UNIT-I

SUBJECT: TEXTILE PROCESSING CLASS: II FD

Typical sequence of processes, Object and methods.Singeing ,Desizing, Scouring, Synthetic Fiber Heat setting, Wool carbonizing, Weighting of silk.Wet processing equipment – Kier - J box – pad roll – U box – Roller bed – Conveyor steamer – stenter.

Textile wet processing:

In which way grey fabric is dyed is called **wet process technology**. Normally wet processing depends on buyer's demand. Suppose your buyer wants the more precised dyed fabric; so in this fact you should mercerize your fabric during the dyeing **pre-treatment process**. Basically if the buyer don't want that so called particular fabric there is no need to **mercerize your fabric**.

Flow Chart of Textile Wet Process Technology

Grey Fabric Inspection
↓
Sewing or Stitching
↓
Brushing
↓
Croping
↓
Singeing
↓
Desizing
↓
Scouring
↓
Bleaching
↓
Mercerizing
↓
Dyeing
↓
Printing
↓
Finishing
↓
Final Inspection
↓
Delivery

Grey Fabric Inspection:
After manufacturing fabric it is inspected in an inspection Table. It is the process to remove neps, warp end breakage, weft end breakage, hole spot.

Stitching:
To increase the length of the fabric for making suitable for processing is called stitching. It is done by plain sewing m/c.

Brushing:
To remove the dirt, dust, loose fibre & loose ends of the warp & weft threads is known as brushing.

Shearing / Cropping:
The process by which the attached ends of the warp & weft thread is removed by cutting by the knives or blades is called shearing. Shearing is done for cotton & cropping for jute. After Shearing or cropping fabrics goes under singeing process.

Singeing:
The process by which the protruding / projecting fibres are removed from the fabrics by burning / heat to increase the smoothness of the fabric is called singeing. If required both sides of fabric are singed.

Desizing:
The process by which the sizing mtls (starch) are removed from the fabric is known as desizing. This must be done before printing.

Scouring:
The process by which the natural impurities (oil, wax, fat etc) & added/external/adventitious impurities (dirt, dust etc) are removed from the fabric is called scouring. It is done by strong NaOH.

Souring:
The process by which the alkali are removed from the scoured fabric with dilute acid solution is known as souring.

Bleaching:
The process by which the natural colours (nitrogenous substance) are removed from the fabric to make the fabric pure & permanent white is known asbleaching. It is done by bleaching agent.

Mercerizing:
The process by which the cellulosic mtls/substance are treated with highly conc.NaOH to impart some properties such as strength, absorbency capacity, lusture is known as mercerizing. It is optional. If the fabrics are 100% export oriented then it is done by highly conc. NaOH (48-52° Tw).

Dyeing:
A process of coloring fibers, yarns, or fabrics with either natural or synthetic dyes.

Printing:
A process for producing a pattern on yarns, warp, fabric, or carpet by any of a large number of printing methods. The color or other treating material, usually in the form of a paste, is deposited onto the fabric which is then usually treated with steam, heat, or chemicals for fixation.

Finishing:
Then finishing treatment are done according to buyer requirements and then folding, packaging, and at last delivery.

SINGEING

Singeing is a part of the **pretreatment processes** carried out in textile processing, and is usually the first step carried out after weaving. It is the process of burning off of protruding fibers from the surface of **yarn** or fabric in order to improve the luster and smoothness of the material. The 'fuzz', as the protruding fibers also tends to scatter incident light on the yarn or fabric surface and contributes to a dull appearance of the textile material. Removal of 'fuzz' results in a smoother and more uniform surface that reflects more light and therefore gives a brighter appearance.

OBJECTIVE OF SINGEING:

1. Burning of projecting **fibers** from yarn/fabric surface.
2. Fabric/Yarn surface become smooth, even and clean.
3. To develop maximum luster in the textile materials.
4. Help to create smart design by printing.
5. Save from uneven dyeing & printing.
6. To make the textile materials suitable for subsequent next process.

