Processing Problems Of Polyester And Its Remedies

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ABSTRACT

Polyester is predominantly used synthetic fiber in textile fiber industry since 1950. Today there are varieties of commercial forms of polyester available in market viz. Texturized polyester, Bright polyester, Dull polyester, Cationic dyeable polyester, Cot look polyester, Microfiber polyester, Air punched polyester, Staple fiber polyester & its blends. The extensive use of polyester in textile industry & High rate of growth of polyester fibers is due to their outstanding physical properties, resistance to moth, mildew and microorganism, ease of handle, easy to dye & easy to care during use. Also they can be successfully blended with cotton with various proportions either in fiber form or yarn in fabric form. It has high durability compared to other fibers used in apparel industry. In spite of its outstanding performance, there are some shortcomings in polyester fabric & its blends for example: Hydrophobic nature, ease of soiling, static charge builds up, Tendency to pill, some problems may occur due to improper processing sequence such as Shrinkage, due to improper heat setting dyeability varies, colour fading in checks & strip fabrics. Therefore it is necessary to analyze different physical & chemical properties of polyester available in varies commercial forms, so we can understand reasons for problems occurring in its wet processing & to eliminate this problems.

INTRODUCTION

Polyester is a synthetic fiber derived from coal, air, water, and petroleum. Developed in a 20th-century laboratory, polyester fibers are formed from a chemical reaction between an acid and alcohol. In this reaction, two or more molecules combine to make a large molecule whose structure repeats throughout its length. Polyester fibers can form very ion molecules that are very stable and strong.

Polyester has been one of the most popular fibers, second to cotton as measured by production tonnage in recent years. The technical merits and commercial veracity of the fiber

production system has led to successful product development and applications. Polyester fibers have many desirable properties including relatively high tenacity, low creep, good resistance to stain and deformation, high glass transition temperature and good resistant to acids, and oxidizing agents. These physical, mechanical and chemical attribute make polyester fibers excellent candidates not only for the apparel and textile products but also for industrial and composite applications. Polyester fiber retains little moisture and does not transport aqueous fluids. The hydrophobic nature of polyester fiber makes them difficult to dye (they require a carrier) and to finish in aqueous media. Their oleophilic nature attracts oily soils and leads to poor adhesion to rubber and plastics. Polyester also has poor resistance to alkalis.

Polyesters are polymers that contain ester linkage groups along their main chains. Poly Ethylene Terephthalate (PET) is the most common fiber forming polyesters. The property of PET fiber depends on the development of the micro structures during the fiber formation (spinning, drawing, heat setting) process where the transformation from melt to solid occurs. Therefore, the physical properties of PET fibers vary depending on their processing conditions and thermal history.

Polyester fiber has conquered the leading position among the synthetics because of its excellent properties such as high strength, abrasion resistance and wrinkle-free characteristics. Due to its hydrophobic and oleophilic nature, its moisture transporting behavior is very poor. Moreover, it has unnatural hand and unfamiliar skin contact sensation and pleasant thermal sensation, lack of moisture absorbency and adsorption properties. Due to this it is easily soiled and accumulates static charge, so not comfortable as natural fiber or fabrics, to overcome some of these problems and to improve the property of polyester, it is modified in two ways.

i. Polymer modification :

   a) By introducing acidic groups in the polymer chain having basic dyeability.

   b) By incorporating some monomers which lowers Tg for low temperature dyeability.

ii. Modification of fabric :

   a) Modification of fabrics by means of treating with alkali (NaOH).

Environmental requirement related legislation and strict eco-regulations in international marketing served as a major driving force for innovation in both the dye manufacturing and dye application industries. Environmental consideration has great impact on the production and coloration of synthesis fibers.

Polyester fiber is having very compact and crystalline structure with no definite dye sites. For, this disperse dyes are used for dyeing of polyester fiber from a stable aqueous dye dispersion. Polyester fiber has high Tg and its dyeing is always carried above its glass transitional temperature.

Generally dyeing of polyester using disperse dyes is carried out under acidic pH. This acidic pH is maintained by using the organic acid like acetic acid. This organic acid increases the BOD value which hampers the marine life. Also this acid has bad odour and harmful effects on the persons who comes in contact with it.

