko-Tex® mark, based on our test report 10.0.77939

CONFIDENCE IN TEXTILES
Tested for harmful substances
according to Oeko-Tex® Standard 100
05.B.2443 Hohenstein

for the following articles:

Knitted fabrics made of 100 % cotton and cotton/polyester 60/40, white, disperse and reactive dyed.

The results of the inspection made according to Oeko-Tex® Standard 100, product class I have shown that the above mentioned goods meet the human-ecological requirements of the standard presently established for baby articles.
The certified articles fulfil the requirements of Annex XVII of REACH (incl. the use of azo-dyes, nickel, etc.) as well as the American requirement regarding total content of lead in children's articles (CPSIA; with the exception of accessories made from glass).
The holder of the certificate, who has issued a conformity declaration according to ISO 17050-1, is under an obligation to use the Oeko-Tex® mark only in conjunction with products that conform with the sample initially tested.
This authorisation is valid until 30.06.2011
Boennigheim, 09.06.2010

Prof. Dr. Stefan Mecheels, Managing Director
Dipl.-Ing. (FH) Elisabeth Weisnet, Head of Test Centre Oeko-Tex® Standard 100

Oeko-Tex Certificate


CERTIFICATE

CERTIFICATE No: CH1939OE-01.2009
REGISTRATION N°: CU 81939

Field of attention:
Textile
Organic Exchange

Issued to:
Knit Concern Ltd.
Narayanganj, BANGLADESH
Project in: BANGLADESH

Standard:
OE Blended resp. OE100 standards of The Organic Exchange

Valid until: 08 July 2010

Control Union Certifications declares to have inspected the unit(s), and/or product(s) of the above mentioned client, and have found them in accordance with the standards mentioned above.
This certificate covers the unit(s), and/or product(s) as mentioned in the authenticated annex of this certificate.
This certificate is in force until further notice, provided that the above-mentioned client continues meeting the conditions as laid down in the client contract with Control Union Certifications. Based on the annual inspections that Control Union Certifications performs, this certificate is updated and kept into force.

Date of certification:
30 March 2009
Place and date of issue:
Mumbai, 30 March 2009

Declared by:
On behalf of the Managing Director
Dr. B. Kumar Choudhary

Certifier
Control Union Certifications
P.O. Box 161
8000 AD Zwolle
The Netherlands
http://www.controlunion.com
tel.: +31(0)38-4260100

1 of 4

CONTROL UNION CERTIFICATIONS

Organic Certificate


Certificate of Appreciation

Knit Concern Ltd.

a Member of Bangladesh Knitwear Manufacturers & Exporters Association (BKMEA)

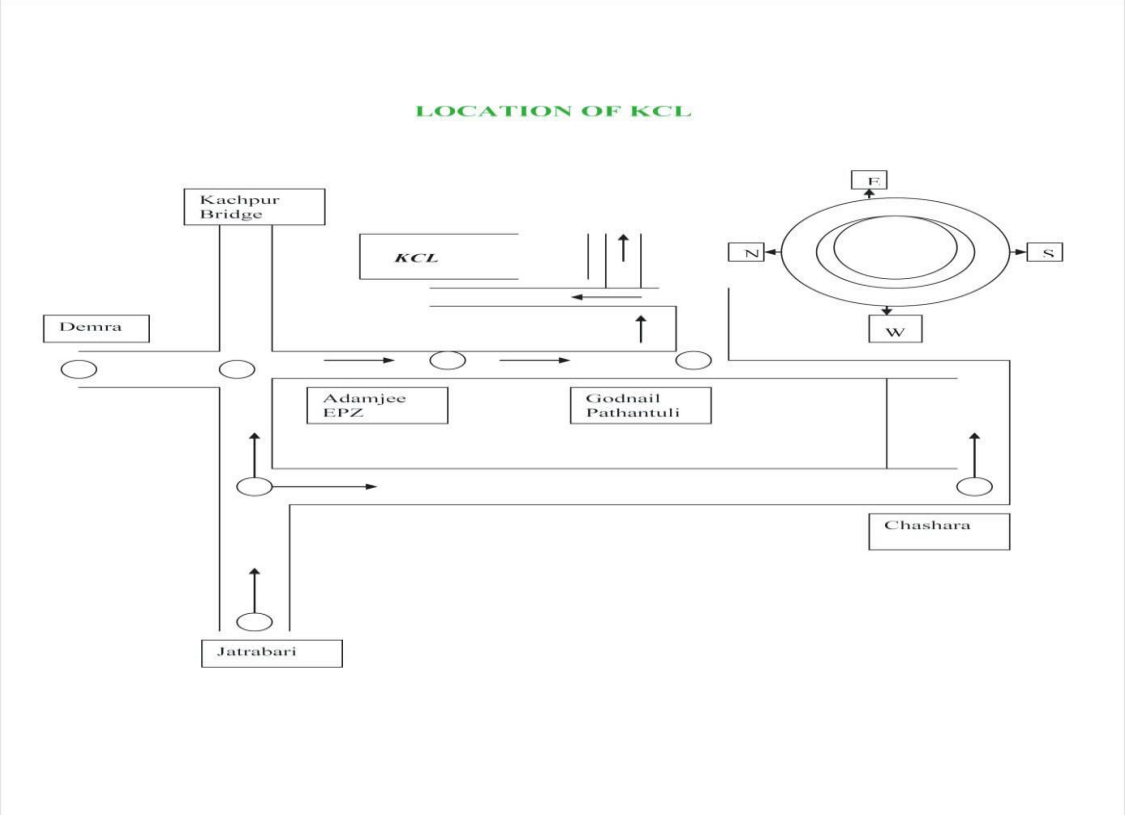
has achieved the award of a 'Best Workers' Friendly Knitwear Industry 2010

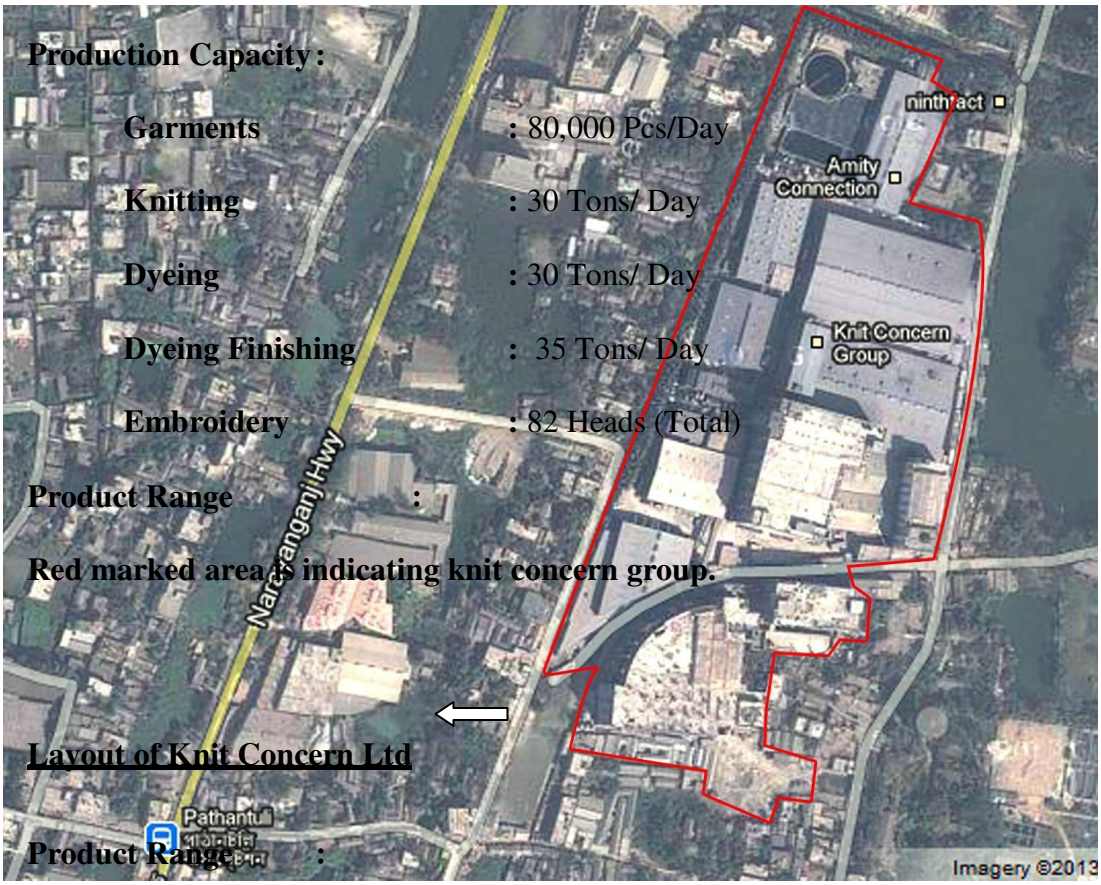
(Md. Fazlul Hoque)
President
Bangladesh Knitwear Manufacturers & Exporters Association

(Md. Nurul Haque)
Secretary In-charge
Ministry of Labour and Employment

1st May Fair Certificate

Location layout





Production Capacity :

Garments : 80,000 Pcs/Day

Knitting : 30 Tons/ Day

Dyeing : 30 Tons/ Day

Dyeing Finishing : 35 Tons/ Day

Embroidery : 82 Heads (Total)

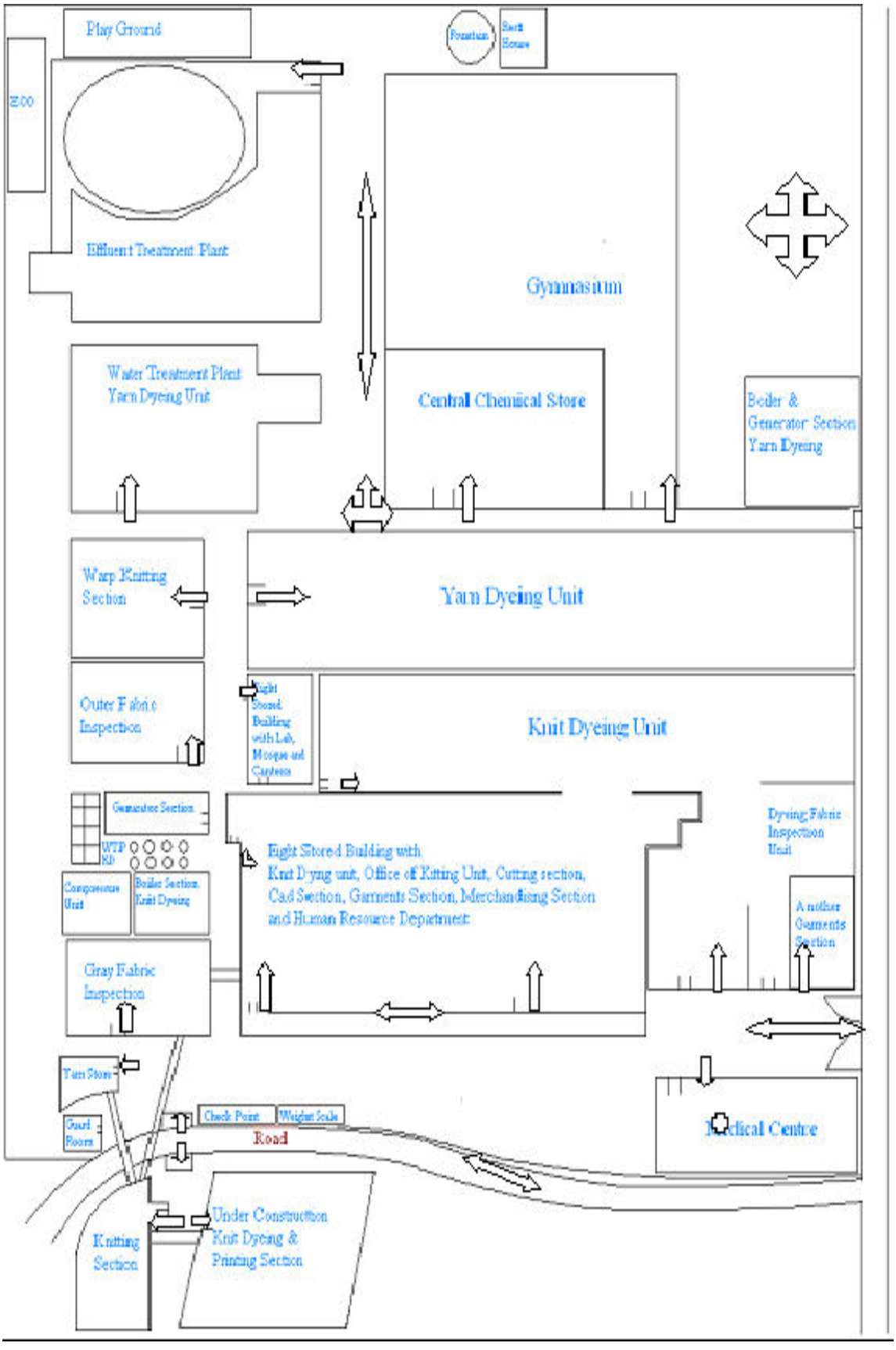
Product Range :

Red marked area is indicating knit concern group.

Layout of Knit Concern Ltd

Product Range :

Lay out of Knit Concern Ltd.



PHYSICAL INFRASTRUCTURE:

Within only a decade by hyper-growth has been transformed into an innovative industrial legend it has branched out into four full fledged factories at three locations Godnail and Chashara in Narayangong and Mirpur in suburban Dhaka.

Knit Concern Group, Godnail premise house the parent organization and ultra-modern Unit-1 with eight stored building as the mail one. Two buildings are under construction in which one of them eight floors are completed and other one is processing.

Knit Concern is located at 62, Water works Road, Godnail, Narayangong about 18 Km from EPZ.

CAPACITY:

Knitting	**:** 30 Tons Per Day
Knit Dyeing	**:** 30 Tons Dyed Fabric Per Day
Yarn Dyeing	**:** 25 Tons Per Day
Daily Washing:	□ Pigment Dyeing-1,500 Pcs
	□ Acid-1,500 Pcs
	□ Garments Wash-20,000 Pcs
	□ Ready Dye-3,000 Pcs
Garments:	□ T-Shirt-60,000 Pcs
	□ Polo Shirt-20,000 Pcs

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:**

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

REMARKS:

It‟s a wonderful project. This project makes profit more than ever for its strong management. Knit Concern Limited (KCL) is leading house of industries and commerce in Bangladesh having Dyeing, Printing Garment and Packaging industries. The main accomplishment of their project is the highly gas-burn power plant and own biological waste water treatment plant. This is from W.T.T.S.R.I. Water Treatment Industry of Italy. This is effectively running to remove effluents from drained water. It is such a type of industry which has the ability to maintain finest quality products. To fulfill the buyer requirements the factory has established a strong management and equipped with modern machineries.

Chapter Three

Manpower Management

n

Manpower Management

Section	Total Employee
Knitting	460 +/-
Dyeing	650 +/-
Garments	5000 +/-
Yarn Dyeing	320 +/-
Others	600 +/-

MANAGEMENT SYSTEM

In knit concern ltd. The management system is regular. Employers are well skilled & are graduated in their respective profession.

SHIFT CHANGE

The industry has three (3) shifts for the workers. Shift duration of every shift is eight (8) hours.

SHIFT	FROM	TO
A	6 AM	2 PM
B	2PM	10PM
C	10PM	6AM

JOB DESCRIPTION OF PO/SPO

1. To Give Program Slip According To Daily Production Plan.
2. **To Follow Up** The Production Process From **Raw Materials To Finished Goods**
3. To **Match Shade** In Connection With Fabric Quality According To Buyer Requirements.
4. To Find Out **Fabric Faults** As Possible (Before Finishing), & Take Step To Recover From It.
5. To Rectify The Finished Fabric Rejected From Quality Control Department.
6. To Coordinate With Unit Technical Manager For Achieving The Target Production.
7. To Motivate Supervisors & Workers For Achieving Maximum Production With Minimum Faults.
8. To Check The Daily Production Report.

9. To Study Dye & Chemicals Nature Delivery By Manufacture & Apply Them Correctly To The Production To Get Best Product.

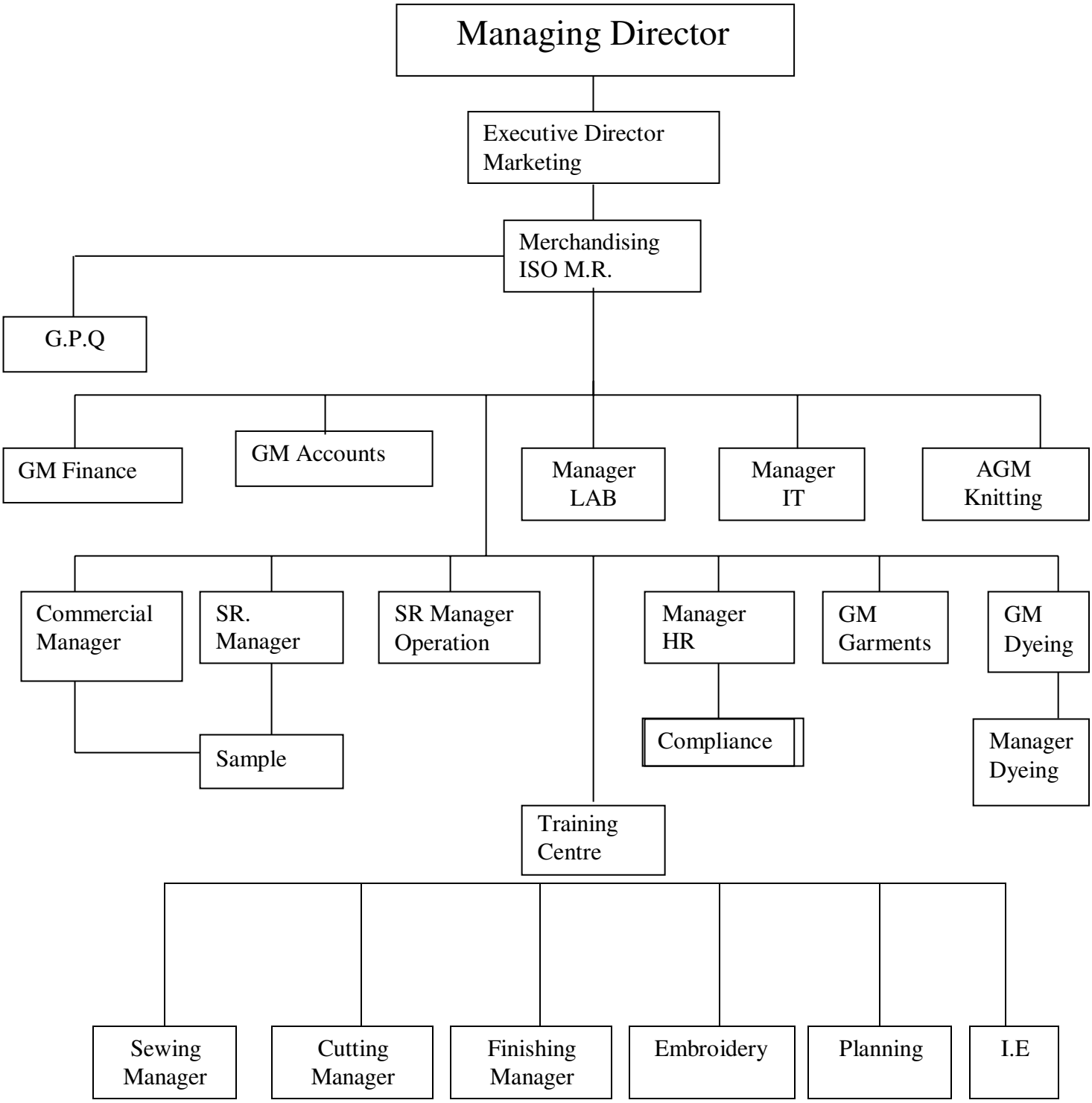
RESPONSIBLITIES OF SPO/PO

The main job as well as main responsibilities of SPO/PO is to process control. the responsibility of a SPO/PO is to complete a batch in required time. any faults or disturbance happens in batch, the blame goes to **po/spo** .the PO should try to minimize overhead expenditures & also try to make a batch more profitable. In word he is charge of a floor & his responsibility is to keep moving the production smoothly

Communication system:

- Intercom telephone
- Fax
- Internal On-line System
- E-mail
- Written letters
- Oral

ORGANIZATIONAL STRUCTURE OF DIFFERENT DEPARTMENT



Chapter Four

Raw Materials Used in Different Sections

RAW MATERIALS

A raw material is something that is acted upon by human labor or industry to create some product that human desire.

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 differentcount 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.

Generally used yarn and their count:	
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
Ecru 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 Material for Knit Dyeing

In the industry the raw materials used for production are:

1. Grey fabrics
2. Dyes
3. Chemicals.

1. 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

2. Dyes

The following dyes are used:

1.Reactive

2.Disperse

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 Turquish –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 Brillient 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\ Indoneshia\ Japan	Fakir dyes
Sumifix Blue EXF	China\ Indoneshia\ Japan	Fakir dyes
Sumifix T. Blue GN	China\ Indoneshia\ Japan	Fakir dyes
Sumifix Red 3BS	China\ Indoneshia\ Japan	Fakir dyes
Sumifix Yellw 3RS	China\ Indoneshia\ Japan	Fakir dyes
Sumifix Yellw GR	China\ Indoneshia\ Japan	Fakir dyes
Sumifix Blue BRF	China\ Indoneshia\ 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

3. 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

Raw Material for Yarn Dyeing

Yarn

Dyestuff

Chemical and Auxiliaries

Name and Source of Raw Material:

Yarn Store for Count Wise:

100% Organic Cotton

20/1, 24/1, 30/1, 34/1, 40/1 GM

50, 75 D

30/1, 34/1, CVC

10/1, 20/1, 24/1, 26/1, 28/1, 30/1, 34/1 40/1, 60/1, and 60/2 Cotton

10/1, 12/1, 30/1, 34/1, 45/1 PC

45/1 TC

10/1, 24/1, 26/1, 30/1, Card

16/1, 20/1, 22/1, 24/1,26/1, 26/2, 28/1, 30/1, 32/1, 34/1, 36/1 and 40/1 Comb

Yarn Sources:

Sudhan, India.