Flow Chart of Singeing Process:

Batch
↓
Pre –Brushing
↓
J-Scray
↓
Gas-singeing

↓

Post-Brushing

↓

Padding

↓

Squeezer

↓

Batching

DIFFERENT TYPES OF SINGEING MACHINE:

There are three different types of singeing machine:

1. Hot Plate singeing machine:

Advantages:

- Hot plate singeing machine is suitable for back filling finishing process as the fiber ends in the interstices are not removed.

Disadvantages:

- Fiber ends in the interstices of warp and weft are not singed.
- Produces an undesirable **fabric** luster due to the frictional contact with the hot plate.
- Causes uneven singeing due to difficulty in maintaining uniform plate temperature.

2. Roller singeing Machine:

Advantages:

- Roller singeing machine is suitable for back filling finishing process as the fiber ends in the interstices are not removed.
- The uneven singeing takes place to a lesser extent in roller singeing.

Disadvantages:

- Fiber ends in the interstices of warp and weft are not singed.
- Produces an undesirable fabric luster due to the frictional contact with the hot plate.
- Causes uneven singeing due to difficulty in maintaining uniform plate temperature.

3. Gas-singeing machine:

Advantages:

- Both sides of the cloth are singed simultaneously.
- Uniform singeing of the cloth is obtained.
- There is no question of unwanted cloth sheen as there is no contact with any metal surface as in the case of the other singeing machines such as the roller and hot plate singeing machine.
- Fibers in the interstices between the warp and weft threads are also burn effectively. This is not entirely possible in the case of other singeing machines.
- Different varieties of fabric can be singed.

Disadvantages:

- The major disadvantage of gas-singeing is obviously that there is a great risk of fire, if proper care is not taken on this count. However, any risk of fire can be avoided completely if,
- The flame is adjusted to be at its optimum size.
- Careful monitoring of the singeing process is carried out.
- The necessary fire-fighting equipment is available close at hand.
- The operators at the machine are properly trained to run the singeing machine and to use the fire-fighting equipment in an emergency.

DESIZING

Desizing is done in order to remove the size from the warp yarns of the woven fabrics. Warp yarns are coated with sizing agents prior to weaving in order to reduce their frictional properties, decrease yarn breakages on the loom and improve weaving productivity by increasing weftinsertion speeds. The sizing material present on the warp yarns can act as a resist towards dyes and chemicals in **textile wet processing**. It must, therefore, be removed before any subsequent wet processing of the fabric.

OBJECTS OF DESIZING:

1. To remove the starch material from the fabric.
2. To increase the absorbency power of the fabric.
3. To increase the affinity of the fabric to the dry chemicals.
4. To make the fabric suitable for the next process.
5. To increase the luster of the fabric increase of **dyeing** and **printing.**

Methods of Desizing:

1. Hydrolytic Method
2. Oxidative Method

1. Hydrolytic Method

- **Rot Stepping:**
  - This is the oldest and cheapest method of desizing.
  - Here no special chemical is used.
  - The cloth is first passed through warm water at 40C in a padding mangle where the cloth is squeezed to about 100% expression.
  - The cloth is then allowed to stand for 24 hours.
  - The microorganisms, naturally present in w ater, multiply and secrete starch-liquefying (hydrolyzing) enzymes, which break down the starch present in the size to w ater-soluble products.
  - The cloth is then washed to remove these products.

- **Acid Stepping**

- Acid steeping is one of the most useful desizing processes where dilute Sulphuric acid is used to Hydrolyze or soften starch.
- By this method, almost all the starch present in the fabric can be liquefied. Fabrics are impregnated with an acid solution in a room where the temperature is 30 degree and have to keep it for eight to twelve hours for acid steeping.
- Remember that during storage of fabric in the tempered room fabric should not be dried otherwise it may damage the fabric.

- **Enzymatic Stepping**
  - The safest method of desizing is enzyme steeping.
  - There is no problem of hydrocellulose which ensure good desizing.
  - This process occupies less space but it is more costly than other desizing methods.