APPLICATION OF POLYESTER

Polyester is used in manufacturing of many products, such as clothing, home furnishings, industrial fabrics, computer, recording tapes, and electrical insulation. It has several advantages over traditional fabrics as it does not absorb moisture. Its low absorbency also makes it naturally resistant to stains. Polyester clothing can be preshrunk in the finishing process. This makes it resist shrinking and it doesn't stretch out of shape. The fabric can be dyed easily, and is mildew resistant too. Textured polyester fibers are an effective, non-allergenic insulator, thus it is used for filling pillows, quilting, outerwear, and sleeping bags.

VARIETY OF POLYESTER

Polyester has following product types:

- Semi-dull
- Bright
- Optically white

Semi-dull

In semi-dull, the TiO_2 content is 0.2 % to 0.3 %and the fiber cross-section is round. This type of fiber is generally used for apparels, industrial yarns and fabrics.

Bright

Here, the TiO_2 content is less than 0.05 percent. Lower amount of TiO_2 gives brightness to the. With this fiber, both triangular cross-section and round cross-section are made. Plus, Trilobal fiber gives a shine to both the fiber and the fabric made out of it.

Optically-white

In optically whitened, a whitening agent, stable at high temperatures of 3000°C is added to the. The fiber made out of this is extremely white. It exhibits fluorescence under Ultra Violet light and saves bleaching operation during chemical processing. Furthermore, this fiber is increasingly being used for optically whitened sewing thread yarn.

RELATIONSHIP BETWEEN STRUCTURE, PROPERTIES & PROCESSING PARAMETERS OF PET FIBERS

Properties of polyester fibers are strongly affected by fiber structure. The fiber structure, which has a strong influence on the applicability of the fiber, depends heavily on the process parameters of fiber formation such as spinning speed (thread line stress), hot drawing (stretching), stress relaxation and heat setting (stabilization) speed.

As the stress in the spinning thread line is increased by higher wind-up speed, the PET molecules are extended, resulting in better as-spun uniformity, lower elongation and higher strength, greater orientation and high crystallinity. Hot drawing accomplishes the same effect and allows even higher degrees of orientation and crystallinity. Relaxation is the releasing of strains and stresses of the extended molecules, which results in reduced shrinkage in drawn fibers. Heat stabilization is the treatment to "set" the molecular structure, enabling the fibers to resist further dimensional changes. Final fiber structure depends considerably on the temperature, rate of stretching, draw ratio (degree of stretch), relaxation ratio and heat setting condition. The

crystalline and non-crystalline orientation and the percentage of crystallinity can be adjusted significantly in response to these process parameters.

PROBLEMS OF POLYESTER PROCESSING

One prominent problem of polyester dyeing is listing . A fabric having listing yields two park look OR entirely shade variation after making the made ups (trouser) which not desirable factor. This is a regular problem of Beam dyeing machine but now common in use. So almost this problem has removed but still listing is problem specially in suiting processing.

Few common reasons may be as under:

1. **Heat Setting Fault** - Uneven heat setting , incomplete heat setting i.e. temperature variation chamber to chamber or side to side, heat setting below optimum temperature, residual moisture of the fabric (which is to be heat set). Nature of fabric, blend of fabric, speed of heat set, over-feed used and working condition of stenter are responsible for accuracy of the heat setting. To ensure the results of heat set following test may be cheek:

   (a) Thermo paper check - For confirmation of both side temperature of the stenter m/c this paper is used.

   (b) Estimation of overfeed - Mark 100 cm mark on selvedge before heat set and measure this mark after heat set. It should be 95 to 97 cm. (Depending on O.F. employed as per fabric requirement). It means 2/0% to 5.0% of employed.

   (c) Take one meter heat set fabric and check its dimensional stability. It should yield maximum 0.5% shrinkage in either side. It means it is properly heat setted.

One reason of listing may be due to improper batching. When improper batching i.e. tight batching, loose batching, wrinkle during batching, uneven width batching, moon cut selvedge batching, overlapping fault and beam slippage are employed then chances of listing appear. There should be uniform tension during whole the batching process. For confirmation of accurate batching as process control check following test may be employed:

- Density of beam to check.
- Observation test of the batch.