PRODUCT MIX:

100% Organic Cotton

50% Organic & 50% Cotton

CVC (Chief Valued 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)

Using Dyes and Chemicals

BASIC CHEMICALS			
NO	**Name of Item**	**Function**	**Company**
1	Hydrogen Peroxide H_2O_2	Bleaching	Tradesia Interation
2	Soda Ash	Color Fixing	Honorich
3	Chemtech ALF	Color Fixing	Chemtech/Fair Bond
4	Acetic Acid	Neutralizer	Jubliant
5	Formic Acid	Neutralizer	BSF
6	Bleaching	Reducing	Mollah Enterprise
7	Caustic Soda	Scouring	Palvi Power
8	Hydrose	Stripping	Mollah Enterprise
9	Kappatex R-98	Stripping	Kapp Chem./Hitech
AUXILIARIES			
NO	**Name of Item**	**Function**	**Company**
1	Cibatex Ab-45	Buffering	Hunts/Swiss
2	Parmagen NF	Deaerating	Impo/Elbe
3	Heptol EMG	Demineralizing	CHT/R.H.Crop
4	Felosan NOF	Detergent	CHT/R.H.Crop
5	Kappawet BOSS	Detergent	Kapp Chemi/Hitech
6	Biopolish EC/	Enzyme	Maltichemi
7	Retrocell PLX Ultra	Enzyme	Harris and Minuk
8	Lavacell BAC	Enzyme	Dystar/Hi Tech Color
9	Albafix ECO	Fixing	Hunts/Swiss
10	Albatex FRD	Fixing	Hunts/Swiss
11	Parmafix RD	Fixing	Impo/Elbe
12	Fixer F-100	Fixing	Cardinal
13	Irgasol DAM	Fixing Remover	Hunts/Swiss
14	Univadine DIF	Dispersing	Hunts/Swiss
15	Sarabid OL	Leveling	CHT/R.H.Crop.
16	Cibacel DBC	Leveling	Hunts/Swiss
17	Seragal C-FTR	Leveling	Hi Tech Color/Dystar
18	Dyclosure S	Leveling	Kisco/Legend
19	Intensol AME 6	M/C Wash	CHT/R.H.Crop
20	Uvitex EBF	Optical Brightener	Hunts/Swiss
21	Sky White BVF	Optical Brightener	Hunts/Swiss
22	Uvitex BHV	Optical Brightener	Hunts/Swiss

23	Finoscav V6	Peroxide Killer	Marlateks/Color Fusion
24	Invatex PC	Peroxide Killer	Hunts/Swiss
25	Chromalase PQ	Peroxide Killer	New SDC Services
26	Zymbiosan PHL	Peroxide Killer	Kisco/Legend
27	Eriopon OS	Reduction	Hunts/Swiss
28	Sirrix 2UD	Sequestering	Clariant/Chemicolor
29	Kappaquest FE	Sequestering	Kapp Chemi/Hitech
30	Seraquest QE	Sequestering	Cardinal
31	Kappaquest A41	Soaping/Leveling	Kapp Chemi/Hitech
32	Cottoblanc NSR	Soaping/Leveling	CHT/R.H.Crop.
33	Tubingal 4748	Softener	CHT/R.H.Crop
34	Serisoft -220 Conc	Softener	Cardinal
35	Epalin –PER	Softener	Cardinal
36	Tubingal 1112	Softener	CHT/R.H.Crop
37	Lustraffin SA 86	Soaping	CHT/R.H.Crop
38	Lustraffin LF	Soaping	CHT/R.H.Crop
39	Edunine SNL	Soaping	Spectra Chemical
40	Silwa SFR	Soaping	Kisco/Legend
41	Abatex AD	Soaping	Hunts/Swiss
42	Regosal RS	Soaping	Kisco/Legend
43	Serawash RWY	Soaping	Cardinal
44	Silicon Softener (Power Soft)	Sewing Thread	Phoenix International
45	Silicon HM-16	Sewing Thread	Mollah Enterprise
46	Silicon Oil (Hacoba fluid 100)	Sewing Thread	Phoenix International
47	Silwa TL-100	Sewing Thread	Elbe International
48	Oiling CT-200	Lubricating	Impo/Elbe
49	Oxalic Acid		Mollah Enterprise
50	Kappazon H53	Stabilizer	Kapp Chemi/Hitech
51	Polydye ST 1133	Stabilizer	Polysistec
52	Nolco – 450	Boiler	Pacific Chemitrade
53	Tandex BWS	Boiler	
54	Tandex BW-200	Boiler	
55	Tandex BWT-400	Boiler	
56	Nolco – 90001	Generator	Pacific Chemitrade
57	Nolco - ST – 40	Generator	Pacific Chemitrade
58	Nolco – 2000	Generator	Pacific Chemitrade
59	Nolco - 7311 Plass	Generator	Pacific Chemitrade
		SALT	
NO	**Name of Item**	**Function**	**Company**
1	Gluebar Salt	Electrolyte	Sino Chemicals
2	Common Salt	W.T.P Plant	Mollah Enterprise
3	Boil Salt	Boiler	Mollah Enterprise
		DYES	
NO	**Name of Item**	**Function**	**Company**
1	Novacron Blue FNR	Reactive Dyes	Hunts/Swiss
2	Novacron Brilli Blue FNG	Reactive Dyes	Hunts/Swiss

3	Novacron Super Black G	Reactive Dyes	Hunts/Swiss
4	Novacron Navy S-G	Reactive Dyes	Hunts/Swiss
5	Novacron Navy WB	Reactive Dyes	Hunts/Swiss
6	Novacron Orange FNR	Reactive Dyes	Hunts/Swiss
7	Novacron Red FNR	Reactive Dyes	Hunts/Swiss
8	Novacron Red S2B	Reactive Dyes	Hunts/Swiss
9	Novacron Bri Red FN3GL	Reactive Dyes	Hunts/Swiss
10	Novacron Deep Red SB	Reactive Dyes	Hunts/Swiss
11	Novacron Turqise HGN	Reactive Dyes	Hunts/Swiss
12	Novacron Yellow FN2R	Reactive Dyes	Hunts/Swiss
13	Novacron Yellow F4G	Reactive Dyes	Hunts/Swiss
14	Novacron Yellow S3R	Reactive Dyes	Hunts/Swiss
15	Remazol Blue RR	Reactive Dyes	Dystar/Hi Tech Color
16	Remazol Bri Blue RSPL	Reactive Dyes	Dystar/Hi Tech Color
17	Remazol Carmine RGB	Reactive Dyes	Dystar/Hi Tech Color
18	Remazol Navy RGB	Reactive Dyes	Dystar/Hi Tech Color
19	Remazol Red RR	Reactive Dyes	Dystar/Hi Tech Color
20	Remazol Ultra Red RGB	Reactive Dyes	Dystar/Hi Tech Color
21	Remazol Yellow RR	Reactive Dyes	Dystar/Hi Tech Color
22	Remazol Ultra Yellow RGB	Reactive Dyes	Dystar/Hi Tech Color
23	Remazol Turqise Blue G	Reactive Dyes	Dystar/Hi Tech Color
24	Livafix Yellow CA	Reactive Dyes	Dystar/Hi Tech Color
25	Synozol Blue KBR	Reactive Dyes	Kisco/Legend
26	Synozol Blue KHL	Reactive Dyes	Kisco/Legend
27	Synozol Blue KRL	Reactive Dyes	Kisco/Legend
28	Synozol Navy Blue HB	Reactive Dyes	Kisco/Legend
29	Synozol Navy Blue KBF	Reactive Dyes	Kisco/Legend
30	Synozol Navy Blue KEF	Reactive Dyes	Kisco/Legend
31	Synozol Red K3BS 150%	Reactive Dyes	Kisco/Legend
32	Synozol Red KHL	Reactive Dyes	Kisco/Legend
33	Synozol Red HB	Reactive Dyes	Kisco/Legend
34	Synozol Yellow K-3RS	Reactive Dyes	Kisco/Legend
35	Synozol Yellow KHL	Reactive Dyes	Kisco/Legend
36	Synozol Yellow HB	Reactive Dyes	Kisco/Legend
37	Synozol Deep Red HB	Reactive Dyes	Kisco/Legend
38	Evarzol Brilli Blue RSPL	Reactive Dyes	
39	Bezaktive Red S-3B 300%	Reactive Dyes	Bezema
40	Bezaktive Red SLF	Reactive Dyes	Bezema
41	Bezaktive Blue S-GLD 150%	Reactive Dyes	Bezema
42	Bezaktive Blue SFR 150%	Reactive Dyes	Bezema
43	Bezaktive Blue SLF	Reactive Dyes	Bezema
44	Bezaktive Yellow S-3R 150%	Reactive Dyes	Bezema
45	Bezaktive Yellow S-8G	Reactive Dyes	Bezema
46	Bezaktive Yellow SLF	Reactive Dyes	Bezema
47	Bezaktive Turqise H-A	Reactive Dyes	Bezema
48	Bezaktive Turqise V-G Conc	Reactive Dyes	Bezema
49	Imcozin Blue E-NR	Reactive Dyes	Tootol Quality Resou

50	Imcozin Navy Blue E-2G	Reactive Dyes	Tootol Quality Resou
51	Imcozin Red E-3BF	Reactive Dyes	Tootol Quality Resou
52	Imcozin Yellow E-3R	Reactive Dyes	Tootol Quality Resou
53	Imcozin Yellow V-4GL	Reactive Dyes	Tootol Quality Resou
54	Imcozin Orange E-2R	Reactive Dyes	Tootol Quality Resou
55	Dychufix Blue BRXF	Reactive Dyes	Dysin Chem
56	Dychufix Navy Blue EC	Reactive Dyes	Dysin Chem
57	Dychufix Red 2BXF	Reactive Dyes	Dysin Chem
58	Dychufix Red EC	Reactive Dyes	Dysin Chem
59	Dychufix Turqise Blue G	Reactive Dyes	Dysin Chem
60	Dychufix Yellow 3RXF	Reactive Dyes	Dysin Chem
61	Dychufix Yellow EC	Reactive Dyes	Dysin Chem
62	Dychufix Yellow 4GL	Reactive Dyes	Dysin Chem
63	Sunfix Super Blue -SBRN	Reactive Dyes	Texco Tech
64	Sunfix Black DN	Reactive Dyes	Texco Tech
65	Sunfix Black GN	Reactive Dyes	Texco Tech
66	Sunfix Navy Blue MFD	Reactive Dyes	Texco Tech
67	Sunfix Navy Blue SBF	Reactive Dyes	Texco Tech
68	Sunfix Navy Blue SPD	Reactive Dyes	Texco Tech
69	Sunfix Red SPD	Reactive Dyes	Texco Tech
70	Sunfix Red MF2BD	Reactive Dyes	Texco Tech
71	Sunfix Red MF-3BD	Reactive Dyes	Texco Tech
72	Sunfix Yellow 3R	Reactive Dyes	Texco Tech
73	Sunfix Yellow MF-3RD	Reactive Dyes	Texco Tech
74	Sunfix Super Yellow-SPR	Reactive Dyes	Texco Tech
75	Sunfix Yellow -SPD	Reactive Dyes	Texco Tech
76	Terasil Blue WBLS	Disperse Dyes	Hunts/Swiss
77	Terasil Blue BGE	Disperse Dyes	Hunts/Swiss
78	Terasil Blue 3RL -02 150%	Disperse Dyes	Hunts/Swiss
79	Terasil Black WW-KSN	Disperse Dyes	Hunts/Swiss
80	Terasil Black WNS	Disperse Dyes	Hunts/Swiss
81	Terasil Black SRL	Disperse Dyes	Hunts/Swiss
82	Terasil Black BFE	Disperse Dyes	Hunts/Swiss
83	Terasil Navy WRS	Disperse Dyes	Hunts/Swiss
84	Terasil Navy GRLC	Disperse Dyes	Hunts/Swiss
85	Terasil Red R	Disperse Dyes	Hunts/Swiss
87	Terasil Red WRS	Disperse Dyes	Hunts/Swiss
88	Terasil Red WFS	Disperse Dyes	Hunts/Swiss
89	Terasil Red W4BS	Disperse Dyes	Hunts/Swiss
90	Terasil Red FBN	Disperse Dyes	Hunts/Swiss
91	Terasil G Yellow W3R	Disperse Dyes	Hunts/Swiss
92	Terasil Yellow W4G	Disperse Dyes	Hunts/Swiss
93	Terasil Yellow W6GS	Disperse Dyes	Hunts/Swiss
94	Terasil Violet BL	Disperse Dyes	Hunts/Swiss

Chapter Five

Knitting Section

Knitting

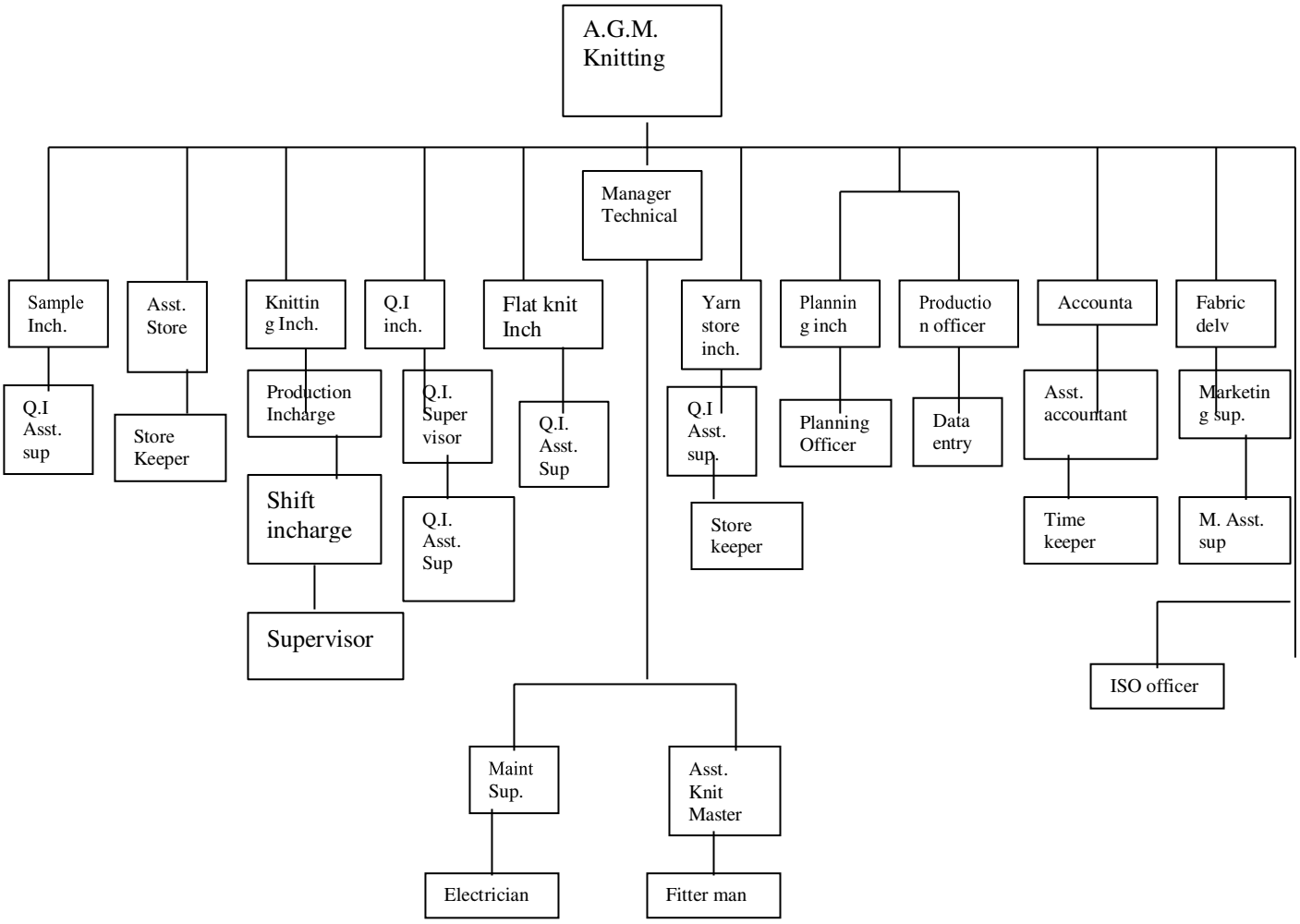
Knitting is a method by which thread or yarn may be turned into cloth or other fine crafts. Knitting consists of consecutive loops, called stitches. As each row progresses, a new loop is pulled through an existing loop. The active stitches are held on a needle until another loop can be passed through them. This process eventually results in a final product, often a garment.

So, the process in which fabrics are produced by set of connected loops from a series of yarns is called knitting.

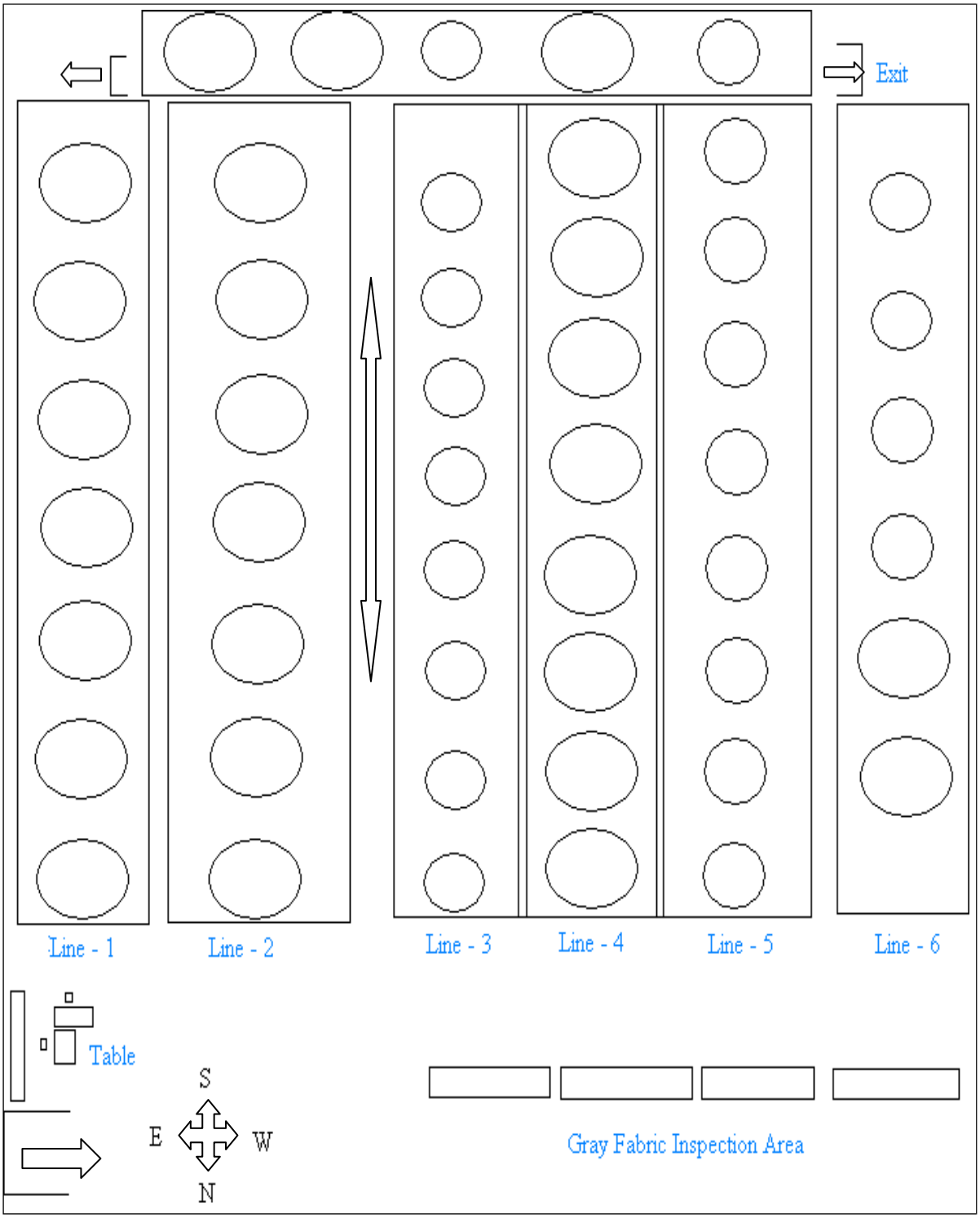
- Warp knitting
- Weft knitting

When fabric is produced by this method in weft direction then its called weft knitting & warp direction then its called warp knitting.

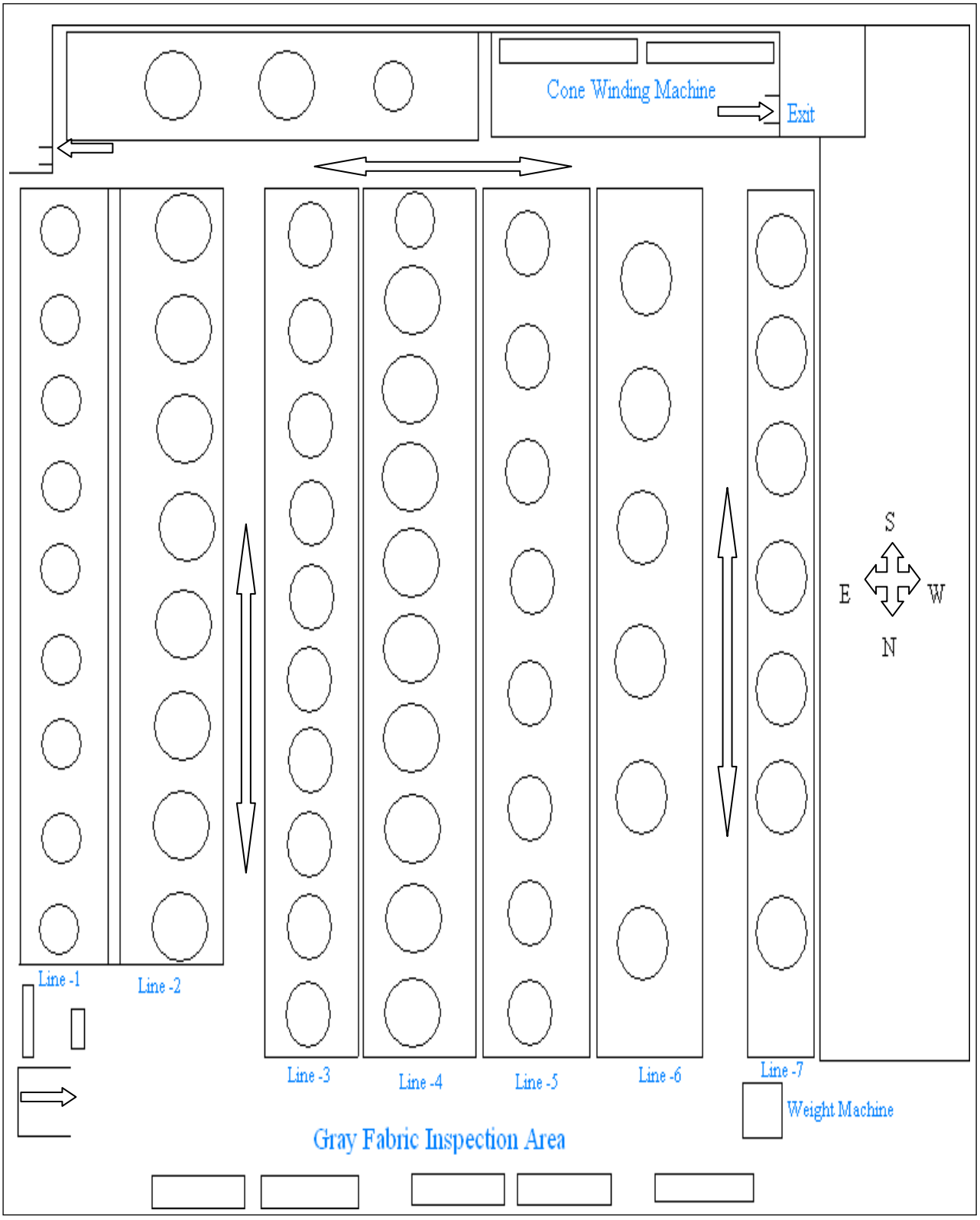
Organogram for Knitting Section



Layout of Knitting Section



Layout of New Knitting Section



Specification of Knitting Machine

Single jersey

M/C NO.	DIA	BRAND	ORIGIN	TYPE	GAUGE	FEEDER	QTY	LYCRA-ATTC
1	15	ORZIO	ITALY	S/J	24	45	1	NO
2	16	FUKUHARA	JAPAN	S/J	24	48	1	NO
3	17	ORIZIO	ITALY	S/J	24	51	1	NO
4	18	FUKUHARA	JAPAN	S/J	24	54	1	NO
5	19	ORIZIO	JAPAN	S/J	24	57	1	NO
6	20	FUKUHARA	JAPAN	S/J	20/24	60	1	NO
7	21	FUKUHARA	JAPAN	S/J	20/24	63	1	NO
8	22	FUKUHARA	JAPAN	S/J	20/24	64	1	NO
9	23	FUKUHARA	JAPAN	S/J	20/24	69	1	NO
10	24	FUKUHARA	JAPAN	S/J	20/24	72	1	NO
11	26	FUKUHARA	JAPAN	S/	20/24	78	1	NO
12	28	FUKUHARA	JAPAN	S/J	20/24	84	1	YES
13	30	FUKUHARA	JAPAN	S/J	20/24/28	90	1	YES
14	30	FUKUHARA	JAPAN	S/J	20/24/28	90	1	YES
15	30	FUKUHARA	JAPAN	S/J SLITTING	24/28	90	1	YES
16	30	FUKUHARA	JAPAN	S/J SLITTING	24/28	90	1	YES
17	32	FUKUHARA	JAPAN	S/J SLITTING	24/28	96	1	YES
18	32	FUKUHARA	JAPAN	S/J SLITTING	24/28	96	1	YES
19	34	FUKUHARA	JAPAN	S/J SLITTING	24/28	102	1	YES
20	34	FUKUHARA	JAPAN	S/J	20/24/28	102	1	YES
21	36	FUKUHARA	JAPAN	S/J	20/24/28	118/108	1	YES
22	36	FUKUHARA	JAPAN	S/J	20/24/28	118/108	1	YES
23	38	FUKUHARA	JAPAN	S/J	20/24/28	114/122	1	YES
24	38	FUKUHARA	JAPAN	S/J	20/24/28	114/122	1	YES
25	38	FUKUHARA	JAPAN	S/J	20/24/28	114/122	1	YES
26	40	FUKUHARA	JAPAN	S/J	20/24	120	1	YES
27	42	FUKUHARA	JAPAN	S/J	20/24	120	1	YES
28	34	FUKUHARA	JAPAN	S/J SLITTING	24/28	110	1	YES
29	25	FUKUHARA	JAPAN	S/J	20/24	75	1	NO
30	26	FUKUHARA	JAPAN	S/J	20/24	78	1	NO
31	30	MAYER& CIE	GERMANY	S/J SLITTING	20/24/28	96	1	YES
32	30	MAYER& CIE	GERMANY	S/J SLITTING	20/24/28	96	1	YES
33	30	MAYER& CIE	GERMANY	S/J SLITTING	20/24/28	96	1	YES
34	30	MAYER&	GERMANY	S/J	20/24/28	96	1	YES