SCOURING:

The process of removing naturals (oil, wax, fats, gum etc) as well as added impurities (during fabrication process) to produce hydrophilic and clean textile materials is called **scouring**. It is very vital process of wet processing.

OBJECTIVES OF SCOURING:

1. The main purpose of scouring is to remove impurities from the textile materials.
2. To make the fabric highly hydrophilic.
3. To make the textile materials in a highly absorptive condition without undergoing chemical or physical damage significantly.
4. To produced a clean material by adding alkali.
5. To remove non-cellulosic substance in case of cotton.
6. To make the textile material suitable for the subsequent bleaching operations.

Methods of scouring: Two methods are available. They are:

Batch process/Discontinuous process (Kier Boiling/Jigger)/Winch dyeing machine.

Working procedure:

1. Kier boiler is provided one man hole for loading and unloading the fabric.
2. The liquor is prepared into the mixing tank by above chemicals then brought into the pre-heater and heated by the steam.
3. The fabric is loaded in the machine by man hole and kept in rope form.
4. Then the hot liquor is pumped and sprayed by spader plate onto the fabric which is packed into the kier.
5. The temperature of the kier is about 100ºC and boiling for 8hours.
6. After scouring the fabric is washed with 80ºC. Otherwise impurities on the fabric would not be removed.
7. Then the fabric is neutralized with 0.1% acetic acid and then cold wash is carried out.

Precautions:

1. Kier should be clean.
2. Material should be packed evenly.
3. The fabric should be immersed in liquor completely.
4. Before starting all the join parts should be checked.
5. The joint parts should be leak proof.
6. Before scouring, the fabric should be starch free.

CONTINUOUS PROCESS(J-BOX).

The scouring vessel looks like the English letter 'J' hence; this process is called J-Box process. In this process desizing, scouring and bleaching operation can be done at a time. This process is also known as Scouring in J-Box.

Procedure: The scouring process in J-Box can be divided into four units. They are:

1. Saturation.
2. Pre-heater.
3. J-Box.
4. Washing unit.

Saturation: Saturation is prepared by the above recipe without caustic soda in the saturation. Then the fabric is possed through the guide roller and immersed into the solution. Here the temperature is about 0-80ºC.

Pre-heater: In pre-heater the materials is passed at temperature 110-120ºC and then passed to the J-Box.

J-Box: In J-Box solution of caustic soda are kept and the fabric is stored in this solution. Here the temperature is about 100ºC. In J-Box, NaOH react with the impurities present in the fabric and finally removed.

Washing unit: The water soluble impurities or products are left on the materials are removed here. First the material are washed in hot water and then cold water and finally dried.

Advantage

1. This process is continuous process, so it is consumes less time.
2. This process is more economical.
3. Desizing, scouring, bleaching operation can be done at a time.

Disadvantage:

1. The result is not as good as compared to with kier.

HEAT SETTING

- Heat-setting is a heat treatment by which shape retention, crease resistance, resilience and elasticity are imparted to the fibres. It also brings changes in strength, stretchability, softness, **dyeability** and sometimes on the colour of the material. All these changes are connected with the structural and chemical modifications occurring in the fibre.
- This operation is crucial for fabrics made of **synthetic fibres** (PE, PA, elastomers), for triacetate, and partly for PAC fibres (setting), since it grants excellent dimensional stabilisation and creaseproof properties, maintained till the fabric is exposed (by air blowing) to temperatures exceeding the heat setting one (after being treated with water at a temperature above the second order glass transition temperature, i.e. 80-85°C for acrylics).

  Heat setting is carried out on gray fabrics (scarcely applied), on scoured fabrics (frequently applied) and on dyed fabrics (scarcely applied). The process grants excellent dimensional stability and good crease-proof properties. As far as operating conditions are concerned, the fabric must be treated in accurately controlled moisture and temperature conditions.

