Quality Control in Garment Manufacturing

- Areas to control quality in RMG factory
  - A. Yarn Test in Composite Factory
  - B. Sample Section
  - C. Cutting Section

    C (a) Printing and

    C (b) Embroidery Section
  - D. Accessories
  - E. Sewing Section

    E (a) Washing
  - F. Finishing Section
  - G. Final Inspection of Garments

A. Yarn Test in Composite Factory

Yarn is tested to evaluate the presence of

- **a. dead fiber,**
- **b. contamination,**
- **c. patta,**
- **d. thick-thin place**
- **e. neps,**
- **f. slubs and**
- **g. hairiness**

A. Yarn Test in Composite Factory

- Process:
  - After receiving the yarn, factory knit/weave sample yardage
  - Sample fabric is dyed in light coloured and dark coloured shade
  - There are some yarn defects that are visible only in light colour and some are dark colour
  - Defects are assessed with standards and decision is taken regarding further use of the yarn.

B. Sample Section : Comments of Buyer on Sample

- Sample making is one of the main processes in garment manufacturing that plays vital role in attracting buyers and confirming the order
  - Problems found in sample garments are usually
    - Wrong Measurement
    - Wrong Shaped Garment Parts
    - Wrong Stitching
    - Spot
    - Rough Hand Feel
    - Wrong Accessories

B. Sample Section

Problems found in sample garments are usually

- Wrong Placket Size
- Wrong Collar
- Wrong Fabric/GSM

B. Sample Section

Sample Garments Fail: Causes and Remedies

- Wrong Measurement
  - Measurement refers to the numerical data which is measured in different dimensions of a garment

Causes	Remedies
Less skill of the sample pattern maker	Have to improve the skill of pattern maker
Less skill of the sample cutting man	Have to improve the skill of sample cutting man
Less skill of the sample sewing person	Have to improve the skill of sample sewing person
Less skill of the sample man to understand the Measurement Sheet	Have to improve the skill of the sample man to understand the Measurement Sheet.

B. Sample Section

Sample Garments Fail: Causes and Remedies

- Wrong Shaped garments Parts
  - Garment Part Shape refers to the shape of different parts of a garment which is made by the help of pattern

Causes	Remedies
Less skill of the sample pattern maker	Have to improve the skill of pattern maker
Less skill of the sample sewing person	Have to improve the skill of sample sewing person
Not using modern sewing machine	Use State of the art sewing machine

B. Sample Section

Sample Garments Fail: Causes and Remedies

- Wrong Stitching
  - Wrong stitching is done on the sample garment

Causes	Remedies
Less skill of the sample sewing person	Have to improve the skill of sample sewing person
Use of wrong size sewing thread	Good type of sewing thread should be used..
Sewing machine handled poorly	Sewing machine should be handled properly

B. Sample Section

Sample Garments Fail: Causes and Remedies

- Print Spot
  - Print Spot is a kind of problem which refers to have spot on print mark.

Causes	Remedies
Less skill of the sample printing person	Have to improve the skill of sample printing person
Inaccurate Art Work	Dyes & Chemicals should be prepared properly.
Inaccurate design	Art Work should be proper
	Design should be accurate.

B. Sample Section

Sample Garments Fail: Causes and Remedies

- Rough Hand feel
  - It is a kind of property by which softness, smoothness and comfortiability of a garment can be assumed.

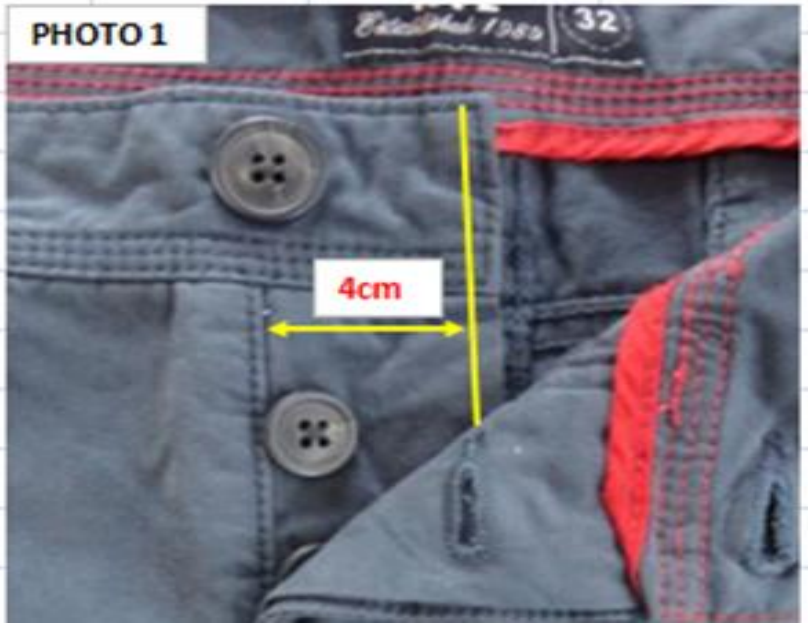
Causes	Remedies
Poor finishing	Finishing should be good.
Poor wash technique	Wash technique should be very good
Poor quality raw material usage.	Should be used good quality of raw material.