		CIE		SLITTING				
35	30	FUKUHARA	JAPAN	S/J SLITTING	20/24/28	98	1	YES
36	30	FUKUHARA	JAPAN	S/J SLITTING	20/24/28	98	1	YES
37	30	FUKUHARA	JAPAN	S/J SLITTING	20/24/28	98	1	YES
38	30	FUKUHARA	JAPAN	S/J SLITTING	20/24/28	98	1	YES
39	32	MAYER& CIE	GERMANY	S/J SLITTING	24/28	102	1	YES
40	32	MAYER& CIE	GERMANY	S/J SLITTING	24/28	102	1	YES
41	32	FUKUHARA	JAPAN	S/J SLITTING	20/24/28	106	1	YES
42	32	FUKUHARA	JAPAN	S/J SLITTING	20/24/28	106	1	YES
43	34	MAYER& CIE	GERMANY	S/J SLITTING	24/28	108	1	YES
44	34	MAYER& CIE	GERMANY	S/J SLITTING	24/28	108	1	YES
45	34	FUKUHARA	JAPAN	S/J SLITTING	24/28	110	1	YES
46	34	FUKUHARA	JAPAN	S/J SLITTING	24/28	110	1	YES
47	36	MAYER& CIE	GERMANY	S/J SLITTING	20/24/28	114	1	YES
48	36	MAYER& CIE	GERMANY	S/J SLITTING	20/24/28	114	1	YES
49	36	FUKUHARA	JAPAN	S/J SLITTING	24/28	118	1	YES
50	36	FUKUHARA	JAPAN	S/J SLITTING	24/28	118	1	YES
51	46	FUKUHARA	JAPAN	S/J	20/24	138	1	YES
52	46	FUKUHARA	JAPAN	S/J	20/24	138	1	YES
53	48	FUKUHARA	JAPAN	S/J	20/24	144	1	NO
54	48	FUKUHARA	JAPAN	S/J	20/24	144	1	NO
55	44	LISKY	TAIWAN	S/J	20/24	264	1	NO
56	44	LISKY	TAIWAN	S/J	20/24	264	1	NO
57	52	LISKY	TAIWAN	S/J	20/24	312	1	NO
58	52	LISKY	TAIWAN	S/J	20/24	312	1	NO

FLEECE

252/253	28	FUKUHARA	JAPAN	3-THREAD FLEESE	16/20	84	2	YES
254/255	30	FUKUHARA	JAPAN	3-THREAD	16/20	90	2	YES

RIB / INTERLOCK

101	30	WELL	TAIWAN	RIB	18	52	1	YES
102	30	FUKUHARA	JAPAN	RIB/ INTERLOCK	18/22	60	1	YES
103	33	FUKUHARA	JAPAN	RIB/ INTERLOCK	18	60	1	YES
104	33	FUKUHARA	JAPAN	8 LOCK	16/18/22	60	1	YES
105/106	34	FUKUHARA	JAPAN	RIB/ INTERLOCK	18/22	60/62	2	YES
107	36	FUKUHARA	JAPAN	RIB/ INTERLOCK	18/22	60	1	YES
108	36	FUKUHARA	JAPAN	8 LOCK	16/18/22	60	1	YES
109	38	FUKUHARA	JAPAN	8 LOCK	18/22	64	1	YES
110/111	38	FUKUHARA	JAPAN	RIB/ INTERLOCK	18/22	68	2	YES
112/113	40	FUKUHARA	JAPAN	8 LOCK	14/16/18	68	2	YES
114/115	42	FUKUHARA	JAPAN	RIB/ INTERLOCK	14/18/22	72	2	YES

INTERLOCK

151	30	FUKUHARA	JAPAN	INTERLOCK	22	108	1	NO
152/153/154	36	FUKUHARA	JAPAN	INTERLOCK	22	120	3	NO
155 TO 158	38	FUKUHARA	JAPAN	INTERLOCK	22	126	4	NO
159	50	LISKY	TAIWAN	INTERLOCK	18/22	180	1	NO

S/J AUTO STRIPER

201/202/203	30	FUKUHARA	JAPAN	AUTO STRIPER 4 COLOR	16/20	48	3	NO
205	30	FUKUHARA	JAPAN	AUTO STRIPER 6 COLOR	20/24	42	1	YES
204	34	FUKUHARA	JAPAN	AUTO STRIPER 4 COLOR	20	48	1	NO

A/S RIB/ INTERLOCK

226	33	FUKUHARA	JAPAN	AUTO STRIPER 4 COLOR	18/24	48	1	YES

227	36	FUKUHARA	JAPAN	AUTO STRIPER 4 COLOR	18/24	48	1	YES

FLAT KNIT M/C

SL	Model	BRAND	GAUGE	WIDTH	FEEDER	TYPE	ORIGIN	QTY
1, 9-11	MC 172SJ	MATSUYA	14”	68”	06	Computerized	China	04
2-3	CMT 211	STOLL	14”	84”	06	Semi-Jacquard	Germany	02
4-8	SFF 152	SHIMA SEIKI	14”	60”	04	Computerized	Japan	05
12-15	PT 222 new	PROTTI	14”	218cm	06	Computerized	Italy	04

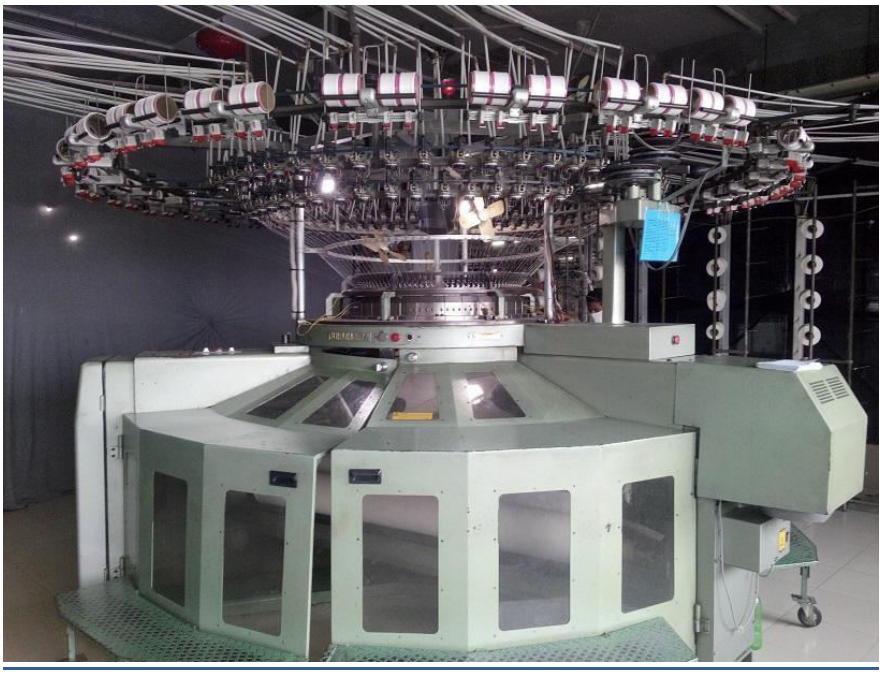


Figure of knitting machine

Production Flow Chart of Knitting Section:

Sample fabric
↓
Design analysis
↓
Machine selection
↓
Setting the machine for the specific design
↓
Sample Knitting
↓
Sample approval
↓
Bulk Production
↓
Grey fabric inspection

Production Parameters in Knitting Section:

This section plans for knitting production. Following parameters are important for the planning of knitting the fabric –

» Order quantity (required amount of fabric to be knitted)
» Type of fabric to be knitted (S/J, rib, interlock)
» No of machine to be used
» Type of yarn used
» Sources of yarn
» Fabric GSM, width

The main parameters controlled in knitting section are stitch length, GSM, Fabric diameter etc.

Some Example:

Fabric type	Count	Gray GSM	Finished GSM	Stitch Length
Single locoest	28/CD	155	180	2.53
Single jersey (Stripe)	26/D.Y	140	160	2.80
Single jersey	22/CD	160	210	2.75
Single jersey	26/D.Y	140	160	2.80
Single jersey(Stripe)	26/D.Y	140	160	2.80
Single locoest	22/CB	160	210	2.80
S/ J (Stripe)	26/D.Y	140	160	2.80
Single jersey	26/D.Y	140	160	2.80

1X1 lycra Rib	30/CB		450	3.55
2X1 lycra Rib	24/1CD	240	360	1.80
1X1 Rib	34/CD	150	175	2.55
Single jersey	30(50%+50%) 40/D Lycra	170	190/195	2.95
Single jersey	26/CB	135	160	2.84
Single jersey	34/CD	115/116	120/125	2.64
Single jersey	34/CD	115/116	120/125	2.64
Single jersey	34/CD	115/116	120/125	2.64
1X1 Rib	34/CD	150	175/180	2.55
1X1 Rib	34/CD	150	175/180	2.55
Fleece	30/CB	240	300	2.90/1.50 4.20
Fleece	30/CB	240	300	2.90/1.50 4.20
Single jersey	24/slub	140	180	2.80
Interlock	40/CB	160	195/200	2.80
Interlock	30/CB	180	260	2.95
Fleece	34/CB	220/225	260	3.50/1.50 3.50
Fleece	34/CB	240	300	2.90/1.50 4.20
Fleece	34/CB	240	300	3.95/1.45 3.95
Single jersey	26/CB	135	160	2.70

Source of Yarns:

- India
- Delta Spinning Mill
- Hanif Spinning Mill
- Nahid Textile Mill
- Square Textile Mill
- Kader Synthetic Mill
- Knittex Textile Mill

Types of Fabrics:

The following types of fabric are available in Knit Concern Ltd.

- Single Jersey
- Double Jersey
- PIQUE.
- PIQUE Lycra
- 1x1 Rib
- 2x2 Rib
- Single Jersey with Lycra
- Interlock

- Pointal Rib
- Terry
- Fancy Terry
- Rib with Lycra
- Single Jersey with Lycra
- Etc

Others Fabrics:

- Y/D Fabric
- Stripe Fabric
- Grey Melange(5% ,10%, 15% Viscose)
- Ecru Melange(2% Viscose)
- Etc

PRODUCTION CALCULATION:

A. Production/shift in kg at 100% efficiency

$$\frac{\text{Width x length x GSM}}{1000}$$

B. Production/shift in meter

$$= \frac{Course/\min.}{Course/cm}$$

$$= \frac{RPM \times No.of\ Feeder \times 60 \times 12 \times Efficiency}{Course/cm \times 100}$$

C. Production per REV = KG

$$\frac{\Pi DG \text{ X No. of feeder X S.L X Machine Total REV}}{1000 \text{ X } 0.9144 \text{ X } 840 \text{ X Count X } 2.204}$$

D. Fabric width in meter

$$= \frac{Total\ no.of\ wales}{Wales/cm \times 100}$$

$$= \frac{Total\ no.of\ Needles\ used\ in\ knitting}{Wales/cm \times 100}$$

E. Theoretical fabric width

$$\text{No. of needle X Wales width} = \pi DG \text{ X Yarn Diameter}$$

$$= \pi DG \text{ X } 4 \text{ X } 1/28\sqrt{\text{count inch.}}$$

F. Fabric G.S.M:

For Single Jersey = 590.5 X 16.1 /S.L /yarn Count.

For Rib = 590.5 X 18.1 /S.L /yarn Count.

For Interlock = 590.5 X 26.1 /S.L /yarn Count.

Machine Production Calculation:

Say,

Feeder = 90
Efficiency = 100%
Machine Dia = 30
Machine Gauge =24
Yarn Count = 30/1
Stitch Length = 2.56mm
Machine Total REV =1500.

$$\text{Production per 1500 REV} = \frac{\Pi DG \text{ X No. of feeder X S.L X Machine Total REV}}{1000 \text{ X } 0.9144 \text{ X } 840 \text{ X Count X } 2.204} \text{ KG}$$

= 15.40 KG.

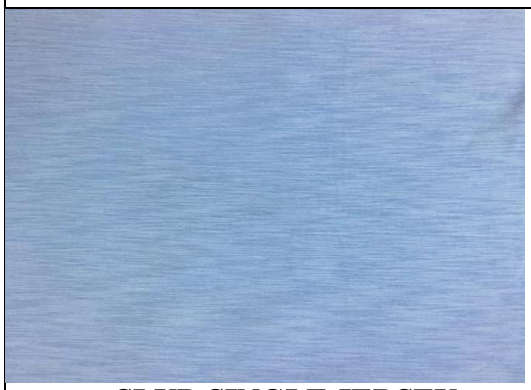
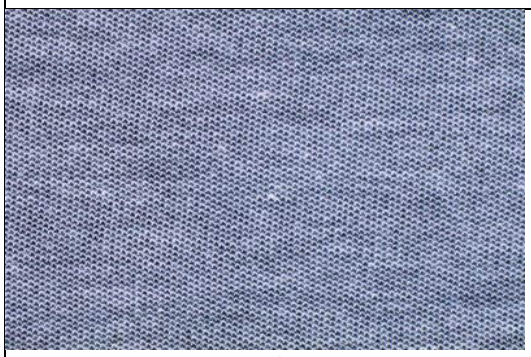
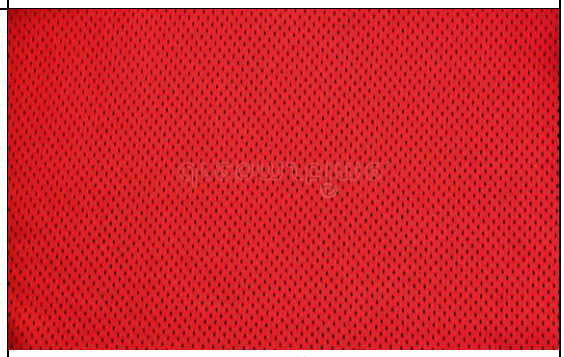
Fabric G.S.M Calculation:

Fabric G.S.M (Grey):

S/J =590.5 X 16.1 / S.L / Yarn Count
= 590.5 X 16.1 / 2.56 / 30
= 124.

So, Fabric GSM = 124.

SAMPLE ATTATCHMENT

 SINGLE JERSEY	 TERRY
 SINGLE JERSEY LYCRA	 1x1 RIB
 SLUB SINGLE JERSEY	 2x1 RIB
 PIQUE	 MESH

Chapter Six

Inspection Section (Grey Fabric)

Gray fabrics inspection

This is the section of dyeing in which the gray fabrics are checked by inspection machine. The fabrics faults are identified. There are many types of faults like-

- Hole mark
- Loop or Pin hole
- Needle mark.
- Sinker mark
- Star mark
- Drop stitches
- Oil Spot
- Oil mark
- Wheel mark
- Flying dust
- Yarn Contamination.
- Yarn Out
- Patty
- Patta
- Chain Star
- Set up
- Slub
- Lycra Out.
- Double yarn.
- Group Mark
- Yarn problem (Thick & Thin Problem).

Faults & their causes in Knitting:

1. Hole Mark

Causes:

- Holes are the results of yarn breakage or yarn cracks.
- During loop formation the yarn breaks in the rejoin of the needle hook.
- If the yarn count is not correct on regarding structure, gauge, course and density.
- Badly knot or splicing.
- Yarn feeder badly set.

Remedies:

- Yarn strength must be sufficient to withstand the stretch as well as uniform.
- Use proper count of yarn.
- Correctly set of yarn feeder.
- Knot should be given properly.

2. Needle Mark

Causes:

- When a needle breaks down then needle mark comes along the fabrics.
- If a needle or needle hook is slightly bends then needle mark comes on the fabrics.

Remedies:

- Needle should be straight as well as from broken latch.

3. Sinker Mark

Causes:

- When sinker corrode due to abrasion then some times can not hold a new loop as a result sinker mark comes.
- If sinker head bend then sinker mark comes.

Remedies:

- Sinker should be changed.

4. Star Mark

Causes:

- Yarn tension variation during production.
- Buckling of the needle latch.
- Low G.S.M fabric production.

Remedies:

- Maintain same Yarn tension during production.
- Use good conditioned needles.

5. Drop Stitches

Causes:

- Defective needle.
- If yarn is not properly fed during loop formation i.e. not properly laid on to the needle hook.
- Take-down mechanism too loose.
- Insufficient yarn tension.
- Badly set yarn feeder.

Remedies:

- Needle should be straight & well.
- Proper feeding of yarn during loop formation.
- Correct take up of the fabric & correct fabric tension.
- Yarn tension should be properly

6. Oil mark

Causes:

- When oil lick through the needle trick then it pass on the fabrics and make a line.

Remedies:

- Ensure that oil does not pass on the fabrics.
- Well maintenance as well as proper oiling.

7. Loop or Pin hole

Causes:

- Due to break down or bend of the latch, pin hole may come in the fabric.

Remedies:

- Change the needle.

8. Oil Spot

Causes:

- Improper greasing
- Excess oiling

Remedies:

- Proper oiling as well as proper maintenance

9. Fly dust

Causes:

- In knitting section too much lint is flying to and fro that are created from yarn due to low twist as well as yarn friction. This lint may adhere or attaches to the fabric surface tightly during knit fabric production.

Remedies:

- Blowing air for cleaning and different parts after a certain period of time.
- By cleaning the floor continuously.
- By using ducting system for cleaning too much lint in the floor.
- Over all ensure that lint does not attach to the fabric.

10. Yarn contamination

Causes:

- If yarn contains foreign fiber then it remains in the fabric even after finishing,
- If lot, count mixing occurs.

Remedies:

- By avoiding lot, count mixing.
- Fault less spinning.

This inspection is pointed by 4 point system

4- Point System		Acceptance Calculation
0-3	1	< 20 =A grade fabric
>3-6	2	20-30= B grade fabric
>6-9	3	30< = unacceptable fabric
>9	4	
Hole<1	2	
Hole>1	4	

$$\text{Total Point} = \frac{\text{Total fault} \times 36 \times 100}{\text{Roll Length (yds)} \times \text{Actual Width}}$$

Machine Specification Of Fabric Inspection

Brand Name : UZU

Model : U2-90031

Country of origin : Thailand

Serial no. : 0095172

Motor : 210HP

Power : 220V

Brand Name : HSING CHENG

ModeL : HC-TIM-1500mm

Country of origin : Thailand

No of motor : 02

Motor : 210HP

Power : 220v

Year of Manufacture : 2005

Raw fabric store

This is a place of fabrics store. Where the fabrics are arranged by type of fabrics & buyer order after completing fabric grey fabric inspection.

Fabrics are separate by rolls or lot. Every face of lot or rolls contains –

- Fabric types
- Yarn count
- Fabric GSM
- Fabric faults name
- Lot number
- Roll number

This section has bin card for every lots which contains the information about fabrics.

Chapter Seven

Central Lab

LABORATORY FACILITIES

LABORATORY:

Lab is the most important section of a dying 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 requirement of the buyer the shade is prepared in a lab considering the economical aspects.
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.
  - Testing the dyed goods.
  - Process optimization and cost reduction through process modifications and developing or testing newer techniques and products.
  - In process checks of important quality parameters affecting the quality, efficiency, cost etc and monitoring.
  - Quality control of all raw materials consumed and also all processed material in terms of color and fastness.
  - Following the color coding system given by the distinctive buyer & also prepare own color bank.

Layout for Central Laboratory:

<table>
<tr><td colspan="2">YARN

LAB</td><td>KNIT

LAB</td><td>WET

LAB</td><td>ANAL
YTICA
L
LAB</td><td>MANAGER

ROOM</td><td>STORE

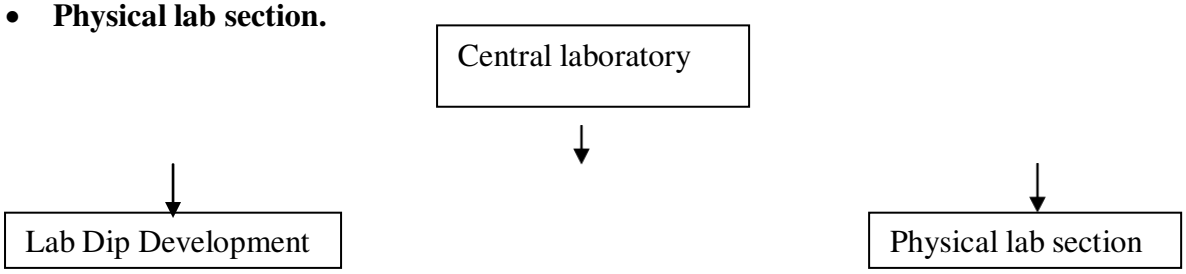
ROOM</td></tr>
<tr><td></td><td>D
O
O
R</td><td colspan="4"></td><td>D
O
O
R</td></tr>
<tr><td>REVISE
D
ROOM</td><td>YARN
COLOR
MATCHING
ROOM</td><td>KNIT
FABRIC
MATCHING
ROOM</td><td>WET
LAB</td><td>CONFERNECE
ROOM

LINE DRYER
ROOM</td><td></td><td>G
A
T
E</td></tr>
</table>

Central Laboratory

Central Laboratory divided in to two sections.

- **Lab dip Development**
- **Physical lab section.**



Lab Dip Development

Lab Dip Development means the sample which is dyed according to buyer"s requirements (similar shade and so on).Depending on lab dip development sample dyeing and bulk production dyeing planning done. The following sequence need to produce a Lab Dip.

Merchandisers sent Swatch or Sample or Color Code

↓

Received Sample by Central Laboratory

↓

Compare Swatch with Self Shade or Spectroflash Machine

↓

Take Recipe for Sample dyeing (More than one Recipe)

↓

Take dyeing auxiliaries automatically and manually

↓

Sample Dyeing

↓

Hydro Extractor

↓

Dryer

↓

Compare Dyeing Sample with Light Box and Spectroflash machine

↓

If need Take correction for required shade manually and automatically

↓

Sample Dyeing

↓

Compare Dyeing sample with Swatch

↓

Approved Sample (Grade: A B C)

Dyeing process (Sample Dyeing):

Dyes in Biker (Auto Lab Dispenser Combo)

↓

Manually Take Dyes which are not present in Auto Lab Dispersion Combo

↓

Fabric Cold wash

↓

Fabric Loading in Dyeing machine

↓

Set Temperature (60 x 60 or any Temp.)

↓

Cooling

↓

Normal Washing (Cold and Hot)

↓

Cold wash with A. Acid: .5 g/l

↓

Hot Wash with Ka A-41.5 g/l at 80 0 c

↓

Hydro -Extractor

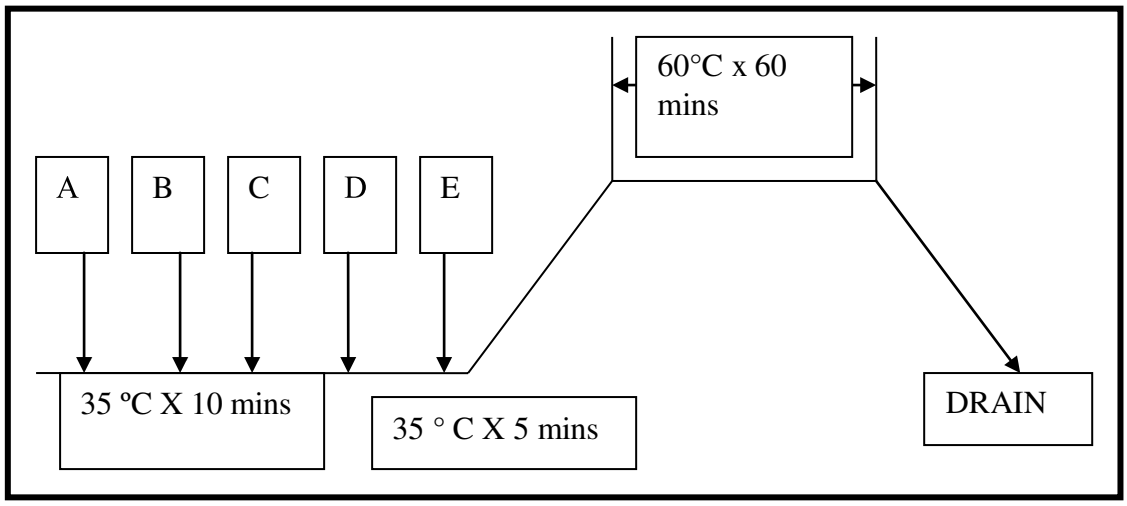
↓

Dryer

↓

Shade Matching

Laboratory Standard Dyeing Procedure:



A – Auxiliaries
B – Dyes
C – Glauber"s Salt
D – Fabric
E – Soda Ash

Washing off Procedure :

2 x Warm rinse at 60°c
↓
Neutralize with 1.2 g/l Acetic Acid PH – 5.0 at 40°c
↓

Lt. Shade	Dk. Shade
↓	↓
Soaping at 90°c with Soaping at 90°c with 1.0 g/l Multi soap SR	.5g/l Multi soap SR
↓	↓
2 x Cold Rinse	2 x Cold Rinse
↓	↓
Dry	Fixed with Tinofix FRD 1.0 % of Dry

Salt & Alkali Requirements:

Total % of Dyestuff	0.5 % & Bellow	***0.6 % - 1.0%***	***1.1 – 2.0%***	***2.1 – 3.0%***	***3.1 – 5.0%***	***5.1 – 5.99%***	***6.0 & Above***
Glauber"s Salt(g/l)	***20***	***30***	***40***	***50***	***60***	***70***	***80***
Soda Ash(g/l)	10	***10***	***15***	***15***	***20***	***20***	***20***

***For Drimarine*:**

Salt(g/l)	**20**	**40**	**50**	**60**	**70**	**80**
Soda(g/l)	**1.0**	**1.5**	**2.0**	**2.5**	**3.0**	**4.0**

Liquor Ratio = 1: 7

Some Sample Of Lab dyeing :



Lab dip or Standard Sample:

A buyer gives the order to the merchandising section of the industry by colored swatch or material or by using PANTONE BOOK CODE which is called the standardsample. The sample is measured by the CCM to get the recipe. The main recipe is choose by metamerism value under three light sources, price and dyestuff availability.Sometimes buyer supplies the reflectance curve and reflectance% of different wavelength from 400-700 nm. Data is input to the computer and main recipe is choosing by the same way.