Heat setting of Some Fibers

Fibre	**Min T. °C**	**Max. T. °C**	**Time in sec**
Polyester (PE)	170	210	15-50
Polyamide PA 6.6	170	210	15-40
Polyamide PA 6	160	180	15-40
Triacetate	160	180	15-40
Acrylic (PAC)	160	180-200	15-40
Elastomers	170	180-200	15-40

STAGES OF HEAT SETTING

Heat-setting can be carried out at three different stages in a processing sequence i.e. in grey condition; after **scouring**; and after dyeing. The stage of heat-setting depends on extent of contaminations and types of fibres or yams present in the fabric. Heat setting after dyeing could lead to the sublimation of **disperse dyes** (if not accurately selected).

STENTER MACHINE

Stenters are widely used for stretching, drying, heat-setting and finishing of Fabrics. The stenter frame is usually 80-100 feet long and 70-100 inches wide. The speed ranges from 10-45 m/min with a maximum setting time in the setting zone 30 sec at temperature ranging from 175 to 250~ depending upon the thickness and type of the material.

WOOL CARBONZING

1. Carbonizing is done to remove the cellulosic impurities from **wool** by treatment with acid or acid producing salts.
2. Carbonizing may be carried out in loose wool or on piece goods after scouring.
3. The process begins by immersing the wool in a solution of sulfuric acid (H2SO4) that reacts with the cellulose impurities in the wool.

TECHNIQUES OF WOOL CARBONZING

1. Scouring of the raw wool with non-ionic detergent.
2. Rinsing.
3. Immersion in a long bowl containing 5-7% (w/v) sulphuric acid, 1-2 g/L detergent at 20-30oC.
4. Double squeezing and/or continuous centrifuging prior to drying.
5. Drying at 60-80oC to a low regain.
6. Baking at 95-120oC to carbonise the VM.
7. Pass through heavy fluted rollers to crush the embrittled VM.
8. Convey to a rotating shaker/de-duster to remove the charred VM dust.
9. Pass through a neutralising bowl usually containing sodium carbonate.
10. Rinsing with a small addition of detergent.
11. **Bleaching wool** with hydrogen peroxide at approximately pH 5 with formic acid.
12. Final drying.

STENTER MACHINE

A machine or apparatus for stretching or stentering fabrics. The purpose of the stenter machine is to bringing the length and width to pre determine dimensions and also for **heat setting** and it is used for applying finishing chemicals and also shade variation is adjusted. The main function of the stenter is to stretch the fabric widthwise and to recover the uniform width.

FUNCTIONS OF STENTER MACHINES

1. **Heat setting** is done by the stenter for **lycra fabric**, synthetic and blended fabric.
2. Width of the fabric is controlled by the stenter.
3. Finishing chemical apply on fabric by the stenter.
4. Loop of the knit fabric is controlled.
5. Moisture of the fabric is controlled by the stenter.
6. Spirility controlled by the stenter.
7. **GSM of the fabric** is controlled by stenter.
8. Fabric is dried by the **stentering process**.
9. **Shrinkage** property of the fabric is controlled.
10. Curing treatment for resin, water repellent fabric is done by the stenter.

COMPONENTS OF STENTER MACHINE:

- Paders
- Weft straightner (Mahlo)
- Burners 10
- Heat recovery
- Attraction rollers
- Circulating fans 10,8
- Exhaust fans 2
- Winder 2
- Clips
- Pins
- I.R
- Cooling drums 2

WORKING PROCEDURE OF STENTER MACHINE

The fabric is collected from the batcher to the scray and then it is passed through the padders where the finishes are applied and some times shade variation is corrected.The fabric is entered into the mahlo (weft straigtner) the function of the mahlo is to set the bow and also weave of the fabric is griped by the clips and pins are also provided but the pins has a disadvantage that they pins make holes at the selvedge but the stretchning of the pins are greater than the clips.these clips and pins are joined to endless chain.there are 8 to 10 chambers provided on the machine

each chamber contains a burner and filters are provided to separate dust from air.the circulating fans blow air from the base to the upper side and exhaust fans sucks all the hot air within the chambers. Attraction rollers ar provided to stretch the warp yarn.