B. Sample Section
Sample Garments Fail: Photo

- Rough Hand feel

FITTING & TECHNOLOGIST REQUEST :

1) Ths Shell fabric , Label and accessorie need separate send for approval.
2) Waistband feel softer , Need to use thicker interlining inside to improve.
3) CF fly stitching and inside shell patch width need follow as PHOTO 1 to make smaller .
4) Pay attention : Sizeset sample the Waist circ (B) is too big , But Hips circ (C) is feel small.So need find the way to make the Waist circ smaller and Hips circ bigger.Other measurements need follow as revised size spec to adjust your Paper pattern.



B. Sample Section

Sample Garments Fail: Causes and Remedies

- Accessories Problem
  - Defective and wrong accessories may be used in the sample

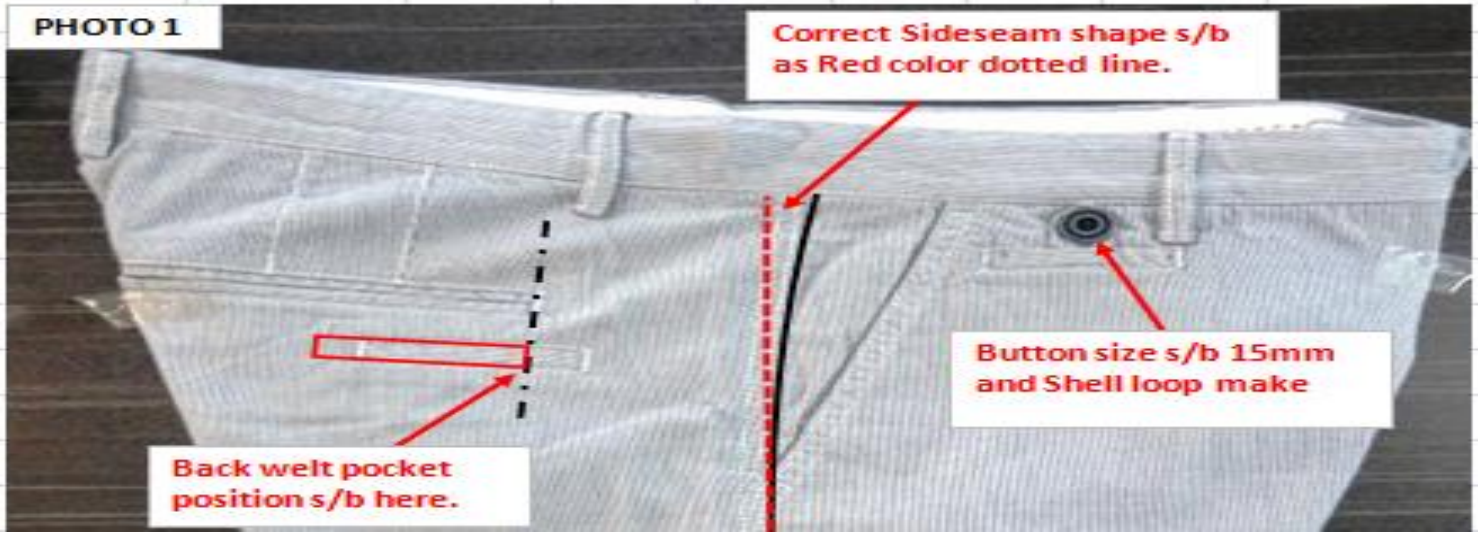
Causes	Remedies
Usage of defective accessories	Use quality accessories
Usage of wrong accessories	Use appropriate accessories

B. Sample Section
Sample Garments Fail: Photo

- Accessories Problem

FITTING & TECHNOLOGIST REQUEST :

1) Ths Shell fabric , Label and accessorie need separate send for approval.
2) Back smaller Welt pocket position still not follow as Counter comment to move , see PHOTO 1.
3) Front Coin pocket button size s/b in 15mm, sample is 18mm too big,
   And the shell loop in 0.7cm too wider, Need make smaller to 0.5cm.
4) Sample measurements not good, Waist circ (B) is too big , But Hips circ (C) and
   Crotch point circ (M) is too small. And Sideseam shape very bad ,see PHOTO 1, Cannot accepted.