(Accuracy of batching is confirmed by hand thumb.)

Listing may be a result of faulty yarn composition, faulty twist, tension variation during weaving, temple mark and different companies count variation yarn etc. As a process control check to ensure above faults following test is employed.

- Grey fabric patti dyeing and
- Carbonizing in laboratory.

A sometime mechanical condition of the machine (beam dyeing) seems responsible for this fault. When In-out pressure, out-in pressure, pump fault, leakage of pressure and chocking of holes are found then listing observed. It is observed that thick and heavy selvedge, dense monogram selvedge yield unlevel batching (on selvedge side) which accelerate listing. It is also found that addition of dyes in several installments, (time to time addition) and formulation of two different class dyes in one process may create listing problem.

To accelerate listing (while polyester dyeing) few more factors may be:

- Excess quantity of fabric batching.
- Faulty formulation of dyes & chemicals.
- Unfair application of ingredients.
- Sequence of temperature raising.
- Grey fabric dyeing without heat set.

Remedial measures

To control listing, heat setting is base process of consideration. If listing is regular problem it means heat set is not proper. So check temperature of all four chambers by thermo paper and thermometer. It is advisable that sometimes outer temperature meter yield false reading of heating. Check overfeeds by marking a 100 cm mark before heat set measure it after heat set. Generally overfeed employed 3.0%-5.0% for polyester fabric and 6.0%-10% in polyamide fabric.

	Overfeed desired
For Suiting (TV/TC)	3.0%-5.0%
For Shirting (TV/TC)	3.0%-5.0%
Wooly sari	5.0%-7.0%
Shamo wooly saree	5.0%-7.0%
Gazzi silk saree	6.0%-7.0%
Moss crepe sari	2.0%-4.0%
American viba saree	2.0%-4.0%
American chiffon saree	1.0%-2.0%
American georgette saree	2.0%-4.0%
Nylon shirting	2.0%-4.0%

After heat setting one sample should be check for accuracy of heat setting

- Residual shrinkage of fabric after heat-set.
- Dyeing of one full width sample in any running shade and its carbonizing to listing factor.

While heat setting the fabric following three heads must be consider which are fabric structure, speed of heat set and temperature of process.

Beside listing , heat set have much more merits such as control of dimensional stability. So it is called as finishing process. Generally heat set is carried out at 200ºC-210ºC temperature for TV/TC blend and at 180ºC temperature for TVA/TCA (acrylic)blend .at 175ºC -180ºC temperature used for wool and nylon blends .as TNV/TNW etc.. Temperature alone is not sufficient for dimensional stabilization without overfeed shrinkage. Time of heat contact is maintained 40 seconds to 60 seconds depending on working condition and fabric structure.

Improper heat setting yield heavily listing and shade variation so it should be control accordingly. As a safety measure residual moisture of the fabric can be calculate before heat-set. Fabric

Efficiency of Heat set

For evolution of perfect heat setting following test are employed:

(a)	Shrinkage test	Before and after
(b)	Pilling test.	-Do-
(c)	Dyeing affinity test.	-Do-
(d)	Crease recovery angle test	-Do-
(e)	Observation test. (Pin mark, wrinkle mark, feel, etc.)	

With reference to listing we can confirm batching accuracy by OUT to IN and IN to OUT pressure watch. To control disperse listing batching must be accurate. It should be batch in uniform tension, equalize the selvedge ends fair combination of overlapping and clip sitting. It should be neither too loose nor too tight in binding. We can control our batching accuracy by observation method too with the help of hand thumb during whole the operation. While batching of two-three different count, different weave fabric is not allowed –in on one batch. Speed of batching m/c must be slow and constant. Batched beam's density can be calculated as:

Time to time colour addition should be avoided to control disperse listing-

It listing is due to weaving faults. Yarn fault etc. then such fabric are dyed in light and pastel colour . Dark colour may be day (for one portion) to produce worsted type effect. It listing is due to mechanical fault then machine should be well in order.

<u>For goods having listing following methods are adopted:</u>

- Carrier –boil and then dyeing.
- Conversion of shade in darker side.
- Stripping of the dyes for redyeing.