Lab Trial:

Getting the recipe the lab officer makes lab trial and matches it with the standard according to buyer requirement.

- **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 measuringdevices, & 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.



Fig: Spectrophotometer – Data color model 600

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 colour on paper
  4. TCX----textile colour on cotton
- 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.

➢ **Sample dyeing instruments:**



01. Machine name: AUTO LAB

Model no: TD-LAB V34
Manufacturer: LAWER
Origin: ITALY
Software version: V 3.9.
Serial no: 2709
Year: 2011
Capacity: 172 bottle

Functions:

1. Preparation of stock solution
2. Auto Dispensing of given recipe

02. Sample Dyeing Machine:



Machine Specification:

Co power Technology co.Ltd.
Model: Supermat
Weight: 135 kg
U.S.A

03. Hydro Extractor:

M/C Specification:
Lab Extractor
SDL
U.K.

Function:

- **To remove extra water from fabrics.**



04. Dryer:

M/C Specification:
SDL ATLAS
Textile Testing Solutions.
U.K.

Functions:

- To dry the fabric.

➢ **Physical lab instruments:**



01. Washing Machine

M/C Specification:
WASCATOR
U.K

Objectives:

- To wash the fabric according to buyer requirements.

Sample: 10 x 4 cm
Multifibre: 10 x 4 cm
Detergent used: Persil per body 10 gm
Time: 30 min

02. Washing Machine

M/C Specification

SDL ATLAS W 228 Rota wash
SDL ATLAS
UK



03. Pilling Tester.

M/C Specification:

M 227 ICI Pilling Testers
Complies with
BS 5811, IWS TM 152 ISO 12945-1

Function:

- To test pilling resistance according to buyers requirements.
- In KCL for H&M no of Revelations 14400
- For others buyers revelations 10800



04. Perspiration Tester:

M/S Specification:

05. Rubbing Tester:

M/S Specification:

KCM-01

CROCKMASTER

JAMES-H.HEAL &CO LTD, HALFIX

ENGLAND

06. Light & Weather Tester:

M/S Specification:

APOLLO

LIGHT AND WEATHER FASTNESS TESTER

HAMES H.HEAL & COLTD.

HALFIX

ENGLAND

FUNCTION:

- To test fastness for light
- To test fastness for weather.

07. Bursting Strength Tester:

M/S Specification:

TRU BURST 2

JAMES-H.HEAL &CO LTD, HALFIX

ENGLAND

FUNCTION:

- To test strength.



08. Electronic Crockmeter:

Brand name: SDL INTERNATIONAL

Year: 2007

Origin: UK

09. Manual Crockmeter:

Brand name: James H Heal

Year: 2007

Origin: UK

10. Scorch Tester:

Brand name: SDL INTERNATIONAL

Year: 2007

Origin: UK

11. Spun yarn Appearance Tester:

M/S Specification:

SPUN YARN APPEANANCE STANDARDS
FOR RANGE OF YARN NUMBERS
36 + „S 50"S (16 TO 12+ tex)

Analytical Lab:

Analytical Lab is very important for Central Lab. In Bangladesh many industry has no Analytical lab.

Objectives:

- To test Formaldehyde in grey or dyed fabrics.
- To test P^H
- To Identify Fiber or PC ratio.

Two standards are used.

- ISO – 14184 – 1
- JISL – 1041 Option – A



15. UV/VIS SPCTROMETER
PERKIN ELEMER U.S.A.

Lab Apparatus and Stationary:



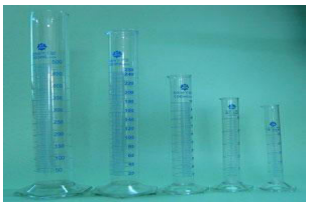
1. Pipette



2. Conical flask



3. Beaker



4. Measuring cylinder



5.Forceps



6. Scissors

Formal Dehyde Testing Procedure:

Take Fabric (1 gm).
↓
100 ml distilled water
↓
Water Bath (60 x 40) Water
↓
Filtered with Filtered Paper
↓
Take water in to Test Tube
↓
Nash Reagent (A. Acid +Acetyl Acetone + Ammonium Acetate)
↓
Water Bath 30 minut

Room Temperature 30 minutes for Cool

↓

Measure Formal Dehyde

PC Ratio Test:

Take 1 gm Fabric

↓

70 % H_2SO_4 Solution

↓

30 minutes

↓

Washing

↓

Weight Again

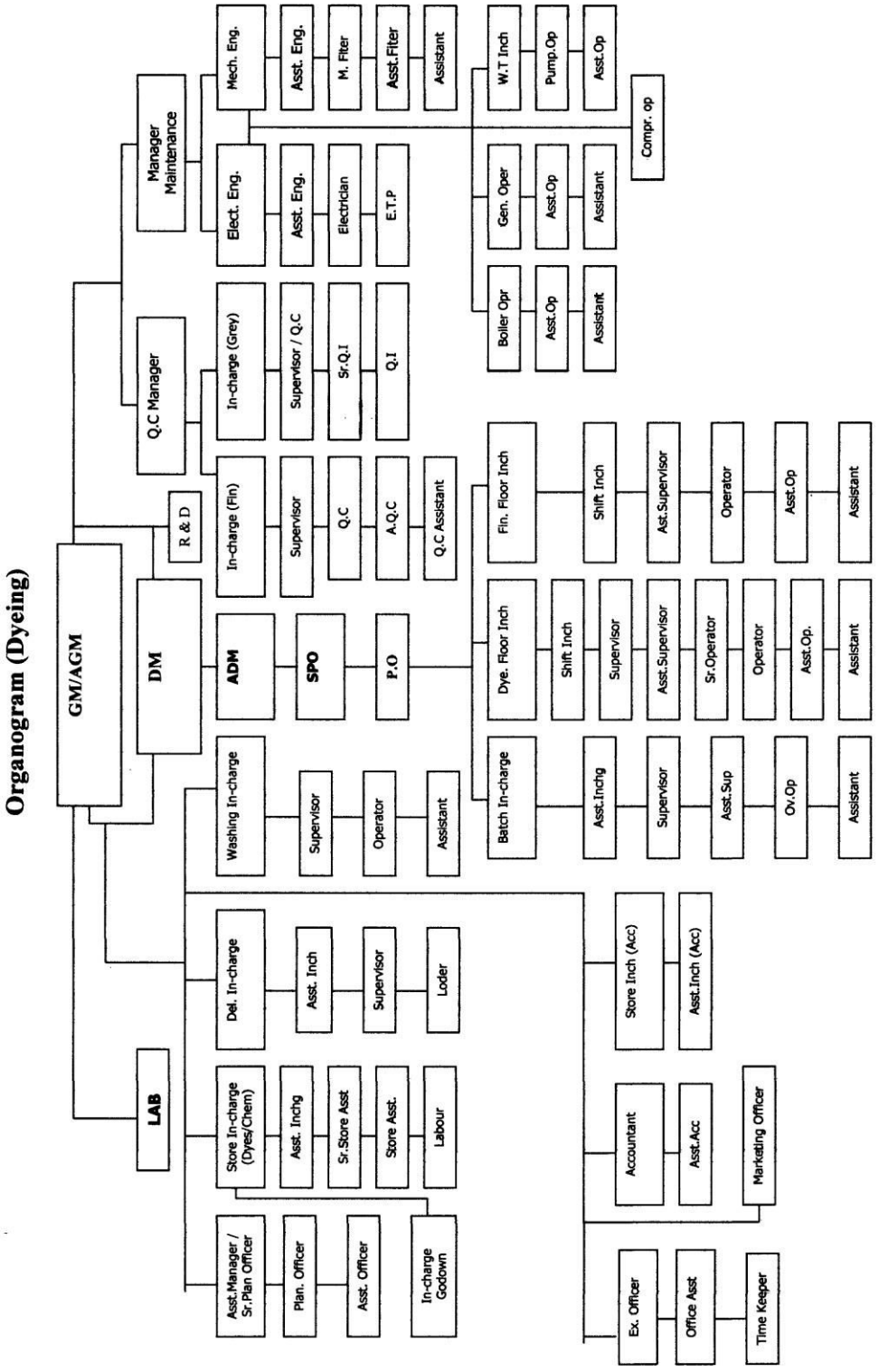
↓

Measurement Pc Ratio

Chapter Eight

Knit Dyeing

Organogram of Knit Dyeing:



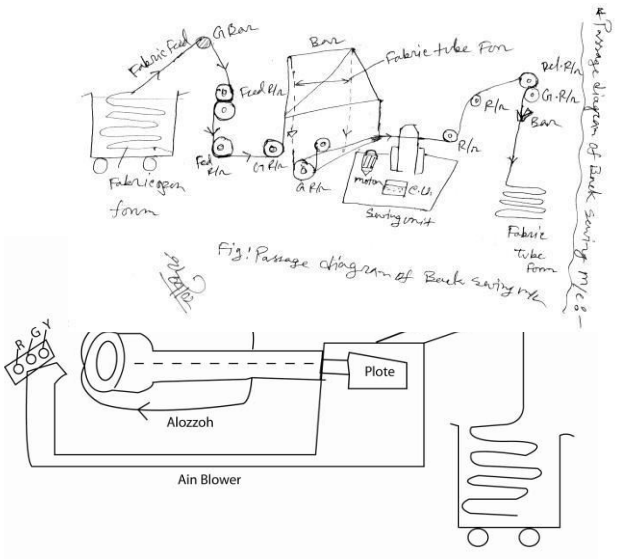
Batch Section

- 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.
- $\text{Batch Quantity} = \frac{\text{Total required quantity X Dia Quantity}}{\text{Total quantity}}$
- $\text{Batch} = \frac{\text{Total batch quantity + total parts}}{\text{Batch Quantity}} = \text{Ratio}$
  - 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:**

❖ BACK SEWING MACHINE

Manufacture: MTG MECCANICA SNC
Country of origin: Italy



❖ TURNING MACHINE

Brand Name: HSING CHENG
Model: HC –TFM-1500mm
Country of origin: Thailand
No of motor: 02
Motor: 210HP
Power: 220v
Year of manufacture: 20

❖ OVER LOCK MACHINE

Brand Name: JUKI
Model No: 3614
Country of Origin: Japan

Point To Be Considered:

1. During Batching 11-12% Extra Fabric Should Be Taken Than The Ordered Fabric
2. Fabric Should Be Turned Over. I.E. Front Side Of The Fabric Is Turned To The Back Side
3. Fabric Should Be Batched Equally For Every Nozzle.
4. Last End Of The Fabric Of The Roll Is Sewn To The First End Of The Other Roll To Make Required Length Of The Required Weight Of The Fabric.
5. If Collar & Cuff Is Present They Should Be Batched To Each Nozzle With Body Fabric In Such A Way That Each Nozzle Gets Equal No. Of Collar & Cuff.
6. When Same Color But Different Dia Of Fabric Has To Batch In The Case, Every Fabric Of Different Dia Of Equal Quantity Of Weight Should Be Batched In Every Single Nozzle Of The M/C.
7. In Case Of Lycra,

BATCH CARD INFORMATION

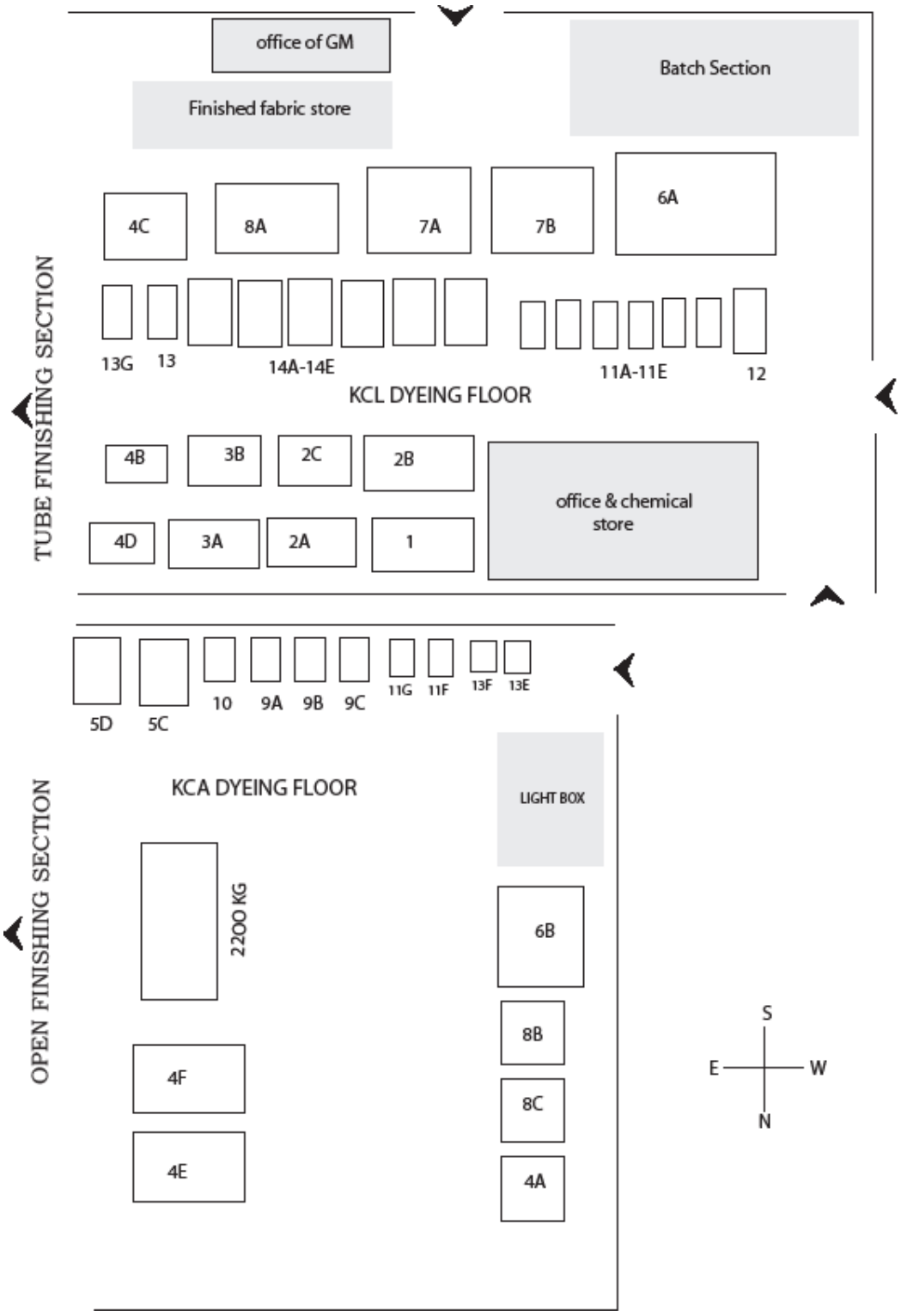
Buyer : H& M
Order no. :755811-1645
Color : 21.008. Lt. Greenish Yellow
Req. GSM: 120/130
Yarn count: 40 1/5 CB
Fabric type: S/J

Date: 09.02.2009
Yarn Lot : Sudhan-7679
Lot No: 3
M/C No: 4F

Fact.&m/c no.	M/C dia	Gauge	Req. dia	Qty. rolls	Grey wt.
KCL – 52	46	24	39	14	401

Actual Weight: 405 KG
Faults: Oil mark, Loop, Set up, Patty, Hole, Yarn Problem, yarn contamination.

Remarks: Enzyme Garment wash.



Lay out plan of Dyeing sections

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:**

Type	Capacity	No. of m/c
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 :

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



HIGH TEMPERATURE DYEING M/C



LOW TEMPERATURE DYEING



Details of Dyeing Machines in KCL

- **Specification of dyeing machines:**

Sample Machine	Sample Machine
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	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 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

Machine No: 10
Brand Name: FONGS
Model: ALLFIT -6O
Serial No : 26012103
Country Of Origin : Honkong
Machine Type :HP/HT 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: 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
No of Nozzle : 01
No of motor: 08
Power: 415 V 3 @ 50 Hz
Water supply pressure req. : 300 Kpa
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
Machine Capacity :30 Kg
Cycle time: 03 min
No of cycle : 12
Main pump speed :80-150 m/min
Winch speed :250 m/min

Machine No: 13
Sample Dyeing m/c:
Brand: Ugoloni
Origin : Italy

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	Capacity: 20 Kg.

Bulk Machine	**Bulk Machine**
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 **Machine No: 2A** Brand Name: FONGS Model: GN 6-SR -4T	**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 :26012101 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: 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: 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	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 Design temp. : 140 ° C Year Built : 2000 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 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

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 :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

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
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

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

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

Machine No: 6A
Brand Name: FONGS
Model: ECO-38-6T
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

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: 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
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

Mechanism of Dyeing Machines

- 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 dossing 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 from 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 circulated by a high pressure pump.

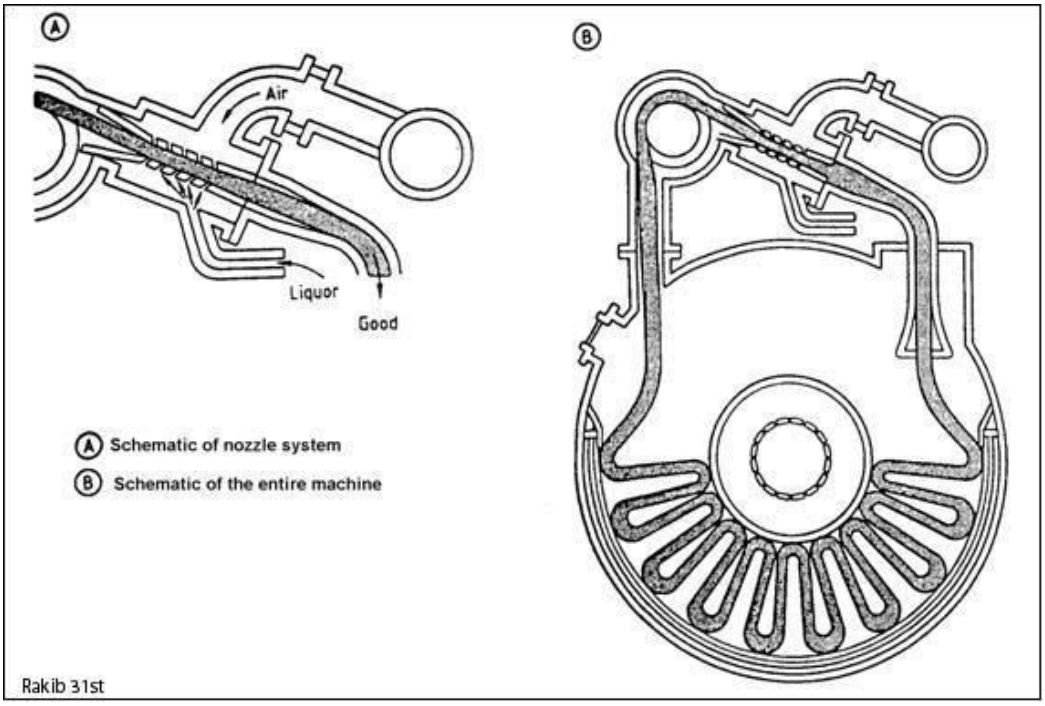


Fig: cross-sectional diagram showing fabric path & nozzle in the high pressure winch d/m

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.

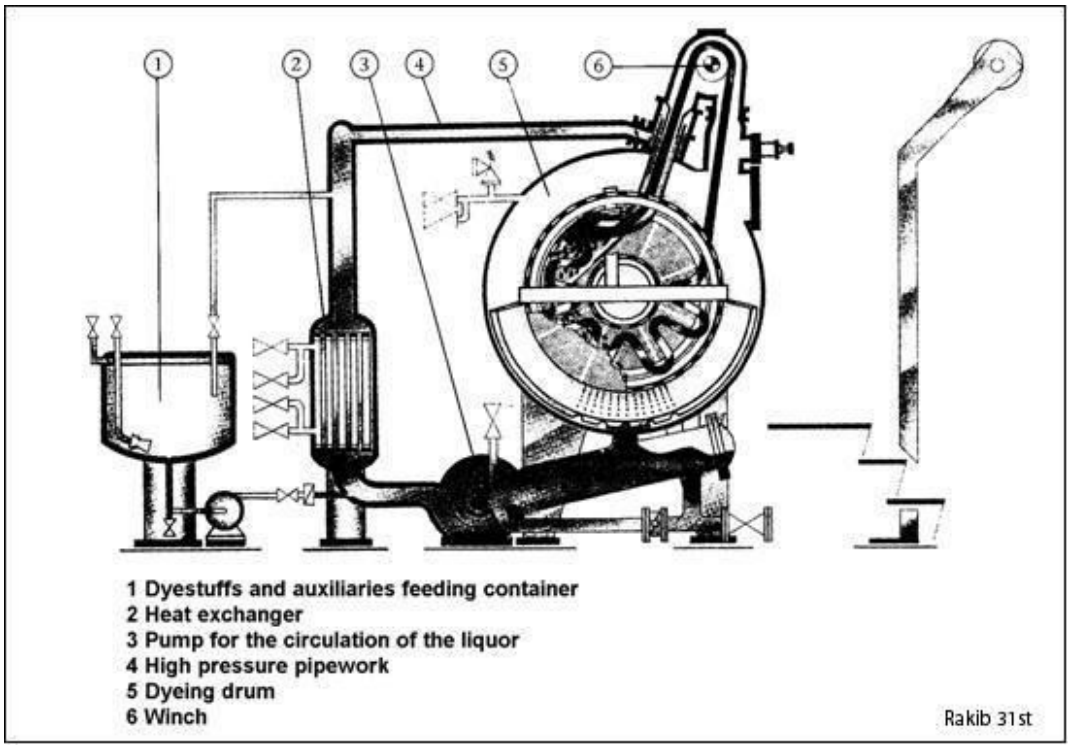


Fig: schematic diagram of the circulation system of liquor in a dyeing machine

- 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/c100 for atmospheric
  - Reel/Winch speed : 150-250 rpm
  - Main motor efficiency: 80-85%

DYEING PROCESS IN KNIT CONCERN LTD

Fabric loading
↓↓
Scouring & bleaching (95°c×50 ~60min)
↓↓
Cooling (ringing 5min +5 min)
↓↓
Scouring hot (use per oxide killer 95°c×10 min)
↓↓
Cooling (5 min ringing)
↓↓
Acetic acid (normal temp. 10 min)
↓↓
ph control ~ 4.5
↓↓
Enzyme
(55°c×50 min)
↓↓
70°c×50 min (the power of enzyme removed)
↓↓
Leveling
↓↓
Color dosing (10 cycle time)
↓↓
10-12 min run time
↓↓
Salt (run time 20 min)
↓↓
Soda dosing (12 cycle time)
↓↓
Run time 20 min
↓↓
60°c×60 min
↓↓
BD 5 min light color or 10 min deep color
↓↓
Normal hot (70°c×10min, 5 min rinsing)
↓↓
A. Acid (normal temp.)
↓↓
5min ringing
↓↓
Chemical hot (70°C to 98°C)
↓↓
Ringing 5 min or 10 min
↓↓
Softener
↓↓
Unload

Dark Room/Matching Room:

Dark Room is the vital place in Dyeing Section where contain four major lights to match the color according to the process sequence for any shade. The major four lights are D 65, TL 83, TI 84 and UV light. In case of white color UV light will be used to match color in different stages since dyeing. D 65 is used maximum. And for others color D 65 light is used. All types of light set on to the light box and under the light box shade will be check. According to the Lab report the buyer gives shade conformation report which includes Std. Swatch, App. Lab dip, Revised Lab and App. Sample. It"s important to inform that before come to the bulk dyeing the sample dyeing will be done. Sometimes topping will be done according to the duty stuffs.

Machine Wash:

In dyeing m/c wash is very important activities .Without m/c wash it is quite impossible to go through next dyeing process. In case of m/c wash detergent, bleaching powder soda Hydrose is used. The process for m/c wash is given below.

DETERGENT

↓

BLEACHING
SODA ASH [30 MIN NORMAT TEMP.]