C. Cutting Section

- Quality control of cutting section mainly divided into four parts. Those are:
  a. Marker Inspection
  b. Spreading Control
  c. Cutting Quality control
  d. Piece Goods Inspection

C. Cutting Section

a. Marker Inspection

- Marker Length
- Marker width
- Lay quantity
- Style/Lot
- Ratio
- The measure of all individual parts marked in marker

C. Cutting Section

b. Spreading Control

- Cut numbers
- Ends
- Alignment
- Tension
- Counts
- Ply Height
- Fabric Fault

C. Cutting Section

c. Cutting Quality Control

- Number of parts
- Miss cut
- Ragged cutting
- Notches
- Matching plies

C. Cutting Section

d. Piece Goods Inspection

- 100 % Cut panel is numbered and inspected to sort the defective ones.
  - **All the defects that are found in the grey and finished fabric is usually found in this inspection. Besides those defects, following defect may be found in the cut panels**
    - **Wrong Numbering**

C (a) Printing

- Defects that are usually found in printing are
  - Crease mark
  - Flushing/Wicking
  - Stick-ins
  - Color out
  - Slanted printing
  - Misplaced print
  - Print stain
  - Uneven shade
  - White spots

Defects in Printing

Crease Mark

Description

- Crease marks appear where creases are caused by fabric fold during printing.

Photo

Defects in Printing

Flushing/Wicking

Description

- when the printed area bleeds out into the unprinted area

Defects in Printing

Stick-ins:

Description

- A stick-in occurs when a small fiber or piece of lint gets stuck in the screen opening
- The result is a small unprinted circle in the design.

Defects in Printing

Color out:

Description

- While printing, if the color paste runs low in the reservoir resulting in blank skips in the print pattern it is called as Color out

Defects in Printing

Slanted Print:

Description

- If the print on the garment parts is bend in any direction is called slanted print

Defects in Printing

Misplaced print:

Description

- If the print is not placed on the desired area is called misplaced print

Defects in Printing

Print stain:

Description

- If print paste scattered in the areas that are not to be printed

Defects in Printing

Uneven Shade:

Description

- Differences in the shade of the print area is known as uneven print of shade.

Defects in Printing

White spots:

Description

- If any dust/dirt remain in the printing area may prevent penetration of print paste into the fabric known as white spots.

Photo

C (b) Embroidery Section

- Defects that are usually found in Embroidery are
  - **Poor Registration**
  - **Fabric Grin Through or Gapping**
  - **Missed Trim**
  - **Bunching at Corners**
  - **Poor Stitch Balance**
  - **Fabric Damage – Needle Holes**
  - **Embroidery Too Thick**
  - **Poor Coverage – Poor Stitch Density**
  - **Poor Hooping**

Defects in Embroidery Section

Poor Registration

Description

Where the stitches and design elements do not line up correctly. The embroidery sewing process sews different colors at different times. If the fabric shifts while one color is being sewn, then poor registration will occur when the next color is sewn.

Sometimes it is difficult to tell the difference between poor registration, poor digitizing, and fabric “grin-through” or “gapping” due to thread “pull”

Photo

Defects in Embroidery Section

Fabric Grin Through or Gapping

Description

Where the fabric is seen through the embroidery design either in the middle of the pattern or on the edge

Photo

Defects in Embroidery Section

Untrimmed Embroidery

Description

Where threads are left on the embroidery pattern between images or lettering.

Photo

Defects in Embroidery Section

Bunching at Corners

Description

Where the corners of lettering or shapes are not sharp and crisp but are bunched up or distorted. Usually caused by too much thread in the corners due to poor digitizing