Though carrier-boil method is enable to solve the problem of listing Now a days polyester is dyed under jet dyeing machine so batching process has eliminated as well as listing problem has removed up to 95% (except Heat setting reasons) due to dye the goods in rope form.

2. POOR FASTNESS PROPERTIES

Thought poor colour fastness to crocking and washing is not a regular problem of disperse dyeing due to dyeing at 130ºC temperature at pressure. But sometimes it is observed in disperse dyeing too due to following reason:

- Due to addition of dyes time to time specially at 110ºC -125ºC temperature without cool down the dye bath.
- Due to dyeing the goods under less temperature i.e. 90ºC-100ºC
- Due to dye without dispersing agents.
- Due to dye the goods after resin finish or silicone finish to change the shade or to rectify the dyeing defects of the fabric.
- When a fabric is dyed several time under pressure then degradation of viscose, cotton may occur result poor colour fastness to crocking and washing obtained.
- Residual alkali after scouring, desizing and bleaching may play an important role in this regard.
- Hairiness of fibre structure also accelerates these problems.
- Selection of faulty dyes for dyeing which contain poor colour fastness to crocking and sublimation create such defects.
- In case of unexhausted days such defects of poor colour fastness obtained .Secondly properly exhausted days also contain superficial dyes particle due to improper after treatment so such problems occurred.
- In case of polyester dyeing under thermosol method. Fabric absorbency play an important role. If curing is not excellent then such defects occurred.
- One more reason of poor colour fastness to Washing and Rubbing is to select non-standard dyes and chemicals for cost saving.
- Water hardness is indirect source of such problems especially in carrier boil method and padding method.
- Few finishing agents which used at the final end of the processing seem a responsible source of these faults.

Remedial Measures

Though all these faults are based on traces of superficial dyes deposited in the outer minute's surface of the fabric. Therefor after treatment process is enabling to overcome on these defects. Few precautions can be employed such as

- Colour addition in several installments should be avoided.
- Dyeing temperature must not be less than 120ºC for 30 minutes. Low temperature dyeing is not permitted.
- Dyes chemicals must be in excellent form a standard company, No local dyes and chemicals are allowed.
- No finished goods are recommended for dyeing without hydrolyze the finishing agent.
- Disperse dyeing must be with desired quantity of dispersing agent leveling agent ph controlling of water softening agent etc. Defoaming agent carriers.
- Fabric must be well scoured bleached desized and well absorbent for results.
- In carrier boil method goods must be dye 90 to 120 minutes at boil and thought after is essential.
- Thought soaping with non-ionic and sodium carbonate at for 60-90 minutes is essential.
- If the problem is related to fibre degradation them no more process are recommended except binding of these defects whit resin finish, silicone finish or any suitable finishing agents.

3. SHADE PROBLEMS IN DISPERSE DYEING

In disperse dyeing shade problem is a major fault. Up to 90ºC-95ºC temperature shade remains invisible while at shade gets its original form. At this stage to mould the shade in desired is not easy so shade matching is a problem.

Therefore following shade problems occurred:

- Shade off, tone change etc.
- Shade. Uneven, no solidity, light –deep etc.
- Whiteness in shade, oxidation type patch.

- Colour patch ring formation air –bubble.
- Shade dullness etc.

Following Points May Be Responsible For Shade Problems

- Due to addition of carrier in excess quantity or its addition below optimum temperature or its addition without pre-dilution and filter .Carrier used to evaporate and deposit on the outer surface of the fabric during dyeing white accelerate such defects. Excess quantity of carrier yields duller shade.
- Thought we dye in light to dark direction but sometimes light-medium shades are after dark shade. In the case shade problems.
- Formulation of dyes should not be of different classes which create this fault.
- Lack of leveling agent or weak in its strength may cause shade unevenness problem.
- Colour addition in installments and at different temperature may cause colour –patch dagi
- Colour spot may be a reason of undesired quality of silicone defoamer
- Colour spot are observed during entanglement of fabric in jet point.
- Colour spots may be due to grey spotting.
- Shade off is observed whit false combination of dyes.
- Undesired pH value of dye bath may yields light and deep shades.
- Temperature is a main factor to get shade –defects. Uneven temperature raise sudden power fail yield of temperature per minutes not desired.
- When different colour fabrics are dyed in darker shade then shade of each piece will be different.
- While reprocessing the fabric original shade get change.