↓

HYDROSE [TEMP. 80°C]

↓

RUN TIME 30 MIN 95 °C

↓

COOLING AT 80°C

↓

RINSING [5+5+5]

↓

ACID [60 10 MIN]

↓

RINSING

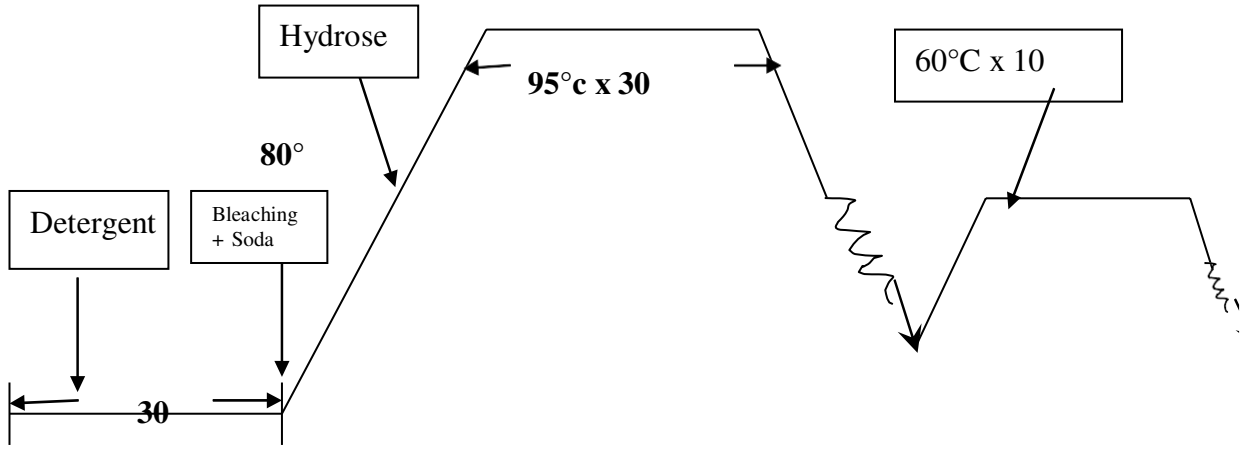


Figure : Curve for M/C Wash

Recipe for Black shade:

PRETREATMENT:

Finocon KRCP	:	0.5 g/l
Kappasol –AF-2000	:	0.1g/l
Felosan NOF	:	0.5 g/l
Kappavon CL	:	0.5 g/l
Kappaquest FE	:	0.3 g/l
Kappazon H53	:	0.35 g/l
Caustic soda	:	2.0 g/l
Soda	:	x g/l
H2O2 (50%)	:	2.0 g/l
A. acid	:	0.3 g/l
Bio EC	:	0 .5 g/l

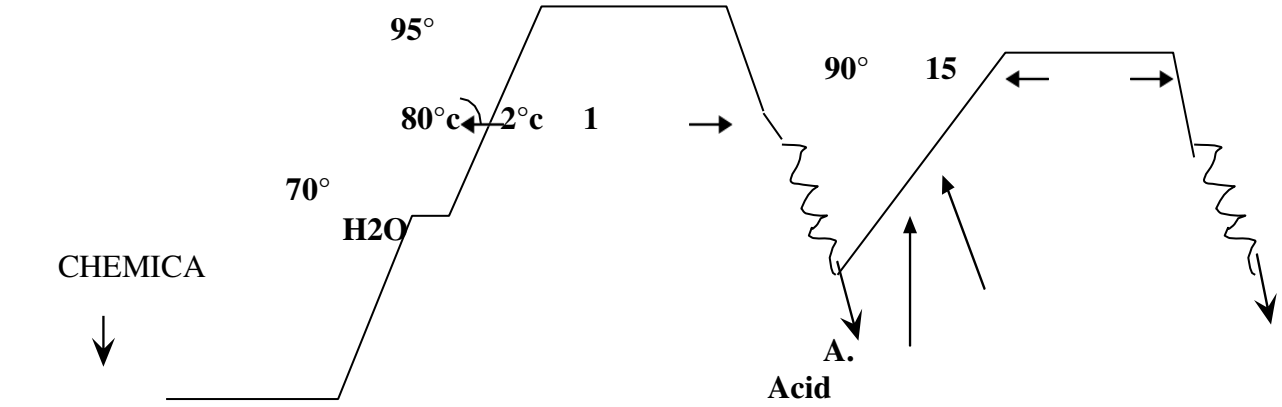
DYEING

Kappasol AF 2000	0.2 g/l
Kappavon CL	0.7 g/l
DBC/DPE	0.5 g/l
Dyes	X %
Salt	X g/l
Soda	X g/l

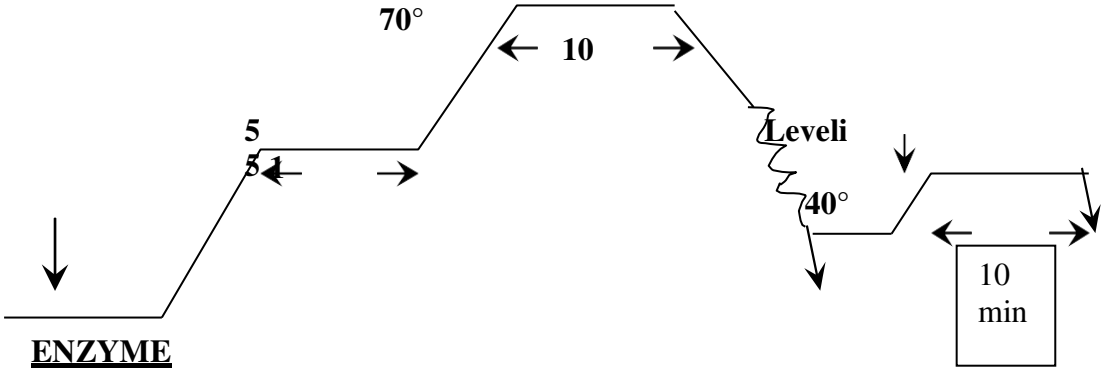
AFTERTREATMENT

A. acid	1.0 g/l
Cibapon R/rwa	1.00 g/l
Fixing	X %
Softener	1 %

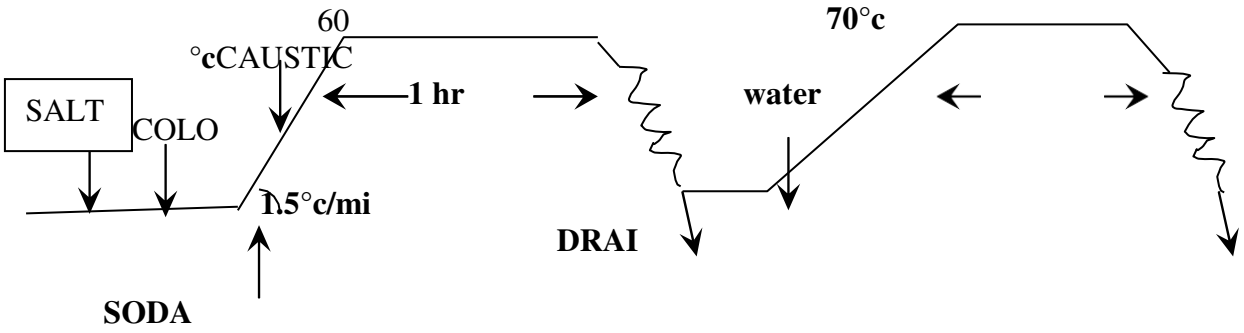
Curve for Black Shade:



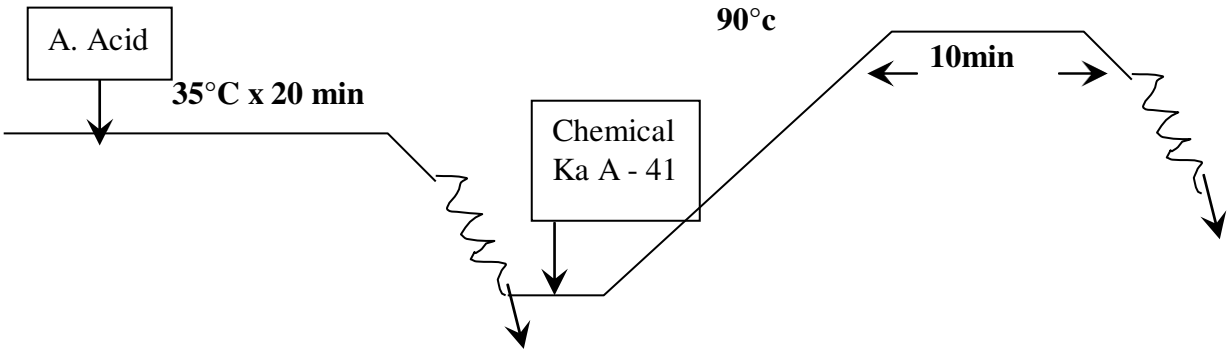
SCOURING



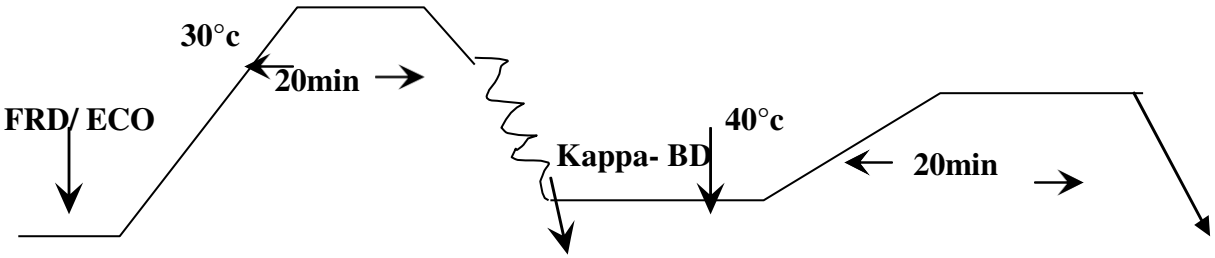
ENZYME



COLOR STEAM **NORMAL HOT**



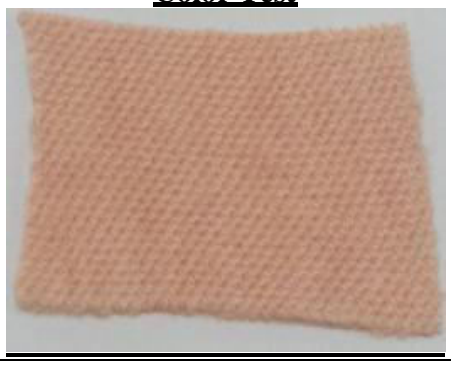
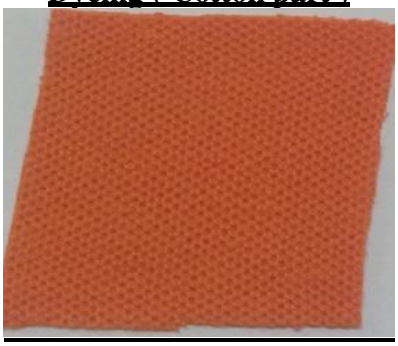
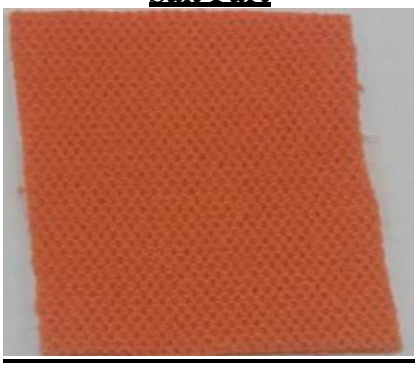
CHEMICAL HOT

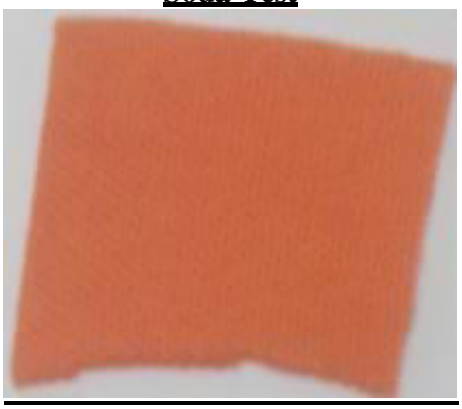
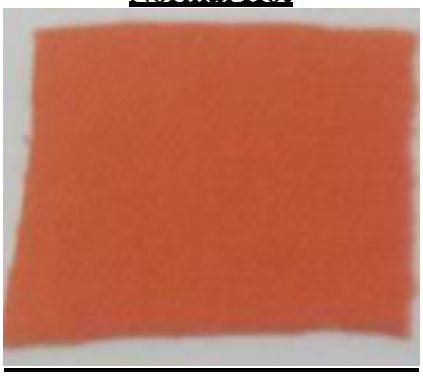


A full process of a CVC fabric:

Fabric loading
↓
Scouring & Bleaching
↓
Enzyme
↓
Dyeing(Polyester part)
↓
Color test
↓
Acid test
↓
Reduction
↓
Cotton part dyeing
↓
Salt test
↓
Soda test
↓
Bath dyeing
↓
Normal hot
↓
Acid test
↓
Chemical hot
↓
Fixing agent
↓
Softener
↓
Unload

Sample Attachment

Scouring & Bleaching 	**Enzyme** 
Dyeing (Polyester part) 	**Color Test** 
Acid Test 	**Reduction Test** 
Dyeing (Cotton part) 	**Salt Part** 

Soda Test 	**Bath Dyeing** 
Normal Hot 	**Acid Test** 

Chemical Hot 	**Fixing Agent** 	**Softener** 

PRODUCTION PARAMETER:

1. PH

- During scouring & bleaching 10-11
- During enzyme 4.5
- During levelling 6.5-7

- Color steam:
  -reactive dyeing 10.5-11
  -disperse dyeing 4.5-5.5
- During fixing 4.0-5.5
- During softening 4.0-5.5

2. TEMPERATURE (°C)

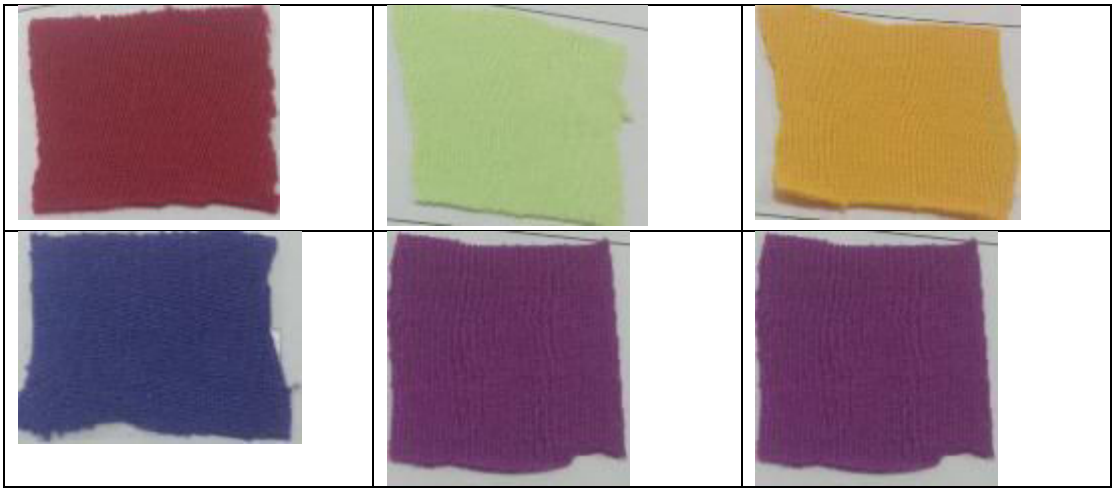
- For cotton scouring & bleaching 90-98
- For polyester dyeing 100-130
- For cotton dyeing
  -80 to 90 (hot brand)
  -40 to 60 (cold brand)

- For cotton hot wash 70-80
- For cotton cold wash 30-40
- For cotton acid wash 60-70

3. TIME:

- In Cotton Dyeing
  -Scouring & Bleaching 60-90 Mins
  -Scouring Hot 10 Mins
  -Enzyme 50 Mins
  -Levelling 10 Mins
  -Softening 20 Mins
- For Color Steam Both Reactive & Disperse 60-90 Mins
- **M:L =**1:7

Some sample of Knit Dyeing :



Chapter Nine

Finishing Section

Finishing Section

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, anticrease, 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.

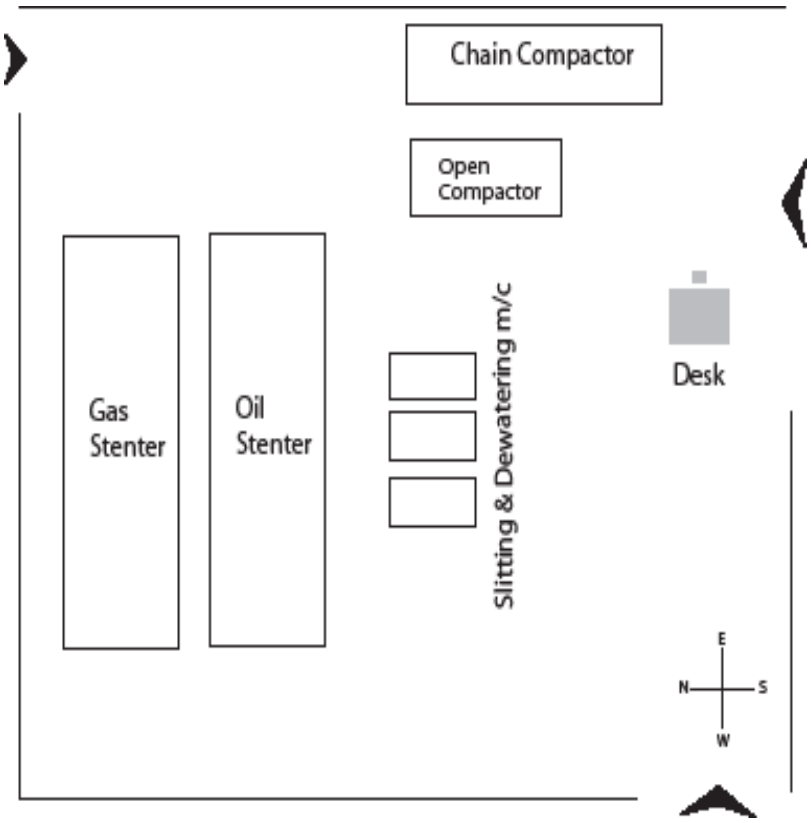
- **Open-finish Section:**

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-

Hydro extractor
↓
Slitting & dewatering
↓
Stenter
↓
Compactor
↓
Q.C

Delivery

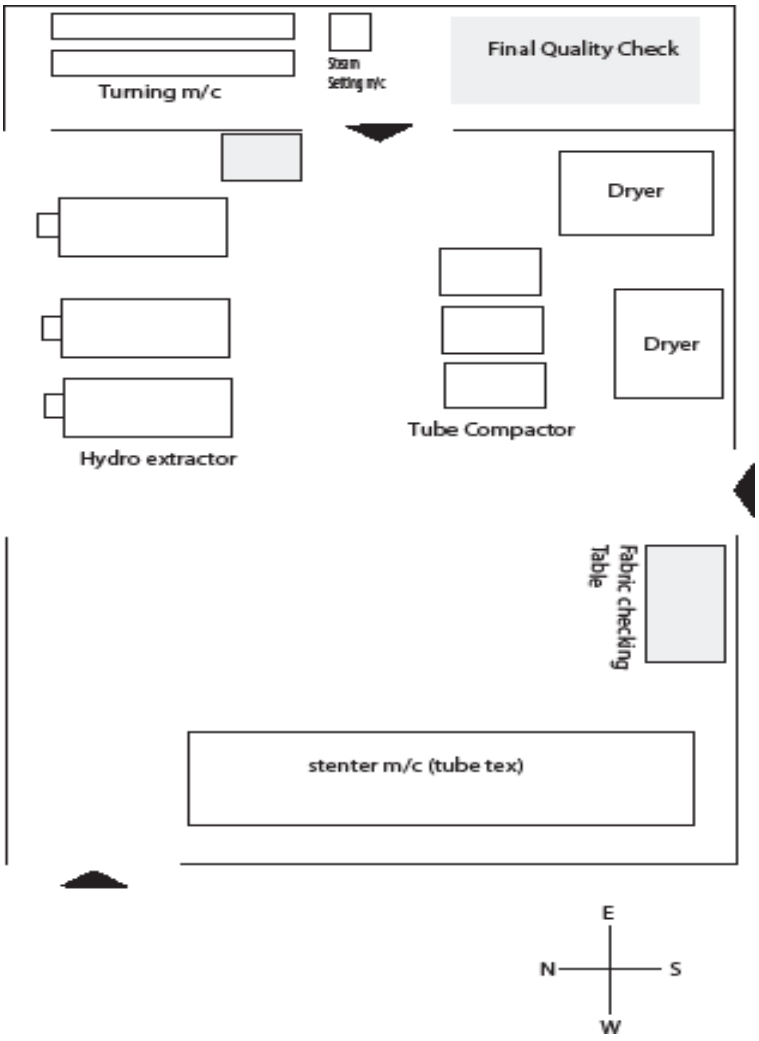


Layout of Open-Finish Section

- **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 –

Hydro extractor
↓
Dryer
↓
Turning m/c
↓
Plaiting m/c or Steam setting m/c
↓
Tube Compactor



Layout of Tube-Finish Section

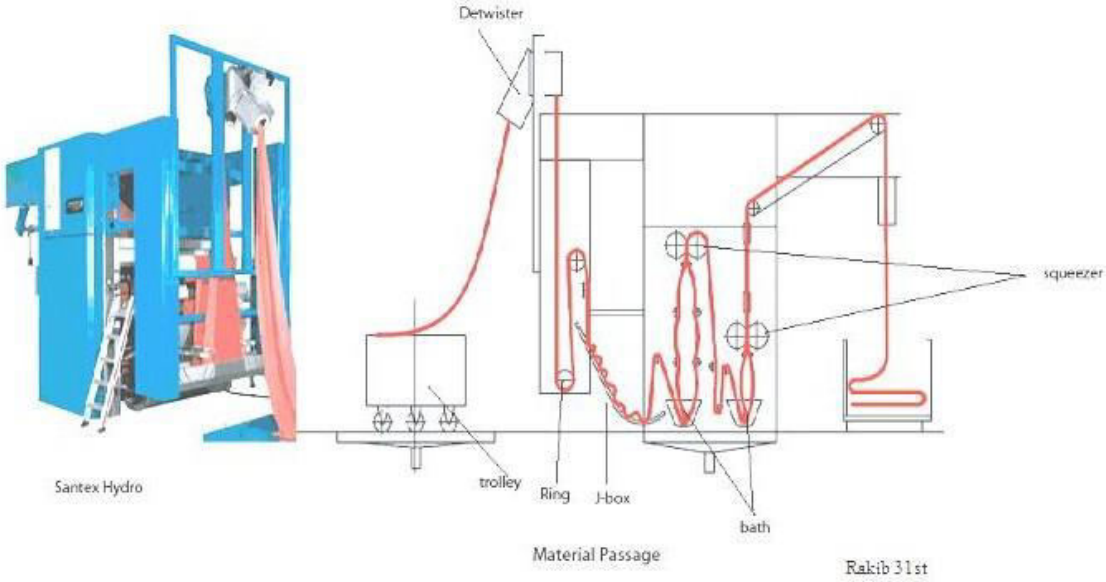
Description of Different Finishing Machines

- **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".



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
   Overfeed regions: J – box, Before Padder 1 & Padder 2
2. Pressure in Padder: Padder 1 – 4-5 bar
   Padder 2 – 3.5- 4 bar
3. 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.
4. Dia of Shaper: Max. 52 inches
   Min. 18 inches

5. Water recovery%: 140-150%

6. 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

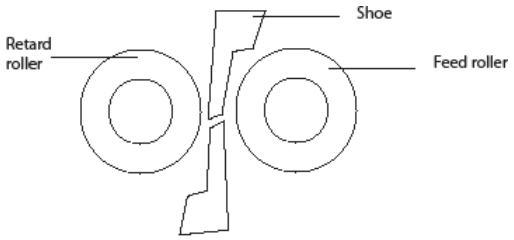
Function:

- 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.



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.

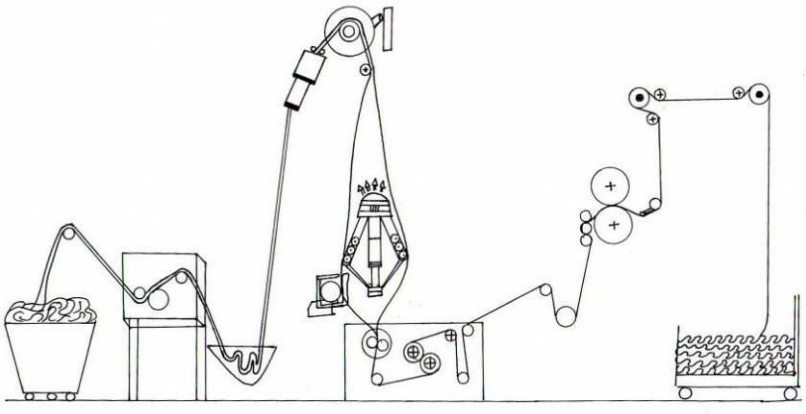
Function:

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



Slitting Machine

Material Passage (Left to Right)



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%)
- 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)

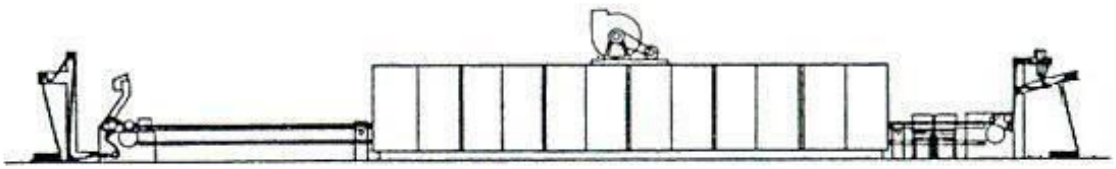


Stenter m/c (chain & clip system)

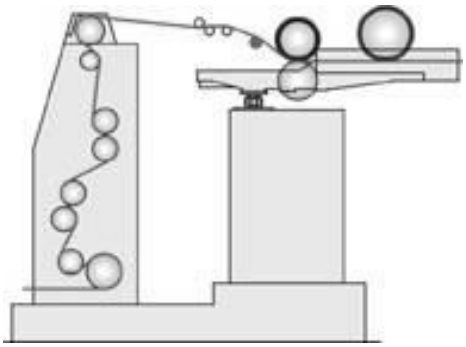
Important Zones & Parts:

- 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.