After stentering we can increase the width of the fabric up to 1.5-2 inch.The speed of the machine is about 7-150 m/min.3 meters fabric can run in each chamber.temperature is adjusted that according to the fabric as for,

1. PC 210 c
2. Cotton 110-130 c

After dyeing 160-170c and after print 130-140c.

CONVEYOR STEAMER

Printed dyes are usually fixed by steaming processes, the steam providing the moisture and rapid heating that brings about the transfer of dye molecules from the thickener film to the fibre within a reasonable time. Historically, the process of developing printed mordants was known as 'ageing' and took a long time, as the term implies. Printed fabric was draped over poles and left in a room with a warm and humid atmosphere for some days, allowing the processes of diffusion and chemical reaction to occur.

The time and conditions for fixation in steam vary with the properties of the dyes and fibres used, ranging from 10 s to 60 min in steam at 200 to 100 °C.

Continuous steaming / curing / polymerising machine is the updated and technologically advanced version of a textile processing machine. In textile processing machine the steaming chamber is closed type made completely in stainless steel AISI 316. Fabric feed takes place through an opening on the front side whilst extraction is from the back side. The fabric is placed on rods and transported through the steaming chamber. The rods are rotating on their axis to avoid marking off from the rod itself. Loop formation is done by a dancing roller system.

ypes of Steamer

1.Continuous steamer and
2.Discontinuous steamer

1.Continuous steamer

→ Festoon steamer
→ Hand bowl
→Tower or cymni type
→Rainbow type

2.Discontinuous steamer

→Cottage type steamer
→Vaccum high pressure
→Belt or stand type

WEIGHTING OF SILK

The process of increasing the weight of the silk material is known as weighting of silk.

OBJECT OF SILK WEIGHTING

1. After the processing of silk material, it loses about 25% of its weight particularly after degumming.
2. This loss in weight leads to a great loss of money since they are very expensive.
3. To compensate the loss, some weight is artificially added to the material by chemical means.
4. During **degumming of silk**, a weight loss of 25% is normally observed in case of **silk fabrics.**
5. Owing to the expensive nature of silk, it is necessary to compensate the weight loss.

Other Objects:

1. Weighting is also done to reduce limpness.
2. To impart a bulky effect.
3. To control the scroopy effect.
4. To give body to the fabric.
5. To give a greater filling capacity.

Silk Weighting Process:

Tin salts are widely used for silk weighting.

There are three methods which are followed:

1st method:

The silk is soaked with stannic chloride solution followed by fixation with sodium carbonate followed by soaping.

Marginal weight increase is observed but the strength is also adversely affected in this method.

2nd method:

- The silk is soaked in stannic chloride and the fixed with sodium phosphate.
- It is then washed and treated with little amount of sulphuric acid.
- It is then soured, washed and taken out.

Even though increase in weight is considerable, the strength loss is still high in this method.

3rd method:

- In this method the fixation is done with sodium silicate.
- This brings out the required increase in weight without affecting the strength much.

Normal Method:

- In the normal practice silk is soaked in stannic chloride solution called Picking.
- Later it is treated with sodium phosphate called Phosphating.
- The picking and Phosphating is carried out alternatively till the sufficient weight is achieved and the sequence is:
- Picking washing - Phosphating - acidifying
- Finally after sufficient loading it is treated with Sodium Silicate.

Chemistry:

Stannic chloride + sodium phosphate Tin phosphate

Tin phosphate + sodium silicate Tri silicate of tin

DEGUMMING OF SILK

The fibroin present in the silk fibre is covered by thin layer of sericin. This sericin present in the silk fibres greatly affects the handle, sheen and texture of the finished goods,. It gets necessary to remove the sericin from the silk fibres. The silk gets more soft, lustrous after removal of sericin. The improved texture is also resulted after sericin removal. This serricin is also known as silk gum.