- Shade problem may be result of yarn fault i. e. different company's yarn in one lot or in different lot. Count yarn used in same piece then tow –three shades observed.
- Due to rise per minutes in starting of dyeing specially at 90ºC dyes rush vary fast and shade problems.
- Operational mechanical and electrical faults may be responsible for shade problem.

Remedial measures

To overcome on above problem, though it is confirm that shade off is a result or yarn. It is due yarn fault then no is possible while in case of either method can implement.

* Partial leveling of the shade with carrier boil and redyeing with 10% colour.

* Major stripping of dyed ground with sodium chlorite and redyeing with 25% colour desired.

* To convert the shade in any possible shade.

* In this case a new shade can be introduced in market without any reprocessing.

4. PUCKERING DEFECT

To be produce unlevel surface of the fabric is termed puckering fault. It is not a regular problem of fabric. Few common reasons of these defects are.

- In acrylic blend fabric (TVA/TCA) where all three fibre have different shrinkage properly. At the time of heat set or high pressure dyeing this shrinkage occur maximum. Secondly due to use of maximum acrylic fibre in may this defect.
- While heat setting the acrylic blend fabric at higher temperature this problem may occur.
- If batching is over tight and producing warp wise streaks during batching it may puckering defects under HP/HT dyeing.
- This defect may be a result of woven tension. When over tension is applied in weaving shad or change of weaving tension time to this defect.
- Yarn fault is source of this defect. When different count twist fancy yarns are used in one fabric then chances of this problem accelerate due to nature of each. Specially that cases

when left-over stock is convert to make a fabric then such fabric has different defected one of them is puckering

- Sometimes fancy yarn. Dobby weave, jacquard weave and fancy designing, patterning may create this defect.

Remedial measures

It is a permanent defect which is not possible to remove Thought strong soaping mangle drying, resin finish and decatising can yield temporary relief sale. Silk calendar can be used as temporary process to make it in even surface.

5. MOIRE (Weavyness)

Moire is a defect of blended fabric. Formation of continuous patches look without colour patch on the dyed fabric is termed moiré. To be produce weavyness look is called weave defect (moiré) too

Over twisted yarn in blended fabric , maximum patterning with dyed yarn tension variation during weaving, of different count and twist uneven heat setting conditions bowing feeding during heat set bowing feeding during batching for HT/HP and residual traces of alkali may be reason of moiré defects. One more thing that residual oil content of yarn can yield moiré defect. Generally it is a defect of beam dyeing operation while in jet dyeing machine this defect has totally finished. Sometimes invisible water mark looks like moiré defects.

Remedial measures

It should be confirm first that moiré defect is in polyester portion or in cotton /viscose part. So that treatment could be given accordingly. If moiré defect is vat dyeing then first strip the dyes in one or two attempting is employed before re-dye the fabric. Only can be use depending on defect prominence. If moiré is in polyester part (confirm it by carbonize a piece of one mater in full width) then following treatments are suggested

- Rebatch the goods for carrier boil and partial dyeing is employed.
- One method is to strip the dye and then caustic boil at jigger . Again load the material for disperse in jet dyeing.

6. ABRASION

It means reflection of (base ground) dyed shade after abrading the cotton /viscose fibre. Therefore it is said that both portion must be dye matched to each other to overcome on problem. It is a fault of cross dyeing style which yield coloure –patch type defect in made ups. Whenever polyester part is darker compared to viscose part in dyeing, or viscose dyeing is darker then polyester dyeing such defects obtained. In case of absolute cross dyeing method (Blue on Yellow, Coffee on Red etc.) chances of abrasion fastness remains in higher side. Degradation of viscose fibre OR to be weak in strength may be a reason of poor abrasion fastness. When off shades. Uneven shade of polyester dyeing are covered with vat dyes then chances of poor abrasion fastness but it is not poor abrasion fastness defects. Corse count, thick yarn. Less twist are main sources of poor abrasion fastness problems. Sometime cross-look seems due lack of reducing agent (sodium hydro sulphite) but it is not source of poor abrasion fastness.