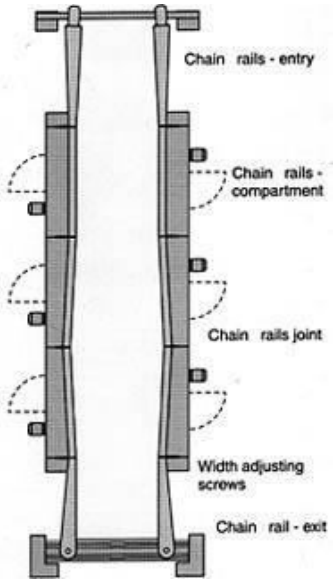
- Front Zone
  - Over feed zone
  - Plaiting
  - Static electricity remover.



Fabric path of stenter



Overfeed & pinning



Fabric in the chain

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 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

Comparative study between two STENTER M/C:

KDST- 02(GAS)	KDST- 03(Thermo oil)
1. The major different is the heating type. Here Thermal oil is used to heat the chamber.	1. Here thermal oil is used to heat the chamber.
2.Heating capacity : 2560KW	2. Heating capacity : 2640KW
3. Year of Construction : 2006	3. Year of Construction : 2008
4. Calorific value is not present	4.Calorific value : 9.87 KWH/Nm 3
5. Its needs more time to grow heat and also to cool.	5.It can grew heat more quickly and also cool so fastly.
6. It has two take up roller in delivery side.	6. It has one take up roller in deliver side.
7. It has recovery system.	7. There have no recovery system.

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%
1×1 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° COver
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. SSTo control the shrinkage
3. To maintain proper width and G.S.M

Heating system: Steam

Main parts of the machine:

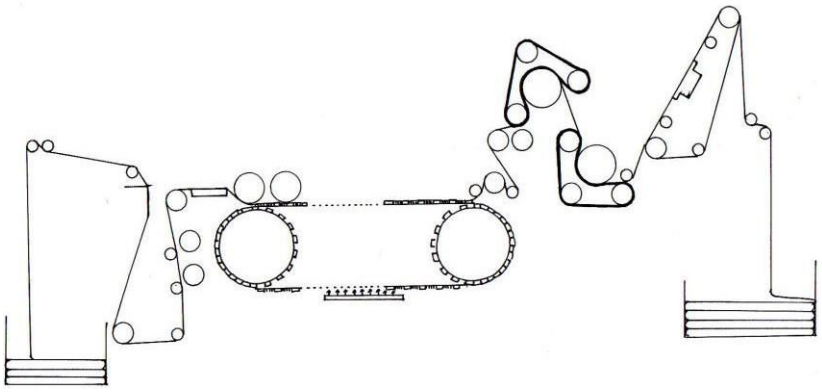
1. Heating chamber
2. Blower (2, one at the entry chain zone for uncurling and another at the entry of compacting zone)
3. Synthetic blanket as a conveyor,
4. Folder
5. Exhaust fan
6. Unpinning cylinder (-40%→+40%)
7. Belt cylinder (-40%→+40%)
8. Uncurling device at entry of compacting zone.
9. sensor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

Additional attachment:

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



Fig. Material Passage



Production : Capacity: 5 tones/shift or 10 tons/day
Actual production: 4 tones/shift.
Utility : Steam Electricity, Compressed air.

Special Finishing Machines

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

No. of m/c: 2
Manufacturer: LAFER, ITAL Function

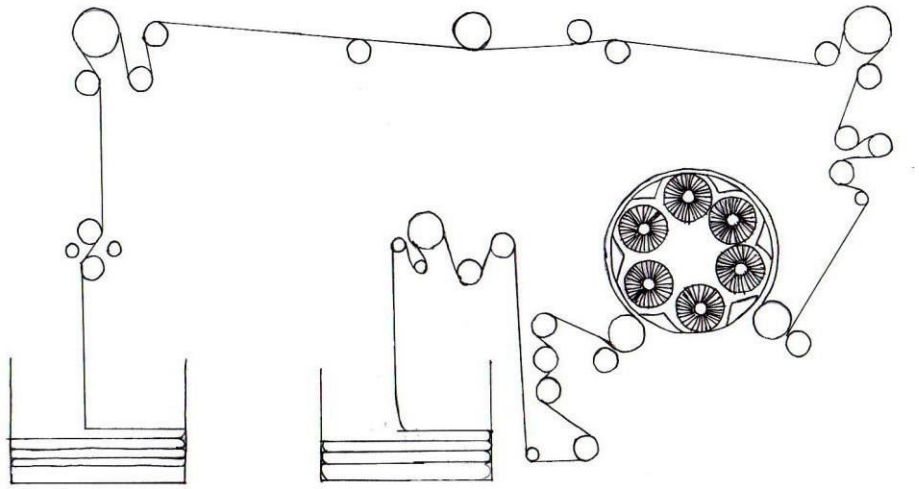
- Make the surface of fabric Smooth
- Improve heat insulation properties.
- Good Hand feel.

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× 2 = 48
24× 1= 24
Cylinder r.p.m (General): 100
Tension: 3 kg



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

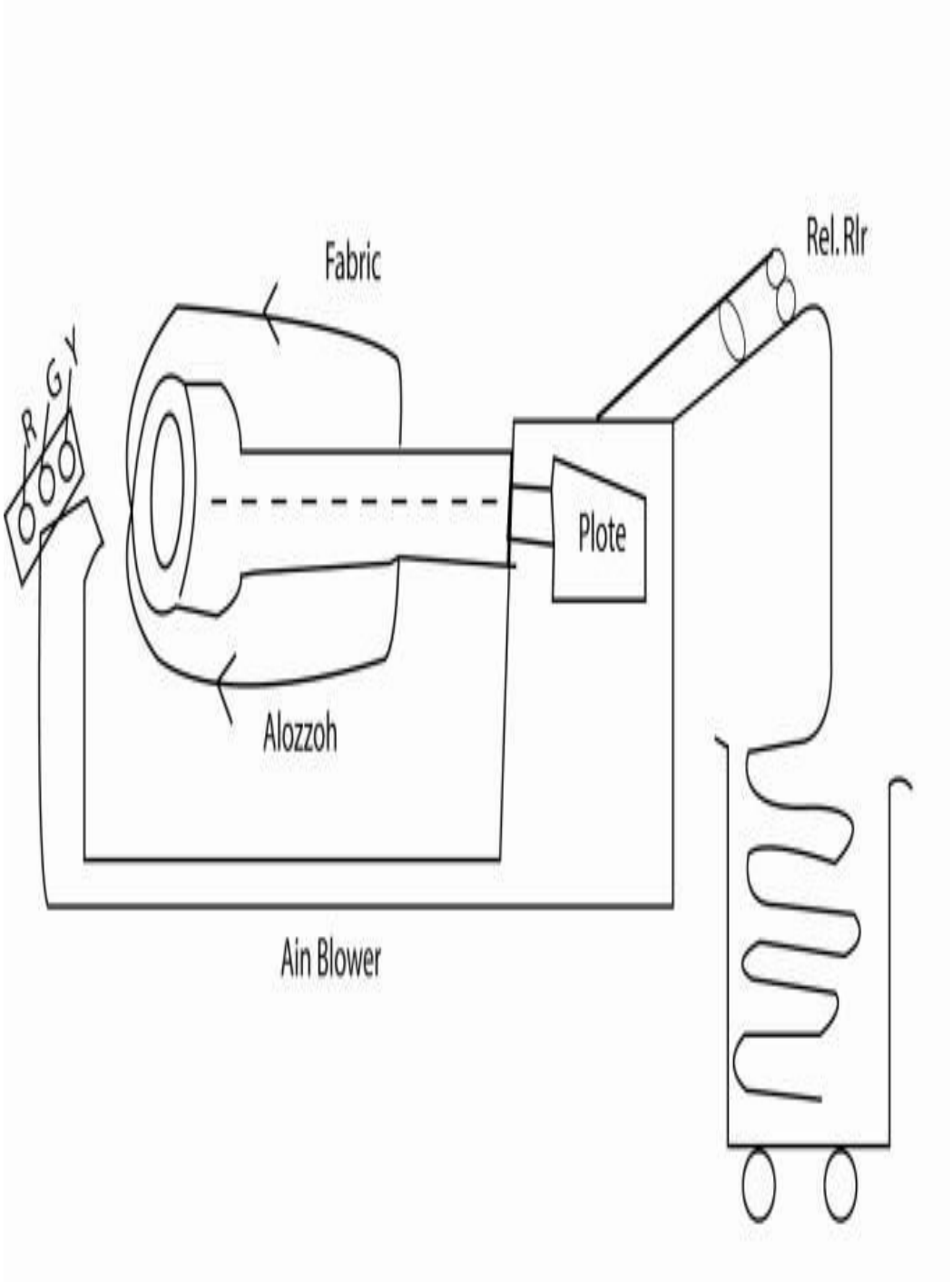
Remarks:

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.

Chapter Ten

YARN DYEING

Organogram of Yarn Dyeing:



SHIFT CHANGE:

Shift	From	To
A	6:00 am	2:00 pm
B	2:00 pm	10:00 pm
C	10:00 pm	6:00 am

DESIGNATION & THEIR RESPONSIBILITIES:

General Manager:

Report to: Board of Directors.

Position Objective: To direct promote and coordinate the operations of the cooperative in a manner that will optimize the cooperative share and savings, improve the supportive efficiency help accommodating mission and goals making result in outstanding customer service.

Position Responsibilities: The General Manager‟s responsibilities involve supervision, public relation, marketing, profitability and sales, service, reporting, capital requirements and other duties as assigned by the board of directors.

Dyeing Manager:

Report to: General Manager.

Position Objective: To direct promote and coordinate the operations of the cooperative in a manner that will optimize the cooperative share and savings, improve the supportive efficiency help accommodating mission and goals making result in outstanding customer service.

Position Responsibilities: To promote and managing the safety of their employees and their work environment. Overall supervision of dyeing and finishing section and quality control. The dyeing manager will maintain a positive attitude that promotes team work within the cooperative and a favorable image of the supportive. Managers also must repot failures to followsafety standards by other outside of their departments and take immediate actions to implement controls for situations that are clearly unsafe.

Production Officer:

Report to: Dyeing Manager.

Position Objective: To plan execute and follow up the production activities and control the quality production with related activities.

Position Responsibilities: Overall supervision of dyeing and finishing, dyes chemicals requisition issue and check program making, sample checking and color measurement.

Shift in Charge:

Report to: Production Officer.

Position Objective: To follow the worker‟s movement and maintain the production Sequence.

Position Responsibilities: To follow the overall workers activities and check the sample at certain time interval. And should discuss with the Production Officer about what happening in the floor.

Supervisor:

Report to: Shift in Charge

Position Objective: To guide the operators and Helpers working at the production unit and motivate the workers when necessary.

Position Responsibilities: Overall guide the operators in production floor and check the sample. And strictly observe the material‟s list whether they are at right quantity taken or not.




Figure : Yarn Dyeing Unit

MACHINE DESCRIPTION:

Machine Type, Brand and Origin and Machine Quantity:

TYPE	BRAND & ORIGIN	M/c QUANTITY
Yarn Dyeing Machine	FONG‟S, China	21
Soft Winding Machine	SSM, Switzerland	05
Soft Winding Machine	FADIS, Italy	02
Hard Winding Machine	SSM, Switzerland	03
Hard Winding Machine	FADIS, Italy	02
Aquasplicer	MESDAN, Italy	08

Soft Thread Winding	SSM, Switzerland	01
Hydro	DETTIN, Italy	02
Dryer	STRYFIELD, England	02
Dryer	STALAM, Italy	01
Auto Dosing		
Silos-Dos	LAWER, Italy	02
Dos-Chem.	LAWER, Italy	04
Rotary Dyes Store	LAWER, Italy	01
Total		**54**

SOFT WINDING

Machine Specification:

Machine No: 01 Brand Name: SSM-TW2-W Type: TW2-W No of Spindle: 78 M/c No: 856.0130/06 M/A No: Year 2007 U: 400V I_{max} : 38A f: 50Hz	**Machine No: 02** Brand Name: SSM-PS6-W Type: PS6-W No of Spindle: 60 M/c No: 883.0427/06 M/A No: Year 2007 U: 400V I_{max} : 32A f: 50Hz
Machine No: 03 Brand Name: SSM-PS6-W Type: PS6-W No of Spindle: 60 M/c No: 883.0428/06 M/A No: Year 2007 U: 400V I_{max} : 32A f: 50Hz	**Machine No: 04** Brand Name: SSM-PS6-W Type: PS6-W No of Spindle: 60 M/c No: 883.04279/06 M/A No: Year 2007 U: 400V I_{max} : 32A f: 50Hz
Machine No: 05 Brand Name: SSM-PS6-W Type: PS6-W No of Spindle: 60	**Machine No: 06** Brand Name: FADIS-SINCRO T-FT P300 Type: SINCRO T-FT P300

M/c No: 8830430/06 M/A No: Year 2007 U: 400V I_{max} : 32A f: 50Hz	Plate No: G0022DX No of Spindle: 96 Year: 2008 Power KW: 12 Volts: 440 Ampere: 16

Machine No: 07

Brand Name: FADIS-SINCRO T-FT P300

Type: SINCRO T-FT P300

Plate No: G0023SX

No of Spindle: 96

Year: 2008

Power KW: 12

Volts: 440

Ampere: 16

YARN DYEING MACHINE SPECIFICATION

Sample Dyeing Machine:

Machine No: 01 Model: Microwin-1 M/c Capacity: 250 gm Package Capacity: 01 Serial No: 32022973T Date/Year Built: 2007 Cert No: SHI 07180069/46 Design Code: PD 5500 2006 CAT2 Design Pressure: 520 KPa Design Temperature: 140°C Hydraulic Test Pressure: 800 KPa Safety Valve Set: 520 KPa	**Machine No: 02** Model: Microwin-1 M/c Capacity: 300 gm Package Capacity: 01 Serial No: 330242855T Date/Year Built: 2008 Cert No: SHI 0830002/118 Design Code: PD 5500 2006 CAT2 Design Pressure: 520 KPa Design Temperature: 140°C Hydraulic Test Pressure: 800 KPa Safety Valve Set: 520 KPa
Machine No: 03 Model: Labwin-12 M/c Capacity: 14 Kg Package Capacity: 12	**Machine No: 04** Model: Labwin-12 M/c Capacity: 14 Kg

Serial No: 31021466T Date/Year Built: 2007 Cert No: SHI 0718016/17 Design Code: PD 5500 2006 CAT2 Design Pressure: 700 KPa Design Temperature: 170°C Hydraulic Test Pressure: 1200 KPa Test Date: 2008 Safety Valve Set: 700 KPa Heating/Cooling Medium: Steam Dye liquid	Package Capacity: 12 Serial No: 31021467T Date/Year Built: 2007 Cert No: SHI 0718016/16 Design Code: PD 5500 2006 CAT2 Design Pressure: 700 KPa Design Temperature: 170°C Hydraulic Test Pressure: 1200 KPa Test Date: 2008 Safety Valve Set: 700 KPa Heating/Cooling Medium: Steam Dye liqui
Machine No: 05 Model: Labwin-6 M/c Capacity: 7 Kg Package Capacity: 6 Serial No: 31021465T Date/Year Built: 2007 Cert No: SHI 0718016/5 Design Code: PD 5500 2006 CAT2 Design Pressure: 700 KPa Design Temperature: 170°C Hydraulic Test Pressure: 1200 KPa Test Date: 2008 Safety Valve Set: 700 KPa Heating/Cooling Medium: Steam Dye liquid	Machine No: 06 Model: Labwin-6 M/c Capacity: 7 Kg Package Capacity: 6 Serial No: 31020961T Date/Year Built: 2006 Cert No: SHI 0615548/5 Design Code: PD 5500 2006 CAT2 Design Pressure: 700 KPa Design Temperature: 170°C Hydraulic Test Pressure: 1200 KPa Test Date: 2008 Safety Valve Set: 700 KPa Heating/Cooling Medium: Steam Dye liquid

Dyeing Machine:

Machine No: 01 Brand Name: FONG"S Model: Allwin-43 M/c Capacity: 30 Kg Liquor Ratio Capacity: 180 Liter Package Capacity: 24 No of Spindle: 04 Serial No: 31021468T	**Machine No: 02** Brand Name: FONG"S Model: Allwin-53 M/c Capacity: 50 Kg Liquor Ratio Capacity: 285 Liter Package Capacity: 36 No of Spindle: 06 Serial No: 31021469T

Cert No: SHI 0718016/7 Year Built: 2007 Design Code: PD 5500 2006 CAT2 Design Pressure: 520 KPa Design Temperature: 140°C Hydraulic Test Pressure: 800 KPa Test Date: 2007 Safety Valve Set: 520 KPa	Cert No: SHI 0718016/9 Year Built: 2007 Design Code: PD 5500 2006 CAT2 Design Pressure: 520 KPa Design Temperature: 140°C Hydraulic Test Pressure: 800 KPa Test Date: 2007 Safety Valve Set: 520 KPa
Machine No: 03 Brand Name: FONG"S Model: Allwin-53 M/c Capacity: 60 Kg Liquor Ratio Capacity: 320 Liter Package Capacity: 48 No of Spindle: 06 Serial No: 31021470T Cert No: SHI 0718016/11 Year Built: 2007 Design Code: PD 5500 2006 CAT2 Design Pressure: 520 KPa Design Temperature: 140°C Hydraulic Test Pressure: 800 KPa Test Date: 2007 Safety Valve Set: 520 KPa	**Machine No: 04** Brand Name: FONG"S Model: Allwin-70 M/c Capacity: 100 Kg Liquor Ratio Capacity: 580 Liter Package Capacity: 81 No of Spindle: 09 Serial No: 31020960T Cert No: SHI 0615548/111 Year Built: 2006 Design Code: PD 5500 2006 CAT2 Design Pressure: 520 KPa Design Temperature: 140°C Hydraulic Test Pressure: 800 KPa Test Date: 2006 Safety Valve Set: 520 KPa
Machine No: 05 Brand Name: FONG"S Model: Allwin-85 M/c Capacity: 200Kg Liquor Ratio Capacity: 1150 Liter Package Capacity: 162 No of Spindle: 18 Serial No: 31021471T Cert No: SHI 0718016/53	**Machine No: 06** Brand Name: FONG"S Model: Allwin-85 M/c Capacity: 200 Kg Liquor Ratio Capacity: 1150 Liter Package Capacity: 162 No of Spindle: 18 Serial No: 31021472T Cert No: SHI 0718016/70

Year Built: 2007 Design Code: PD 5500 2006 CAT2 Design Pressure: 520 KPa Design Temperature: 140°C Hydraulic Test Pressure: 800 KPa Test Date: 2007 Safety Valve Set: 520 KPa	Year Built: 2007 Design Code: PD 5500 2006 CAT2 Design Pressure: 520 KPa Design Temperature: 140°C Hydraulic Test Pressure: 800 KPa Test Date: 2007 Safety Valve Set: 520 KPa
Machine No: 07 Brand Name: FONG"S Model: Allwin-120 M/c Capacity: 400 Kg Liquor Ratio Capacity: 2400 Liter Package Capacity: 324 No of Spindle: 36 Serial No: 32022972T Cert No: SHI 0718069/64 Year Built: 2007 Design Code: PD 5500 2006 CAT2 Design Pressure: 520 KPa Design Temperature: 140°C Hydraulic Test Pressure: 800 KPa Test Date: 2007 Safety Valve Set: 520 KPa	**Machine No: 08** Brand Name: FONG"S Model: Allwin-120 M/c Capacity: 400 Kg Liquor Ratio Capacity: 2400 Liter Package Capacity: 324 No of Spindle: 36 Serial No: 31021473T Cert No: SHI 0718016/100 Year Built: 2007 Design Code: PD 5500 2006 CAT2 Design Pressure: 520 KPa Design Temperature: 140°C Hydraulic Test Pressure: 800 KPa Test Date: 2007 Safety Valve Set: 520 KPa
Machine No: 09 Brand Name: FONG"S Model: Allwin-145 M/c Capacity: 600 Kg Liquor Ratio Capacity: 3000 Liter Package Capacity: 486 No of Spindle: 54 Serial No: 32023066T Cert No: SHI 0718075/21 Year Built: 2007 Design Code: PD 5500 2006 CAT2	**Machine No: 10** Brand Name: FONG"S Model: Allwin-145 M/c Capacity: 600 Kg Liquor Ratio Capacity: 3000 Liter Package Capacity: 486 No of Spindle: 54 Serial No: 32023065T Cert No: SHI 0718075/19 Year Built: 2007 Design Code: PD 5500 2006 CAT2

Design Pressure: 520 KPa Design Temperature: 140°C Hydraulic Test Pressure: 800 KPa Test Date: 2007 Safety Valve Set: 520 KPa	Design Pressure: 520 KPa Design Temperature: 140°C Hydraulic Test Pressure: 800 KPa Test Date: 2007 Safety Valve Set: 520 KPa
Machine No: 11 Brand Name: FONG"S Model: Allwin-145 M/c Capacity: 600 Kg Liquor Ratio Capacity: 3000 Liter Package Capacity: 486 No of Spindle: 54 Serial No: 31021474T Cert No: SHI 0718016/55 Year Built: 2007 Design Code: PD 5500 2006 CAT2 Design Pressure: 520 KPa Design Temperature: 140°C Hydraulic Test Pressure: 800 KPa Test Date: 2007 Safety Valve Set: 520 KPa	**Machine No: 12** Brand Name: FONG"S Model: Allwin-145 M/c Capacity: 800 Kg Liquor Ratio Capacity: 4600 Liter Package Capacity: 648 No of Spindle: 54 Serial No: 31021475T Cert No: SHI 0718016/33 Year Built: 2007 Design Code: PD 5500 2006 CAT2 Design Pressure: 520 KPa Design Temperature: 140°C Hydraulic Test Pressure: 800 KPa Test Date: 2007 Safety Valve Set: 520 KPa
Machine No: 13 Brand Name: FONG"S Model: Allwin-166 M/c Capacity: 1000 Kg Liquor Ratio Capacity: 5600 Liter Package Capacity: 788 No of Spindle: 69 Serial No: 31021476T Cert No: SHI 0718075/103 Year Built: 2007 Design Code: PD 5500 2006 CAT2 Design Pressure: 520 KPa Design Temperature: 140°C	**Machine No: 14** Brand Name: FONG"S Model: Allwin-205 M/c Capacity: 1600 Kg Liquor Ratio Capacity: 8600 Liter Package Capacity: 1296 No of Spindle: 108 Serial No: 31021477T Cert No: SHI 0718075/111 Year Built: 2007 Design Code: PD 5500 2006 CAT2 Design Pressure: 520 KPa Design Temperature: 140°C

Hydraulic Test Pressure: 800 KPa Test Date: 2007 Safety Valve Set: 520 KPa	Hydraulic Test Pressure: 800 KPa Test Date: 2007 Safety Valve Set: 520 KPa

HYDRO-EXTRACOR MACHINE SPECIFICATION

Machine No: 01	**Machine No: 02**
Model: Detting Berta 36 TE	Model: Detting Berta 36 TE
Total Basket: Four	Total Basket: Four
Per Basket Package Capacity: Eight	Per Basket Package Capacity:
Total Package Capacity: Sixty Four	Total Package Capacity: Sixty Four
Basket Rotation Time: Six Minute	Basket Rotation Time: Six Minute
Serial No: 0154	Serial No: 0154
Year: 2007	Year: 2007
Maximum Speed: 1400-1500 rpm	Maximum Speed: 1400-1500 rpm
Maximum Rotation: 1470 g/l	Maximum Rotation: 1470 g/l
Power: 16 KW	Power: 16 KW
Alimentation: 400 V @ 50 Hz	Alimentation: 400 V @ 50 Hz

RF DRYER MACHINE SPECIFICATION

Machine No: 01

Machine Name: Strayfield

Model Type: SO 100/TE

Serial No: 7-01-267

Per Meter Conveyor Capacity: 30-35 Package

Maximum Weight: 3600 Kg

Conveyor Length: 8.75 m

Conveyor Width: 1.40 m

Supply Volts: 380-420

Supply Frequency: 50 Hz

Supply Phase: 3

Supply KVA: 230

Supply Power Factor: 0.9

RF Power Output: 100 KW

Operating Frequency: 27 MHz

Date of Manufacturing: 2007

Country of Origin: U.K

Machine No: 02

Machine Name: Strayfield

Model Type: SO 100/TE

Serial No: 7-01-270

Per Meter Conveyor Capacity: 30-35 Package

Maximum Weight: 3600 Kg

Conveyor Length: 8.75 m

Conveyor Width: 1.40 m

Supply Volts: 380-420

Supply Frequency: 50 Hz

Supply Phase: 3

Supply KVA: 230

Supply Power Factor: 0.9

RF Power Output: 100 KW

Operating Frequency: 27 MHz

Date of Manufacturing: 2007

Country of Origin: U.K

Machine No: 03

Machine Name: Stalam

Machine Type: Textile Dryer

Model: RF 150 KW

Module No: 1/1

Module Weight: 3950 Kg

Per Meter Conveyor Capacity: 40-45 Package

Conveyor Length: 9.75 m

Conveyor Width: 1.75 m

Installed Power: 250 KVA

Maximum Current: 38 A

Short Circuit Current: 100 KA

Matriculation No: 1869/1

Voltage Supply: 400 V+/-5%

Phase: 3-Earth

Frequency: 50 Hz+/-2%

Year: 2009

Made: Italy

HARD WINDING MACHINE SPECIFICATION

Machine No: 01 Brand Name: SSM Type: CW2-W No of Spindle: 96 M/c No: 863.0029/07 U: 400 V I_{max} : 28 A f: 50 Hz Made: Switzerland	**Machine No: 02** Brand Name: SSM Type: CW2-W No of Spindle: 96 M/c No: 863.0027/07 U: 400 V I_{max} : 28 A f: 50 Hz Made: Switzerland
Machine No: 03 Brand Name: SSM Type: CW2-W No of Spindle: 96 M/c No: 863.0028/07 U: 400 V I_{max} : 28 A f: 50 Hz Made: Switzerland	**Machine No: 04** Brand Name: FADIS Type: SNCRO T-FT/RT P 300 Plate No: G 0024 DX No of Spindle: 96 Year: 2008 Power KW: 12 Volts: 440 Ampere: 16 Made: Italy

Machine No: 05

Brand Name: FADIS

Type: SNCRO T-FT/RT P 300

Plate No: G 0025 SX

No of Spindle: 96

Year: 2008

Power KW: 12

Volts: 440

Ampere: 16

Made: Italy

PRODUCTION MANAGEMENT

Production Parameter:

Process	**Temperature (ºC)**	**P^H**	**Time (min)**	**M:L rato**
Scouring and Bleaching	98 ºC	11.5-12.0	60	1.8
Enzyme Wash	55 ºC	4.5-5.0	60	1.8
Enzyme Deactivation	70 ºC		10	1.8
Reactive Dyeing (Light Shade)	60 ºC	10.5	60	1.8
Reactive Dyeing (Dark Shade)	60 ºC	10.9-10.12	60	1.8
White Shade	98 ºC	10.5-11.5	20	1.8
Turquise Color Dyeing	80-90 ºC	10.9-10.12	90	1.8
Polyester Dyeing	130 ºC	4.5	45	1.8

Production Flow Chart:

Sequence of Operation:
Approval of Lab dip
⇩
Grey Fabric Inspection
⇩
Batching
⇩
Scouring and Bleaching
⇩
Enzyme Wash (If Required)
Dyeing
⇩
Bath Drain
⇩
Cold Wash
⇩
Neutralization
⇩
Soaping
⇩
Fixing (If required)
⇩
Softening

BATCHING SECTION:

Batching:

Batching preparation is the process where inspected grey yarns are divided into different batches with reasonable quantities according to machine capacity, nozzle number, availability of machines etc in order to make them suitable for the further operation in batching. It must be carefully observed that nozzle of a machine contains equal length of fabric.