The main objective of the degumming process is to get improved lustre, softness, and texture. ***"The process of removing the sericin or silk gum from silk fibre is called degumming".***

WEIGHTING OF SILK FIBRE:

This weight loss is recovered again by treating the processed silk with weighting agent. ***"The process of recovery of weight loss during degumming by using any external weighting agent is called weighting of silk"***. In this process the processed silk is treated with any suitable silicate solution. The properties of silk like feel, softness, and lustre also get changed up to some extent. Extra dose of weighting agent can be harmful to the silk fabrics.

UNIT-II

SUBJECT: TEXTILE PROCESSING

Mercerization – Theory process – Methods – Chemicals – effects.Bleaching – Hypo chlorites – Hydrogen peroxide – sodium chlorite,Evaluation of bleached fabric – whiteness – absorbency – chemical damage – residues.

MERCERIZATION

A treatment of cotton yarn or fabric to increase its luster and affinity for dyes. The material is immersed under tension in a cold sodium hydroxide (caustic soda) solution in warp or skein form or in the piece, and is later neutralized in acid. The process causes a permanent swelling of the **fiber** and thus increases its luster.It is the process of treatment of cellulosic material with cold or hot caustic conditions under specific conditions to improve its appearance and physical as well as chemical properties.

Purpose of mercerizing

1.To improve the lusture
2.To improve the strength
3. To improve the dye uptake and moisture regain.

Mercerizing process

The mercerizing involves these three subsequent steps,

a. Impregnation of the material in in relaxed state,cold caustic solution of required strength and wettability..
b. Stretching while the material is still impregnated in the caustic solution.
c. Washing off the caustic soda from the material while keeping the material still in the stretch state.

Alkaline Treatments

Mercerization, the treatment of cotton with a strong caustic alkaline solution in order to improve the luster, hand and other properties, was named after its discoverer, John Mercer, and has been in use for some time. It has been seeing an increase in application recently.
The methods and effects involved in the processing of cotton and polyester are different, but,

both involve treatment with a strong alkaline solution before dyeing to improve the properties of the fiber, and so both can be considered together to be alkaline treatments.

Furthermore, in the handling of blended and union weaves of polyester and cotton, both fibers can be treated effectively with alkalis at the same time, and so it is important that the two treatments be given equal consideration in such a case.

MERCERIZATION PROCESSING

If cotton is dipped into a strong alkaline solution such as lithium hydroxide, caustic soda, or potassium hydroxide, the fibers will swell and shrink. If the fibers are placed under tension while in this swollen state and then rinsed with water, the alkali will be removed and a permanent silk-like luster will result.

Alternatively, after swelling, if the alkali is rinsed off when the fiber is in its shrunk state, an increase in luster may not be discernable, but the fibers will fix in that shrunk state, thus giving good elasticity to external stress.

The former is known as tension mercerization and is often simply called **mercerization**, while the latter is referred to as slack mercerization. Due to considerations of cost and efficacy, only caustic soda is used as the alkali in industry.

THE EFFECTS OF MERCERIZATION

- Improved luster
- Increased ability to absorb dye
- Improved reactions with a variety of chemicals
- Improved stability of form
- Improved strength/elongation
- Improved smoothness
- Improved hand

Appearance is improved through increased luster, a deepening of the color and the production of a transparent look, the feel of the fabric is improved through a resulting soft hand and improved smoothness, and strength and elongation are also improved, along with the addition of good stretching ability. The treatment and handling can be adjusted to fit different requirements, thusallowing for the best application of the results of different processing.

BLEACHING

Bleaching is chemical treatment employed for the removal of natural coloring matter from the substrate. The source of natural color is organic compounds with conjugated double bonds , by doing chemical bleaching the discoloration takes place by the breaking the chromophore , most likely destroying the one or more double bonds with in this conjugated

system. The material appears whiter after the bleaching.

Natural fibres, i.e. **cotton**, wool, linen etc. are off-white in colour due to colour bodies present in the fibre. The degree of off-whiteness varies from batch-to-batch. Bleaching therefore can be defined as the destruction of these colour bodies.
The purpose of bleaching is to remove coloured impurities from the fibre and increase the whiteness level of fabric.