Remedial measures

Polyester and viscose fibre must be dyed in same depth and tone in colour –value to avoid cross dyeing. It polyester part is light. It should be matched by redyein g the individual warp ends and weft ends can be check to find out the. Subjective material can be pad in soap solution for overning to remove the residual shrinkage.

7. PILLING

To collect a bunch of small loose fibre (in shape of hundreds of small ball) on surface of fabric is called pilling defect. Residual hairiness is responsible to generate pilling. These small balls affect the luster, shinning and soft handle of the fabric.

Few responsible sources of pilling are as under

Pilling is a final shape of collected loose fibre nape etc. So poor singeing seems a base of pilling. Immature flame, maximum speed of singing process, more gap between flame and fabric, uneven length of flame, weavyness of flame disturbances time to time are sources of poor and improper singeing. Excellent heat setting means low tendency to pilling whenever improper heat setting is employed it may affect the pilling factor.

Nature of yarn is another prominent factor to generate pilling fault. Such as sluby yarn, fancy yarn fancy yarn, less twisted yarn short length fibry yarn (woolen yarn silk yarn) may create polling problems.

Fibre abrasion may be a source of loose fibre which yields pilling.

Remedial measures

Re-singe the fabric with fair combination of flame colour, flame height flame maturity, distance with fabric, turn of singeing nature of fabric working the dampness of fabric and setting of guide rollers.

After Re-singe the fabric it is tested it is tested on pilling testing machine where fabric use to rub with cork sheet box up to 18 times. If no naps loose are there then ok. Otherwise fabric is once again. If texturized materials have stiff feel then such fabric is washed dyed first before singeing to avoid harshness stiffness of the fabric. Few special verities of synthetic fabric which used for printing are treated for shearing and cropping to remove the loose fibre naps etc. as anti-pilling precaution.

8. CREASE RECOVERY ANGLY

Object of crease recovery angle is to get resistance to wrinkle as well as to form a desired angle of crease for use. This object is fulfilled by the material. Undesired angle like is not preferred. It is desired in either side (warp wise or weft wise) depending on structure of fabric. One reason of undesired C.R. angle is improper heat setting. This yields shrinkage and wrinkle both to accelerate undesired crease recovery angle.

Fibre blend is responsible for undesired C.R. angle such as 15:85 blend in suiting , 100% viscose in weft, 100% polyester filament used in weft and 100% texturized suiting, shirting etc. Excess use of acrylic, wool fibre in blending yields undesired crease recovery angle. Yarn properties also play an important role in crease recovery angle such as H.T yarn, filament yarn and sluby yarn etc. Unfair finishing agents formulation compared to exact requirement of the fibre, time to time change of mangle pressure during finishing operation to get desired feel. It disturbs the C.R. angle. Improper bonding of resin, finish may cause defective crease recovery angle.

Remedial measures

Before remedial measure we must aware about its reason of unliking and operational errors. While analysis of C.R. angle no negligence is required such as stripe pressing time, recovery time, pressing weight, atmospheric condition, no loose air fan on, window close, sharp cutting the specimen of warp and weft side, minimum five specimen testing of each side and handling problem during measure the angle on monitor etc. Heat setting should be properly implemented to get desired C.R. angle. Fabric structure and blend should be adjusted while getting the test. While finishing the fabric mangle pressure should not be disturb time to time to finish. It creates trouble in getting fair C.R. angle.

Formulation of finishing ingredients must be excellent as par requirement of the fabric. Silicone and softener finish yields lower C.R. angle while finish KVS yield excellent. Desired crease recovery angle. All crease recovery angle problems are rectified by refinishing the material except yarn and blend maxing .cases.

9. LOOSE FINISH

Finish which has no body, no stiffness, no anti-crease resistance no texture etc. is called loose finish. Loose finish may be of result of over style working at chemical coating zone. Finishing agents may be precipitate insoluble and settle down in bottom which loose finish. In case of degradation of viscose/cotton finish may be harsh and loose both. In material has processed several time and refinish is required then finishing variation may occur.