Batching is the process to get ready the fabrics which should be dyed and processed for a particular lot of a particular order.

Purpose of Batch Section:

- To receive the grey Yarn from Soft winding or other source.
- Turn the grey yarn if require.
- To prepare the batch of yarn for dyeing according to the following criteria-
  - Order sheet (Received from buyer)
  - Dyeing Shade (Color or white, Light or dark)
  - Yarn Count

- Yarn Lot
- Yarn Brand
- M/c No
- Roll No
- M/c Capacity
- M/c Available
- Emergency

- To send the grey yarn to the dyeing floor with batch card.
- To keep records for every previous dyeing.

Proper batching Criteria:

- To use maximum capacity of existing dyeing m/c.
- To minimize the washing time or preparation time and m/c stoppage time.
- To keep the no of batch as less as possible for same shade.
- To use a particular machine for dyeing same shade.

Batch Management:

Primarily batching is done by dyeing manager taking the above criteria under consideration. Batch section in charge receives this primary batch plan from dyeing manager. Some time planning is adjusted according to m/c condition or emergency.

PROCESS DESCRIPTION

PRETREATMENT:

The term "Pretreatment" covers all operations of preparing textile material for subsequent dyeing and finishing processes.

Objective:

The preparation of goods for dyeing and printing is a far important process than the production of white goods. Textile material to be dyed or printed must have the following properties:

High and uniform dye uptake and absorptive.

Completely free from husks.

High degree of polymerization of the cellulose.

Adequate degree of whiteness to permit faultless dyeing of pale shades

SCOURING & BLEACHING:

Scouring and bleaching are also known as pre-treatment. The main purpose of scouring cotton fabrics is to remove natural as well as added chemicals of essentially hydrophobic character as completely a possible and leave the fabric in a high absorptive condition without undergoing chemical or physical damage significantly and also to make the goods suitable for removing the natural coloring matter of the cotton during the subsequent process.

Process:

- At first the fabric is loaded on to the bath.
- Required amount of water is taken to the bath.
- Wetting agent Anti-creasing agent added.
- Scouring agent (Caustic/Soda) and Stabilizer are added by the aid of dosing when the temperature reached at 50ºC.
- H_2O_2 is added by the aid of dosing system for 05 minute.
- Temperature is raised to 98ºC and the process is carried for 60 minute.
- The liquor is drained at 80ºC.
- After that chemical wash and enzyme wash are done.

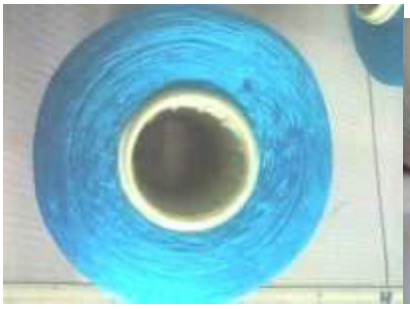
DYEING

Winding Technology:

The soft package winding is the most important pre dyeing operation ,which directly affects not only the dyeing quality but also post dyeing operations such as rejects, wastages and poor unwinding ,thread breakages etc. Well wound is half dyed, is the popular saying which is very correct in the context of package dyeing ,because we cant expect miracles from the most advanced dyeing machinery ,if our packages areof poor quality.
Factors like count of the yarn, angle of winding, yarn tension during winding, diameter and traverse of the package, the stability of the package, the winding ration, the compactness and size of the feed package all affect the package make up and mustbe considered while selecting a machine for soft package winding.

The Package:

The yarn to be dyed is first to be wound into a package .The weight and diameter of the package is limited by the space available between the spindles (pitch) and by the levelness obtainable when a dyeing is carried out using a particular dyestuff. The package dimensions and weight are influenced by the type and construction of yarn to be processed, class of the dyestuffs , machine flow rate ,end use of the dyed substrate and package holder e.g. spring, cheese or cone.


Package on rigid dye tube


Package on a perforated SS cone

The yarn package must be stable enough, to withstand the handling during loading, processing and unloading from the machine. It should withstand the temperature change and flow volume and flow direction of liquor. It should accommodate a small amount of shrinkage and swelling during processing with temperature increase as well as wetting.

Package weight and density:

The package weight and density are two important parameters which are to be standardized for uniform and trouble free dyeing .The packages may be soft or hard these should conform to the standards, when too soft liquor flowing through it will find the course of least resistance and cause channeling, which leaves some parts of the package relatively undyed or lighter. If the packages are wound too hard, a point can be reached where the flow of liquor is impeded to such an extent that poor dyeing or none may occur. The package weight and dimensions depends upon the type of the machine, its flow rate, automation, type and construction of the yarn to be dyed, dye class to be used and type of package holder to be used. The typical density norms for different type of yarns is between 350-450 gm/ltr.The most important requirement of soft package for dyeing are-

- Density of the package should be uniform throughout of the package diameter, ie the layer to layer density is controlled.
- The packages should not have the hard edges, or these must be broken or cupped by a suitable device or manually.
- The package weight must be controlled and all the packages must fall within the standard norms.
- The density variation from one package to another must be controlled statistically and CV5% should not exceed 5%

Process Sequence of Soft winding:

Creel with supply package
↓
Inlet Eye
↓
Pre-tensioner
↓
Feeder
↓
Yarn Tensioner
↓
Waxing Device
↓
Yarn Sensor
↓
Yarn Tension Sensor
↓
Loop catcher

Guide Rod

Winding Head

Programs Sets for SSM Soft Winding Machine:

Count	Length (mm)	Speed(rpm)	Feeder Setting	Tension	Time (min)	Weight (gm)
10/1	18600	1000 DIGI	10	95.85	19	1100
16/1	29800	1000 DIGI	10	90.80	30	1100
20/1	37000	1000 PREC	15	80.70	37	1100
22/1	41000	1000 PREC	15	80.70	41	1100
24/1	44800	1000 PREC	20	75.65	45	1100
26/1	48500	1000 PREC	20	70.65	49	1100
28/1	52000	1000 PREC	25	70.60	52	1100
30/1	56000	1000 PREC	25	70.60	56	1100
34/1	63500	1000 PREC	25	65.55	64	1100
38/1	71000	1000 PREC	30	60.55	71	1100
40/1	74700	1000 PREC	35	55.45	75	1100
45/1	84000	1000 PREC	35	50.40	84	1100

Programs Sets for FADIS Soft Winding Machine:

Count	Length (mm)	Speed(rpm)	Feeder Setting	Tension	Time (min)	Weight (gm)
10/1 Comb	18600	1000 DIGI	30	30.30	22	1100
16/1 Cotton	29800	1000 DIGI	30	28.28	35	1100
20/1 Comb	37000	1000 DIGI	30	26.26	45	1100
22/1 Comb	41000	1000 DIGI	30	27.27	50	1100
24/1 Comb	44500	1000 DIGI	30	26.26	52	1100
26/1 Comb	48000	1000 DIGI	30	24.24	56	1100
28/1	52000	1000 DIGI	30	24.24	60	1100

Comb						
30/1 Comb	56000	1000 DIGI	30	22.22	65	1100
34/1 Comb	63500	1000 DIGI	30	20.20	75	1100
38/1 Comb	71000	1000 DIGI	30	18.18	80	1100
40/1 Comb	74000	1000 DIGI	30	17.17	85	1100
45/1 Comb	84000	1000 DIGI	30	13.13	95	1100

$$\text{Density, } \rho = \frac{M}{\Pi \times \{(D_1/2)^2 - (D_2/2)^2 \times h}$$

Where,

M = Total Package Weight, D_1 = Package dia, D_2 = Bobbin dia, h = Package Length or Height

- Per day production soft winding = 1.5 Tons.
- Average Density of Soft winding Package = 0.372 - 0.500 gm/cm^3.

$$\text{Per day Production Calculation} = \frac{\text{M/c rpm} \times \text{No of Spindle} \times \text{Efficiency} \times 60 \times \text{day}}{\text{Count} \times 840 \times 100} \text{ lb}$$

Flow Chart of Package dyeing Machine:

Soft winding
↓
Batching
↓
Dyeing
↓
Hydro-Extractor
↓
Drying
↓
Random winding or hard winding

Package dyeing machines:

Package dyeing machines are the most widely used now a days for dyeing of almost all type of yarns, due to economical, automatic and accurate dyeing results. The term package dyeing usually denotes for dyeing of any type yarn wound on the compressible dye springs/perforated solid dyeing tubes or cones. Yarn dyeing in package form is done at high temperature and under high pressure, with the packages mounted on hollow spindles .These spindles are fixed on the dyeing carriers, which is inserted into the dyeing vessel after closing the lid of the machine, the dyeing liquor isforced through the packages in two way pattern (inside to out and outside to in) and goes on circulating throughout the vessel and yarn.



All operations from pre treatment to finishing can be performed in the same machine, without taking out the material out of the machine.



Main parts of the machines:

1. Main kier or the main vat in which the actual dyeing is being carried out.
2. Expansion or addition tank
3. Stock or preparation tank
4. Main pump
5. Injector or dosing pump
6. Dyeing carrier
7. Sampling device
8. Back cooler in fully flooded models
9. Control panel

Working principle of package dyeing machine:

The material to be dyed is wound on the dye springs, perforated plastic cheeses orsteel cones and loaded in the carrier spindles, which are compressed and bolted at the top to make a uniform and homogeneous dyeing column. The liquor containing dyes chemical and auxiliaries is forced through with the help of pump, and circulated through the material from inside –out and is reversed periodically so that each and every part of the material get the same and uniform treatment. The dyeing cycle is controlled through a micro computer and different chemicals may be added through the injector pump or color kitchen at any stage of dyeing.

In case of fully flooded machines, the liquor expands with the rise in temperature (approximately 5% volume increases from 30-130 degree centigrade temperature) is taken back in the expansion tank through a back cooler. This extra water is then again injected to the dyeing vessel through an injector pump. Expanded volume of the dye liquor is thus remains in continuous circulation in the system.

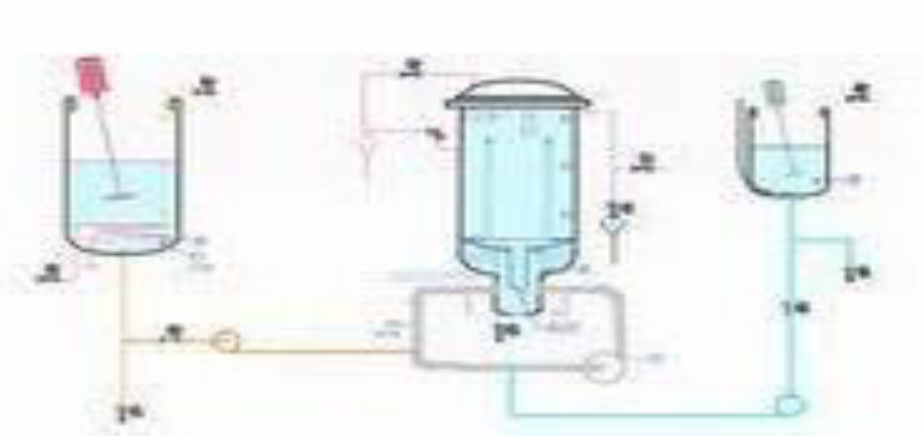
Any type of addition can be done to the machine through the injector pump, the quantity and time of injection can be controlled through the programmer.

Air pad technology is possible in all types of machines such as vertical kier, horizontal kier and tubular dyeing machines.

The material after dyeing is washed and finished properly in the same machine and taken out hydro extracted or pressure extracted in the same machine and dried subsequently.

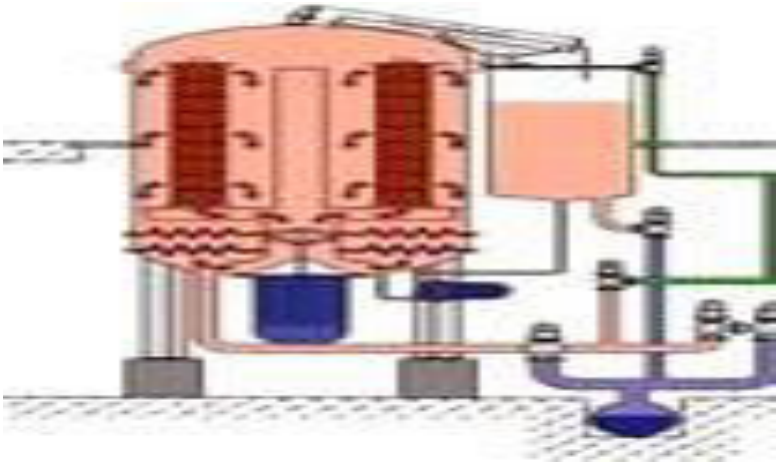
Vertical Kier Dyeing Machines:

Knit Concern Ltd machines have a vertical cylindrical dyeing kier, in which material loaded into carriers with vertical perforated spindles, is dyed .The machine could be fully flooded or air pad type .These are high pressure machines and suitable up to 135 ^{0}C temperature dyeing.



Material to Liquor Ratio:

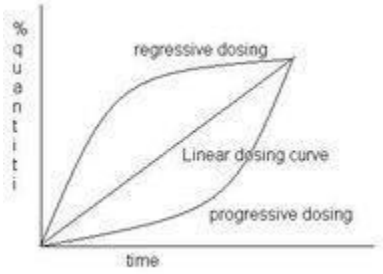
Material to liquor ratio is most important feature of the package dyeing machines, typically machines with M: L from 1:6 to 1:70 are commonly used KCL. However it is always preferred a machine with lowest possible liquor ratio, without affecting the quality of dyeing. The liquor ratio of the machines is reduced by reducing length the pipelines in the system, by modifying the carrier shape, by modifying and relocating the heat exchangers, air pad system and automatic liquor ratio adjustment, and using internal pumps.



A Fully Flooded Machine

Dosing System:

It is essential for perfect dyeing results and reproducibility of results that addition of different chemicals, dyes, auxiliaries etc is done in a controlled manner and repeated exactly in a same manner always. The machine which run through programmers can be programmed in such a way those additions can be done in a specified time by following an incremental/progressive curve, a linear curve or a regressive curve etc.



Flow Control:

Flow control of liquor through the packages is very important. Flow rate regulation allows for adopting the optimum dyeing conditions in function of the material under process, type of fiber (cotton, polyester, wool, acrylic, viscose or blended yarns) dyestuff class, strike rate of the dyes, material density and permeability.

Two processes are important to attain leveling in batch dyeing

Dye builds up gradually and distributes evenly on the surface of the fiber.

Absorbed dye diffuses evenly into the fiber.

The rate of dyeing can be controlled by the dyeing conditions such as the dyebath temperature, pH, inorganic salt and other auxiliaries etc., and the supply of dye can be controlled by the physical conditions of the dyebath such as the circulation of the dye liquor, the flux and the rate of circulation of the material, etc.

The dye should be distributed uniformly in the fiber in a short time by controlling these two processes effectively in order to attain level dyeing in a short time.

A uniform distribution of the dye on the fiber surface plays an important role for effective level dyeing, and to this end the dye should be supplied throughout the fiber at the rate corresponding to the rate of dyeing.

The final exhaustion will be attained quicker and the dyeing time will be shorter, when the rate of dyeing is high, however, when the rate of dyeing exceeds the rate of supply of the dye, a uniform distribution cannot be attained thus leading to unlevel dyeing. The rate of dyeing can be set at a quicker rate, if the dye can be supplied at a higher rate.

The lesser flow is required in high permeable materials, and high flow rate is required in the tightly wound packages. Flow can be regulated as per the processing sequence, like bleaching, washing, dye exhaustion and fixation, rinsing and soaping etc. In fully automatic machines the flow rate is controlled through a programmer by inverter driven pump motors. The pump speed is varied as required by the process. In semi automatic machines the flow can be varied to some extent with the help of valves.

After Scouring and Bleaching Time and Temperature requirements:

After Scouring and Bleaching:

Auxiliaries + Salt ⇒ 50°C × 10 min

Dyes Dosing ⇒ 50°C × 20 min

Then Run ⇒ 50°C × 10 min

For Color Proper Mixture

Migration ⟹ 80°C × 20 min

Cooling up to 60°C

Soda dosing ⟹ 60°C × 30 min [Rate 70%]

Process Flow Chart:

For Light/Medium Shade: Demineralization → Scouring and Bleaching → Hot wash with Peroxide Killer → Neutralization after Bleaching → Dyeing → Rinse → Neutralization after Dyeing → Soaping → Rinse → Finishing → Unload

For Dark Shade:

Demineralization → Scouring and Bleaching → Hot wash with Peroxide Killer → Neutralization after Bleaching → Dyeing → Rinse → Neutralization after Dyeing

Soaping

↓

Rinse

↓

Soaping

↓

Rinse

↓

Finishing

↓

Unload

Overall for all shade Process:

Demineralization

↓

Add Sequestering agent and Acetic Acid

↓

Check P^{H} and P^{H} 4-4.5

→

Run 20 min at 50°C

↓

Scouring and Bleaching

↓

Inject leveling and caustic dosing 05 min at 50°C

↓

Then run 05 min at 60°C

↓

Check P^{H} and P^{H} 11-12

→

Peroxide dosing 05 min at 60°C

↓

Then temperature increasing 110°C at 20 min

↓

Now cooling 80°C

↓

Drain

↓

Add PQ Hot wash with Peroxide Killer

↓

Run 60°C at 20 min (For PC-80°C at 20 min)

↓

Overflow or rinsing

↓

Run 15 min at 35°C

↓

Drain

Inject Acetic Acid 10 min at 50°C

↓

Absorbency test and if mot Ok then

↓

Add wash chemical

↓

Run 15 min at 95°C

↓

If Bleaching is Ok then

↓

Add leveling and salt

↓

Run 10 min at 50°C

↓

Check P^{H} and P^{H} 5.5 -6

→

Dyes Mixing 05 min at 65°C

↓

Dyes dosing 20 min at 50°C

↓

Color Migration 30 min at 60°C

↓

Level check, if not Ok then

↓

Adding level and run 10-20 min

↓

If level is Ok then

↓

Soda mixing 05 min at 60°C

↓

Then soda dosing

↓

Run 30 min at 60°C

Check P^{H} and P^{H} 10.5 -11.5

↓

→

When soda dosing finishes then shade basis run dyeing

↓

Light- 30 min at 60°C

↓

Medium- 40 min at 60°C

↓

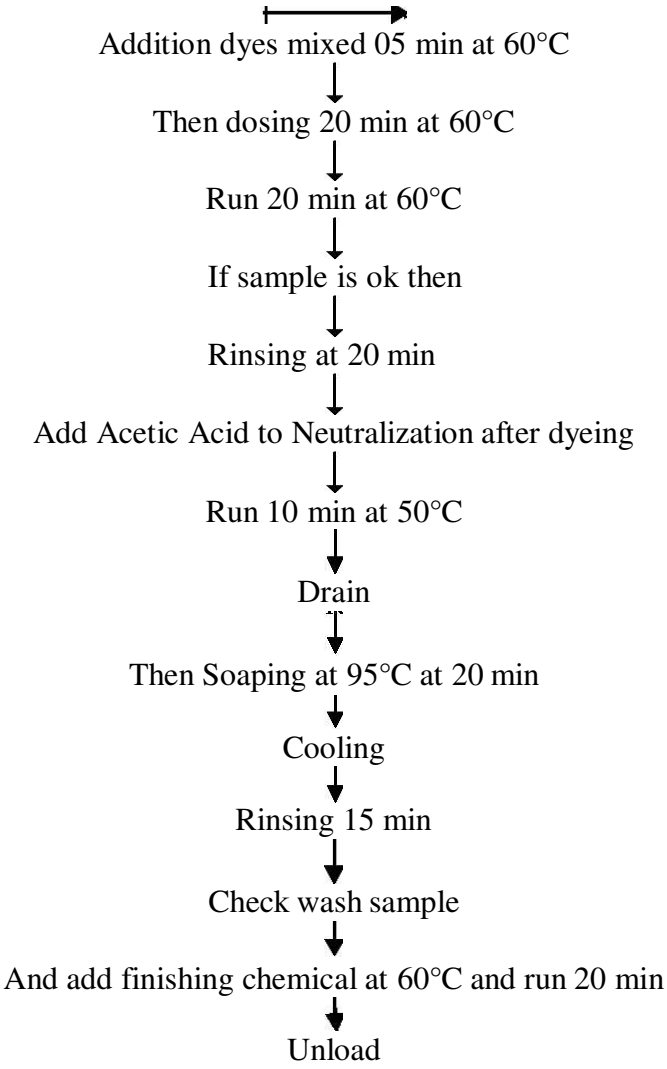
Dark- 60 min at 60°C

↓

Dyeing Sample Check If not Ok

↓

Sample Check



HYDRO-EXTRACTOR

Hydro extraction is a very important process stage of drying process as for as the yarn quality and process cost is concerned. The main features desired from a good hydro extractor are-

- To remove the maximum possible unbound moisture.
- The moisture should be evenly removed within a batch, i.e. all the packages have same moisture level%.
- Uniform removal of moisture from within a package.
- Minimum or no damage to the yarn quality, without deforming the shape of package.
- Minimum or no damage to the dye tubes, springs, cheeses and cones in long run. Low labor engagement
- Flexibility of the loading of different sizes and types of materials.

This machine is run to a maximum speed of 1400-1500 rpm and are available in fully or semi automatic versions. The machines have a twin basket system, out of which one is under operation while other is ready for unloading and loading. Due to high speed of the basket the cycle time 5-6 min/cycle.