THE AIM OF BLEACHING CAN BE DESCRIBED AS FOLLOWING:

- Removal of coloured impurities.
- Removal of the seed coats.
- Minimum tendering of fibre.
- Technically reliable & simple mode of operation.
- Low chemical & energy consumption.
- Increasing the degree of whiteness.

BLEACHING AGENT

A bleaching agent is a substance that can whiten or decolorize other substances.**Bleaching** agents essentially destroy chromophores (thereby removing the color), via the oxidation or reduction of these absorbing groups. Thus, bleaches can be classified as either oxidizing agents or reducing agents.

TYPE OF BLEACHING AGENTS

1. Oxidative Bleaching Agents
2. Reductive Bleaching Agents

HYDROGEN PEROXIDE

Hydrogen peroxide is the bleaching agent for the treatment of natural and synthetic fibers (cotton, wool, silk, linen, rayon). The use of hydrogen peroxide allows not only a high degree of brightness, but also preserves the mechanical properties of the fibers. Similar to pulp bleaching, this process takes place in an alkaline environment. The bleaching liquors have to be stabilized to prevent decomposition reactions due to the presence of trace metals such as copper, iron and manganese, which can often be found in fibers or in water.

Cotton is the main fiber bleached today. Practically all cotton produces nowadays is bleached. About 80-90% of all cotton fabrics are bleached with hydrogen peroxide. Typically,

bleaching with 0.3-0.6wt% solutions of hydrogen peroxide at a pH of 10.5-11.5 is carried out for 1-3 hours at a temperature of 90-95°C. In the past, sodium hypochlorite was commonly used for cotton bleaching. Hypochlorite bleach was, however, abandoned because of high fiber damage and technical difficulties.

SODIUM HYPOCHLORITE

Sodium Hypochlorite is a greenish-yellow liquid commonly referred to as "Bleach." The chemical compound formula for Sodium Hypochlorite is NaOCl.Sodium Hypochlorite is prepared by reacting dilute caustic soda solution with liquid or gaseous chlorine, accompanied by cooling. It is used extensively as a bleaching agent in the textile, detergents, and paper and pulp industries.

The active ingredients in hypochlorite bleaches vary with pH. At pH <>2 is the main component in solution; at pH 4 to 6, HOCl is the dominant species; at pH > 9, OCl^- is the only component present. It is the hypochlorite ion in basic solution that is the active ingredient in household bleach, which is typically about 5 to 6 percent NaOCl. The OCl^- ion oxidizes chromophores in colored materials, and is itself reduced to chloride and hydroxide ions.

Sodium chlorite, anhydrous is in the form of slightly hygroscopic crystals or flakes, soluble in water.The hydrated material is in the triclinic leaflets. The chemical formula is NaClO2, and molecular weight is 90.45. The molecular weight of hydrated product is 144.5.

SODIUM CHLORITE ($NACLO_2$)

The sodium chlorite is available as a powder , and it is applied under strongly acidic conditions to textiles. Its application produce a toxic and corrosive gas.

1. Bleaching Mechanism

Sodium Chlorite is an oxidant particularly adapt for synthetic fibre **bleaching** (polyamidic, acrylic, polyester) and cellulosic (man-made and natural, particularly for linen). Its oxidant action works thanks to Chlorine Dioxide which develops through an acidification process: therefore it is highly recommended to work with closed equipment and to furnish the bleaching departments with aspiration systems.A general guideline for bleaching bath at M:L=1:10 is

2. pH :

The pH of around 4 ± 0.2 required for bleaching is maintained with buffers or as termed in industry activators, like sodium acetate or sodium dihydrogen phosphate (NaH 2PO4) Latter is usually preferred because it improves whiteness o goods. Neutral or slightly acid chemicals that liberate acid on heating are also used occasionally. Organic esters like ethyl lactate or titrate and their ammonium salts are also suitable for this purpose however the pH range for different substrates is as given below,

Polyamide=	3.5-3.8
Acrylic=	3.0-3.5
Cotton=	3.6-4.0

Linen=3.6-4.0

cotton/polyester=3.6-4.0