Remedial measures

Examine fabric weight/unit area, type of weave type of blend of blend reed and pick count of the yarn percentage of shade and finishing standard to avoid loose finish etc. Fair formulation of finishing agents required to overcome on the defect. It should be balance with softener, polycot, stiffener , silicone, pH controlling agent.

Mechanical process like Blow, Decatising, Sanforising must be control to overcome on this problem. Operation fault such as finish at low temperature, excess mangle pressure, faster speed etc. should be control accordingly. Resin finish remove the problem of loose finish to

attain desired body. Loose finish goods can successfully refinish with resin finish, Appertain EMC, polycot, AMH along with soft and silicone emulsion.

10. STIFF FINISH

With mangle pressure is used below optimum level under less pressure then stiff finish problem arise. Due to excess quantity of stiffeners such as apprentan EMC, MB, AMH, polycot arcytex etc. This problem may be due to use no softeners or less softness alongwith stiffening agents. Stiff finish may be a reason of quality orientation. In gaverdine, crepe, twill, matte and cord weave fabric this problem may occur. In acrylic blend dobby weave, jacquard weave fabric stiffness may occur. Heating problem may yield this defect too. While singeing the filament fabric heat setting of stiff finish problem may occur. Sometimes excess concentrations of chemicals produce stiff finish. Thickness of the fabric plays an important role to accelerate hare finish. Stiff finish may be a result of negligence, operational fault etc.

Remedial measures

If hard finish is no stiffer and slightly change is needed pass the material on stenter through water. If little more softness is required then goods with cationic softener (Nopcoter CP. Nopcoter A Ceranine HC 39 Or Kata softener). To get slightly change in finish wetting agent Hyonic PE or Nopco 1565 can be used at mangle bath to pass the fabric. A lone silicone finish may be used to attain softer touch. If resin finish is there and no softener washing soaping seems beneficial then strip-out the finish first then refinish the fabric with suitable softening agents.

11. HARSH FINISH

In means undesired feel of the fabric due to papery feel harshness feel, oily leathery feel sand feel and moist feel etc.So following reasons are responsible for these faults:

It may be due to nature of fabric such as hairy yarn fabric over twisted (HT) fabric , crepe twill fabric or cord weave fabric, filament oriented fabric after heat set at high temperature and feel of the fabric etc. Lurace oriented fabric yields harsh finish. Residual oil content of the fabric accelerate oily etc. If fire degradation is there then harsh finish is a common factor. Few special fibre create harsh feel under temperature such as wool acrylic and nylon. Overheating always produce harsh finish. When dry heat is used (in polymersation) for curing and bonding

purpose then fabric harshness accelerate . So over heating should be eliminated at heat-set, dyeing, drying, polymerizing, finishing and sanforizing .

Fabric harshness may be due to basic nature of the finishing ingredients. Resin KVS, Urea formaldehyde, starch solution and unfair combination of chemicals finish. In acrylic blend goods residual due to thermo nature of the fibre. So, higher temperature is avoided to get harsh free fabric.

Remedial measures

Strict control on high temperature processing, proper singeing fair combination of flame whit polymerization nature of fabric, optimum heat set drying and proper sanforizing is essential to get-rid of above problem.

If harshness is due to hair surface then singe the fabric. Harshness can be remove by using cationic softeners, Silicone emulsion, polythene emulsion, AMH and acrytex chemical during finish. Anionic and reactive softener yield excellent and thought these produce slightly costly in nature. Harshness of fabric can improve by mechanical process such as Dectising , Sanforzsing, Blow, Felt and silk Calender etc..

CONCLUSION

It was shown that dyeing as a process contains a considerable number of variables, and errors in any or all of them can produce dyeings which are not acceptable, with the result that expensive shading has to be used. Many faults that can arise in earlier stages of processing become clearly visible for the first time after dyeing and it is necessary for the dyer to learn to recognize their symptoms. Some of the common dyeing problems include dye spots, migration, uneven dyeing, staining, and shading, off shade colors, poor hand and poor fastness.

The dyeing strategy depends on the quality of the dyed material as judged by fastness properties. Dyeing and physical properties can be improved with a decrease in overall costs together with ecological advantages. The textile industry, especially the dyeing and finishing sector, needs to adopt a more critical attitude by solving dyeing problems in order to establish the most logical methods of improving human performance.

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