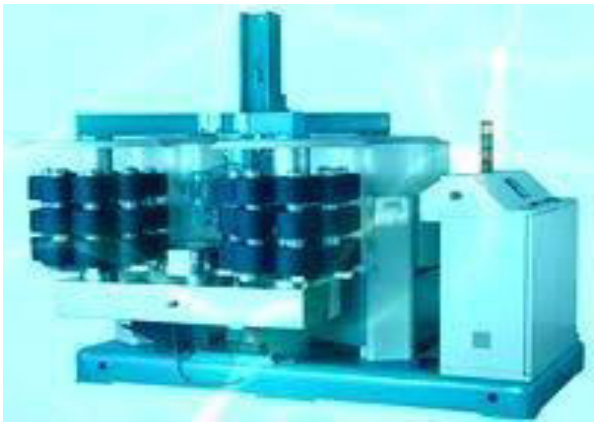


Image: Hydro-Extractor

RF DRYER

Radio frequency driers:



In RF driers the dielectric energy (electromagnetic) radiations are used for drying purposes. An RF drier has an electrically charged metal plate or electrode above the material, and another oppositely charged plate or electrode below the material to dry. The RF units switches the electrodes polarity at 27.12 MHz or (27.12 million times/second), whatever molecules being polar in nature try to align themselves with the electrode polarities and start oscillating with charge at the electrodes. The oscillation of the polar molecules (water molecules) thus generate internal heat due to this very high frequency oscillations and when a sufficient amount of energy is supplied ,the water is converted into steam which leaves the material and the product is dried.



Calculation:

$$V = \frac{P \times 1.2}{M}$$

V= Conveyor speed in m/hr, P = Power available for use in kW, and M = Moisture to be evaporated in kg from 1 meter Conveyor.

Let the dry of material is = 100 kg
The weight of dyed hydro-extracted material = 150 kg
The moisture content = 50%
The final moisture to keep in material = 5%
The moisture to evaporate in dryer = 45%

Let there be a loading of 100 kg/m in the dryer
So water to be evaporated from 1 meter belt is 45 kg

$$\text{The belt Conveyor speed will be} = \frac{\text{kW of power of RF} \times 1.2}{\text{Water to be evaporated from1 meter}}$$

If the power input of the dryer is 130 kW,

$$\text{Then belt speed will be} = \frac{130 \times 1.2}{45}$$

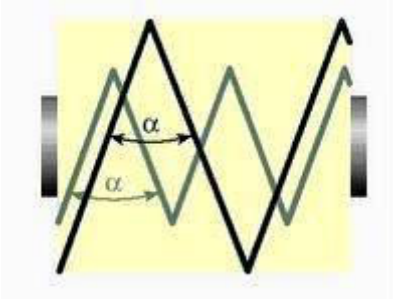
$$= 3.46 \text{ m/hr}$$

The above calculation gives us a rough idea about the approximate speed; however the actual speed is finalized after actual trials on a particular quality of the yarn.

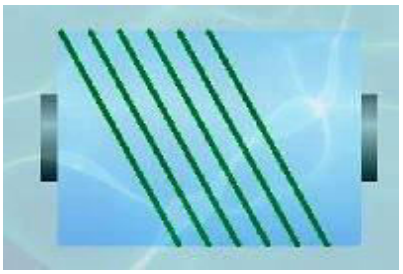
HARD WINDING OR RANDOM WINDING

Random soft package winding machines are conventional winding machines, in which a grooved drum acts as both the driving as well as the traversing element. The winding is done through indirect drive to the package, which we call the friction drive. The yarn lay formed is random, that"s why is called random winding.
The main characteristics of random windings are-

Winding angle:-Since grooved drum is used for winding the winding angle remains the same.



Winding ratio:-The number of coils per turn of the package decreases as the diameter of the package increases, so the package is softer at the outer layers.



Some sample of Yarn Dyeing

Chapter Eleven

Quality Testing, Control & Assurance System

Quality Assurance System

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.

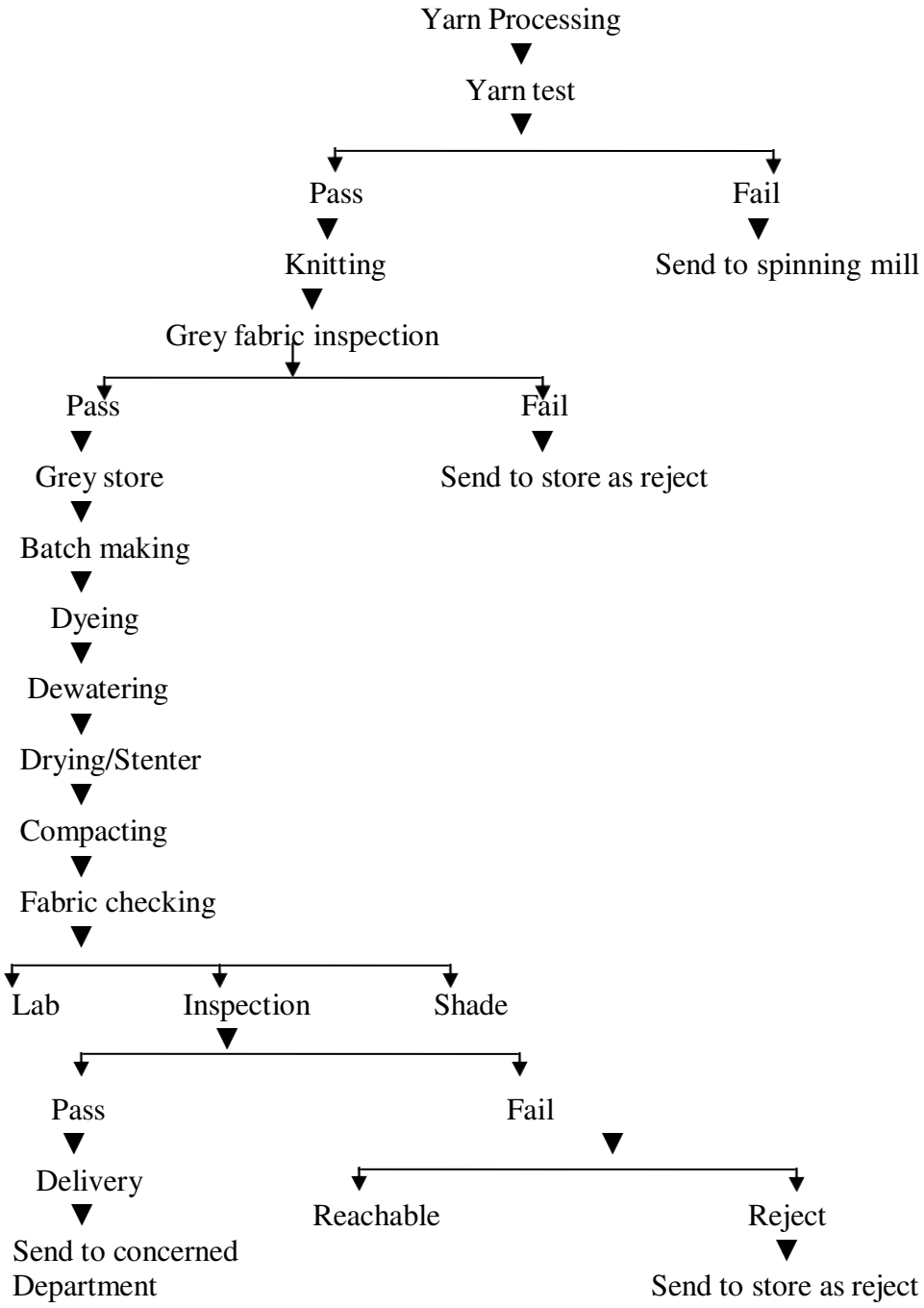
In Dyeing section:

- 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 care of intensive foaming, which is caused when, the pumps try to pump a mixture of air and water. This resets 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 H_2O_2 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 & openings-

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 requerments

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:

Scoured sample
▼
Engyme sample
▼
Salt Sample
▼
Soda sample (after 10 min)
▼
BD sample (60°C × 20 min)
▼
Normal hot sample
▼
Acetic acid sample
▼
Chemical hot sample
▼
Softener sample

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

Dimensional Stability:

This is checked by spirility test . Equipment Used :

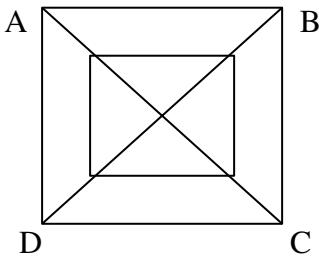
Quick wash m/c

Template Size :

- 38 "x 38"
- 25" x 25"

Temp.= 50° C

Time = 12 ' (Wash & Dry)



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

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

Chapter Twelve

Washing

Machine in washing unit:

- **Machine name: Tumble Dryer**

  Brand name: TRIVENETA

  Origin : Italy

  Serial No. : 08387

  Year : 2008

  Volt. : 400

  Number of tumble dryer : 6

- **Machine name: Hydro extractor.**
  Brand name : Chungmoo.
  Origin : Korea
  Number of Machine : 3



Fig: Hydro extractor.

- **Machine name: Pigment dyeing machine.**
  Brand name: TONELLO
  Origin: Italy
  Number of Machine : 2



Figure: Pigment dyeing m/c

- **Machine name: Garments Dyeing machine**
  Brand name: SUTLICK
  Origin: Hongkong
  Number of Machine : 10



Fig: Garments Dyeing m/c

Machine wash:

Machine is washed with Hydrose (3g/l), caustic (1g/l), and soda ash (2g/l) at 98℃ ℃ for 30 minutes to 2.5 hours

↓↓

Then water is drained

↓↓

Rinsing

↓↓

Hot wash at 70-80C

↓↓

Neutralization with acetic acid (0.5-1 g/l) at 60-70C for 5 minutes

↓↓

Normal wash

Washing:

There are different types of wash that is done in this washing section..

- **Normal wash:**
  At normal temperature for 5 mins.
- **Garment wash:**
  At normal temperature with softener for 10 minutes
- **Panel wash:**
  At normal temperature with softener for 30 minutes
- **Enzyme wash**:
  Acetic acid 0.4 g/l and enzyme 0.4-0.5 g/l at 55C for 25 minutes
- **Silicone wash:**
  Silicone softener 2 g/l and softener 1g/l at normal temperature for 10 minutes.

- **Acid wash:**

Sand and $KMnO_4$ (300-500gm) at normal temperature

↓↓

1-2 minutes run time

↓↓

Water(100 litre) and Meta (0.5-1 g/l) at normal temperature for 10-15 mins

↓↓

Normal wash 2 times

↓↓

Softener (1g/l) and run time 2 mins

- **Antic wash(vintage wash):**

Soda ash (0.5g/l) and caustic (0.2 g/l)

↓↓

Run time 30 mins at 70C

↓↓

Drain

↓↓

Normal wash

↓↓

Hot wash at 70C for 5 mins

↓↓

Normal wash

↓↓

Neutralization with acetic acid (0.5 g/l) for 5 mins

↓↓

Normal wash

↓↓

Softener for 2 mins

↓

Unload

Dyeing:

- **Dip dyeing:**

  Garment is hang on a hanger and dipped in dye solution at 60 c (for reactive dyes) and at 80C (for terquish color) for 30-40 minutes

↓

Normal wash

↓

Washable dyeing:

Hot wash at 70 C for 5 mins with 0.3g/l acetic acid

↓

Cationization with Modern MSC 6g/l for 5 minutes at normal temperature

↓

Caustic treatment with 3g/l caustic for 30 minutes at 60 C

↓

Dyeing with washable dyes for 10 minutes at normal temperature

↓

40 g/l salt is given at 60C for 10 minutes dosing

↓

Run time 30 mins

↓

Sample check

↓

Drain

↓

Normal wash

↓

Fixing for 5 minutes

↓

Normal wash

↓↓

0.4 g/l acetic acid and 0.5 g/l enzyme at 55C for 3 minutes

↓↓

Unload

❖ **Cold dyeing:**

Hot wash with 0.3 g/l acetic acid at 70C for 5 minutes

↓↓

Normal wash

↓

Dyeing with cold dyes for 10 minutes at normal temperature

↓

Salt (40 g/l) is added for run time 5 minutes

↓

1 g/l Mibafor AD is added and run time 5 minutes

↓

Mibafor RA 5 mins dosing and run time 30 minutes

↓

Drain

↓

Normal wash (4 times)

↓

0.4 g/l acetic acid and 0.5 g/l enzyme at 55C for 3 minutes

↓

Unload

❖ **Oil dyeing:**

Asuprend WS (30g/l) and dyes are mixed at normal temperature

↓

Garment is dipped for 5 minutes

↓

Hydro extraction

↓

Drying at 110C for 1 hour

↓

0.4 g/l acetic acid and 0.5 g/l enzyme at 55C for 3 minutes

↓

ASUMINC-ESCAMAS softener 1g/l and silicone softener 2g/l for 1 minute at normal

↓

Temperature

↓

Unload

❖ **Gel dyeing:**

Compound Neutro Gel/ Compound Blue Jeans (1%owf) and dyes are mixed

↓

Applied on garment

↓

Drying at 110C for 1 hour

↓

0.4 g/l acetic acid and 0.5 g/l enzyme at 55C for 3 minutes

ASUMINC-ESCAMAS softener 1g/l and silicone softener 2g/l for 1 minute at normal temperature

↓

Unload

❖ **Neon dyeing:**

Fabric, dyes and water are added at 40C and run time 10 minutes

↓

Then temperature is raised to 60C and run time 15 mins at 60C

↓

Sample check

↓

Rinse

↓

Drain

↓

Normal wash

↓

New water, fabric and binder (Albatex binder) are added in bath

↓

Run time 10 minutes

↓

Drain

❖ **Enzyme:**

Water, fabric and acetic acid (0.3-0.5 g/l) are added at normal temperature

↓

pH (4.5-5.5) is checked

↓

Temperature is raised to 60C and after 5 minutes sample is checked

↓

Then run time 55 minutes at 60C

↓

Rinse

↓

Drain

↓

Normal wash

❖ **Softener:** Softener (1 g/l) for 5 minute

↓

Unload

↓

Hydro

↓

Drying

Stones and sand used in washing:





Chapter Thirteen

Maintainance

MAINTENANCE

The act which is done to keep the factory -plans, equipment, machine tools etc in an optimum working condition, minimize the break down of machines to improve productivity of existing machine tools and avoid sinking of additional capacity and to prolong the useful life of the factory plant and machinery is called maintenance.

Maintenance Procedure:

Mainly three types of maintenance-

- Preventive maintenance
- Periodic maintenance
- Corrective maintenance

Maintenance of machinery and their Schedule:

Generator	After 40,000 hours major overhauling is done.	After 20,000 hours major overhauling is done.	After 24 Hours air filter cleaning has done. After 2,000 hours Mobil filter and strainer filter changed.
Boiler	After 1 year scaling or fouling has cleared.	Blow down after03 hours for 01minute.	After 24 hours water check hardness(>10)
Compressor	After 40,000 hours overhauling is done.	After 2,000 hours changing of air filter met.	After 3,000 hours oil change.
Water Treatment Plant	After 02 years resin changed	Dosing of salt after 8-12 hours.	
Dyeing and Finishing Machines	It has a schedule of preventive, periodic and corrective maintenance. They have done the maintenance by the following up that is given by their IT Section.		

Maintenance Tools and Their Function:

Maintenance Tools	Function
Cutting Disc	For cutting pipes, rods
Glove valve	Fitting for steam line
Tread trap	Joining of broken metallic parts
Union Elbow	Fitting for water, steam line

Gear oil	Lubrication
Cutting oil	Lubrication
Hydraulic oil	Lubrication
Oil gun	Oil Application
Spanner	Tightening of nut bolts
Maser range	Tightening of nut bolts
Flat or star screw driver	Screw Tightening and loosening
Hacksaw blade	Cutting
Spray gun WP40	Spraying a chemical named WP40
Drill machine	Drilling to make hole
Grinding machine	Grinding
Hacksaw frame	Cutting
Grease	Lubrication

Available Facility of Utility and Their Sources:

Utility	Source
Steam	Boiler
Gas	TITAS
Compressed Air	Compressor
Electricity	PDB and Generator
Water	Natural Water by Pump
Temperature Control	AC Chiller

Chapter Fourteen

Utility Section

UTILITY SECTION

Major Utilities Used In KCL Dyeing Are:

1. Water
2. Electricity
3. Steam
4. Compressed Air
5. Effluent 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:

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

- 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

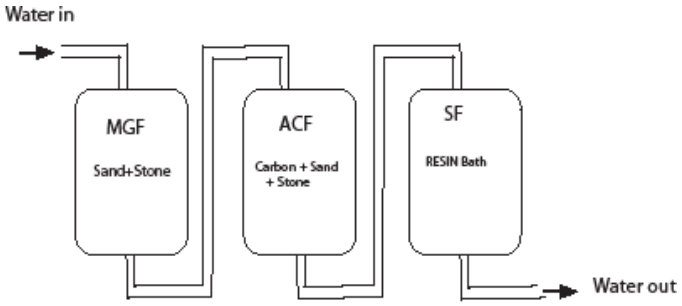
➢ Plant Description: **Demineralization by Resin treatment**

Three vessels system – Removal

Vessel – 1 – Multi-Grade Filter (MGF) – For Iron

Vessel – 2 – Activated Carbon Filter (ACF) – For TDS removal

Vessel – 3 – Softener Filter (SF -Resin) – For Hardness removal



Water Demineralization Treatment Plant



➢ Water dstribution 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.

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

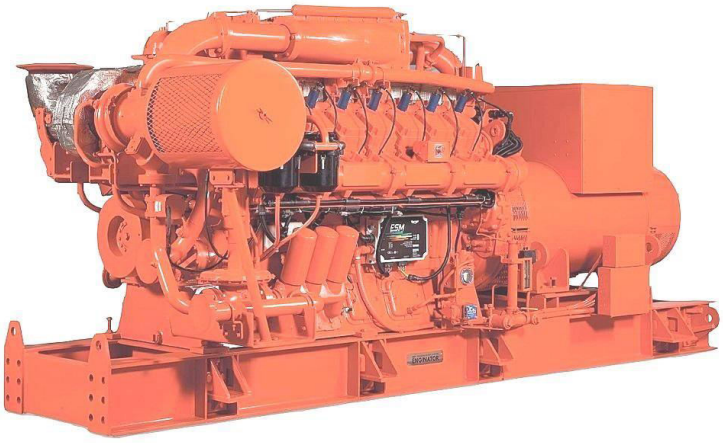
No of boiler	:	03
Type of boiler	:	Horizontal, Fire tube boiler
Brand	:	LOOSE INTERNATIONAL (Germany)



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

ELECTRICITY/GENERATOR

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



Gas Generator used in KCL

- 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

Comressed 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

EFFLUENT TREANTMENT PLANT (E.T.P.)(Biological E.T.P.):

The Effluent which is treated by a plant that is called Effluent Treatment Plant. In fact, water is the heart for dyeing Industry and chemical also an important element for different stage of dyeing. Now , it is quite impossible without chemical continue dyeing. So, which chemical we use in Dyeing that mixed with water and finally drain.If the chemical mixed water goes outside through river it is very harmful for not only our environment but also all alive animals.



Effluent Treatment Plant

Types of E.T.P:

There are different types of E.T.P are available .Those are

- Biological E.T.P.(Best)
- Chemical E.T.P.
- Biological & Chemical E.T.P.
- Physical ETP

Biological E.T.P.:

- The Effluent will be treated according to sequence or stage by stage.
- Its primary cost or set up cost is very high.
- Its effluent treatment will be best.

KNIT CONCERN LTD E.T.P.:

- Cost of the project is nearly 8, 00, 00,000 BDT.
- Fully Biological E.T.P.
- Manufactured by Water Treatment Technology (W.T.T.) of ITALY.
- 60 lac litre storage capacity
- 30 lac litre processing capacity

Plant Equipment:

1. Screen Brush
2. Lifting Pump
3. Storage and Homogenizing Tank
4. Neutralization
5. Distributor
6. Biological Oxidation
7. Sedimentation Feeding Tank
8. Sedimentation
9. Sludge Return Pump
10. Sludge Thickener
11. Blowers
12. Chemical Reagents
13. Flow Meter
14. Main Switch Board
15. Air Left
16. Filter Press

Different chemical used in E.T.P.:

- Sodium Hypo chloride :
- Sulfuric Acid :
- Polyelectrolyte
- Nutrient salt
- De-colorant
- Anti-foam

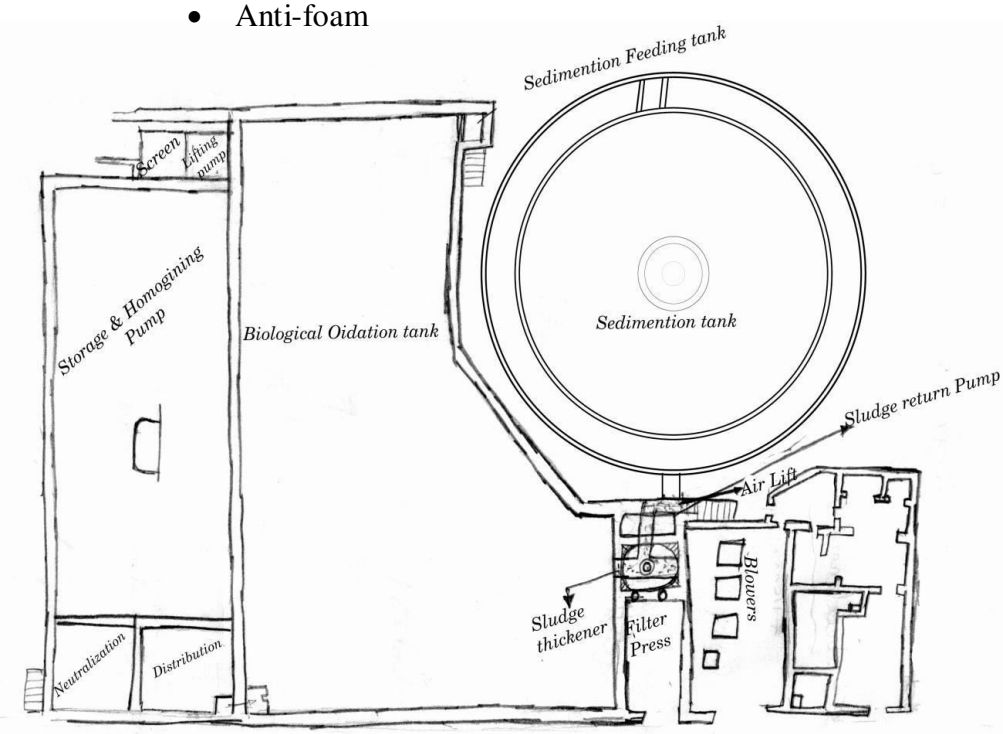


Fig : Layout plant for ETP

Object of ETP: To remove coloring matter.

To control PH.

To maintain proper value of BOD and COD.

Manufacturer Company Name: Panta Rei Srl

Country of Origin: Italy

Capacity: 125 m^3

Built Year: 2007

Process Sequence:

Screen
↓
Lifting pump sump
Storage and homogenizing tank
↓
Neutralization tank
↓
Distribution tank
↓
Biological oxidation tank
↓
Sedimentation feeding tank
↓
Sedimentation tank
↓
Sludge return pump sump
↓
Sludge thickener tank
↓
Filter process

Volume of Tank:

- Storage and homogenizing tank: 6000 m
- Biological oxidation tank: 8600 m

No of Blower:

- Three for Biological oxidation tank
- One for Storage and homogenizing tank.

Specification of the Blower:

R.PM: 2966

Volt Required: 400 V
Required Frequency: 50 Hz

Power required: 55 kW/hr

Volume of production airflow: 1415 m/hr

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 quantity	-when bacteria become weak it is added to a certain -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

Gas:

Gas is mainly used for stem production. The gas is used from TITAS, generally 2500 CFt gas is required to produce one ton steam per hour.

Cost of different utility:

- 1 unit electricity-2.60Tk
- 1 kg steam-0.50Tk
- 1Ton water-7.30Tk

Remarks:

For smooth running of a factory utilities are unavoidable. It has no direct use but help in the production so utility should have the proper characteristics to met the production parameter.

Chapter Fifteen

Stores & Inventory Control

Scope of Inventory Control:

1. Raw materials →
    a) Dye store
    b) Other chemicals
    c) Gray fabric

2. Finished fabric
3. Spare parts

Frequency of Inventory Update:

1. Monthly inventory control
2. Annual inventory control

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.

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.

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.

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 Sixteen

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 peoplein the marketing section of the industry.

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.

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 GROUP 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.

Marketing Strategy:

Marketing strategy is a very important factors to sale the products to the buyer . 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 .

In **KNIT CONCERN GROUP** mainly senior marketing officers, merchandiser & 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 & the merchandisers communicate with the buying houses to collect the orders.
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
- OKAIIDI
- 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 Seventeen

Conclusion

Last of all we again give grade thanks to GOD for successfully completed our industrial attachment. Actually, **Knit Concern Group** is a 100% export oriented knit composite industry. During the training period we have completed our industrial attachment to a systematic routine which was provided by **Knit Concern Group** .We get help from different sections officers and workers which was helpful to gain very good practical knowledge. Sometimes we operate machine for various jobs during operation. Last of all we thank all the officers and workers who helped us by co- operating and giving reliable information to us.