Photo

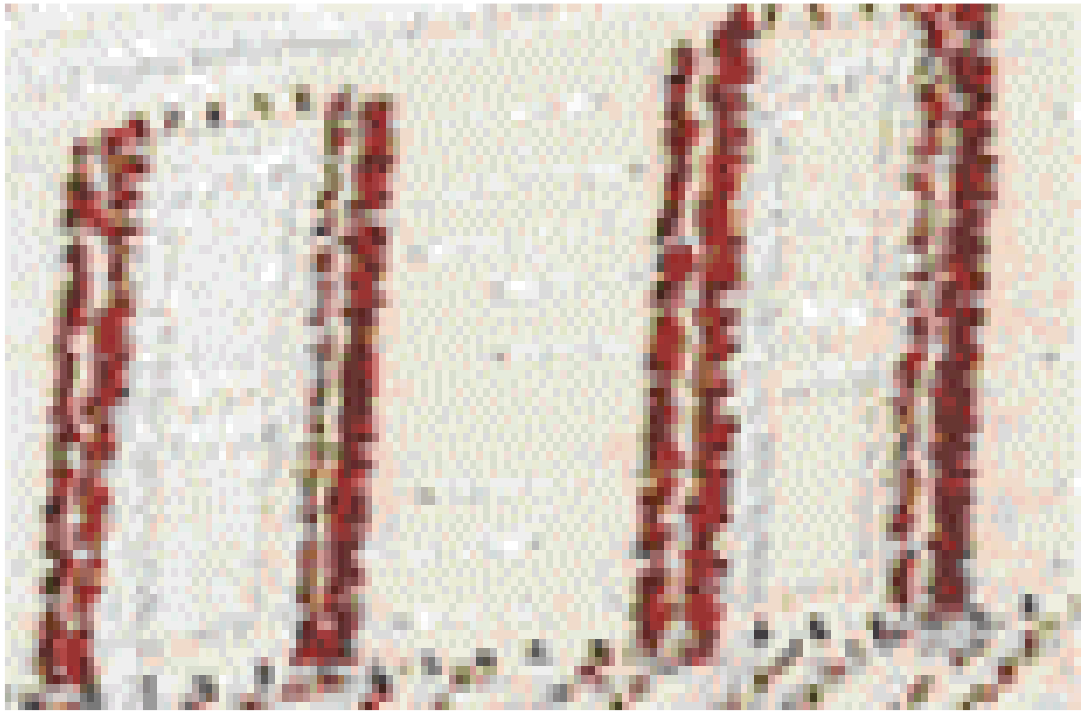
Defects in Embroidery Section

Fabric Damage – Needle Holes

Description

Where the fabric is damaged around the corners of the embroidery.

Photo



Defects in Embroidery Section

Embroidery Too Thick

Description

Where the embroidery is too thick and uncomfortable.

Photo

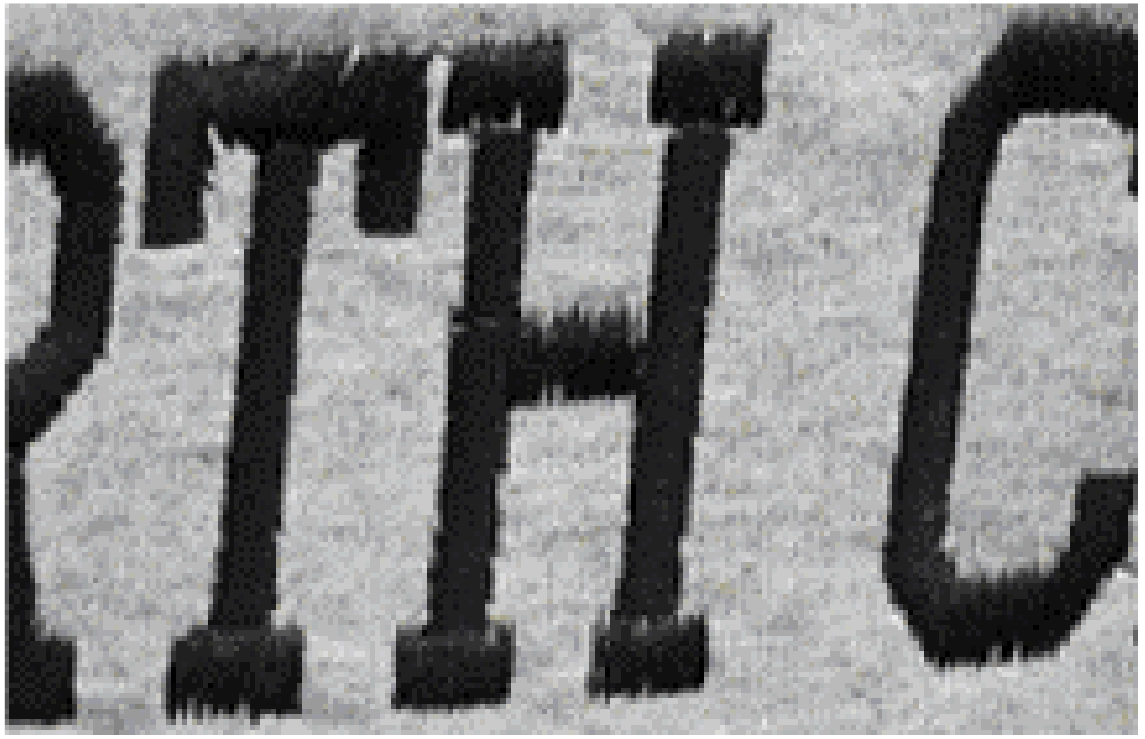
Defects in Embroidery Section

Poor Stitch Density

Description

- Where the stitch density is not thick enough and one can see the fabric through the embroidery stitching

Photo



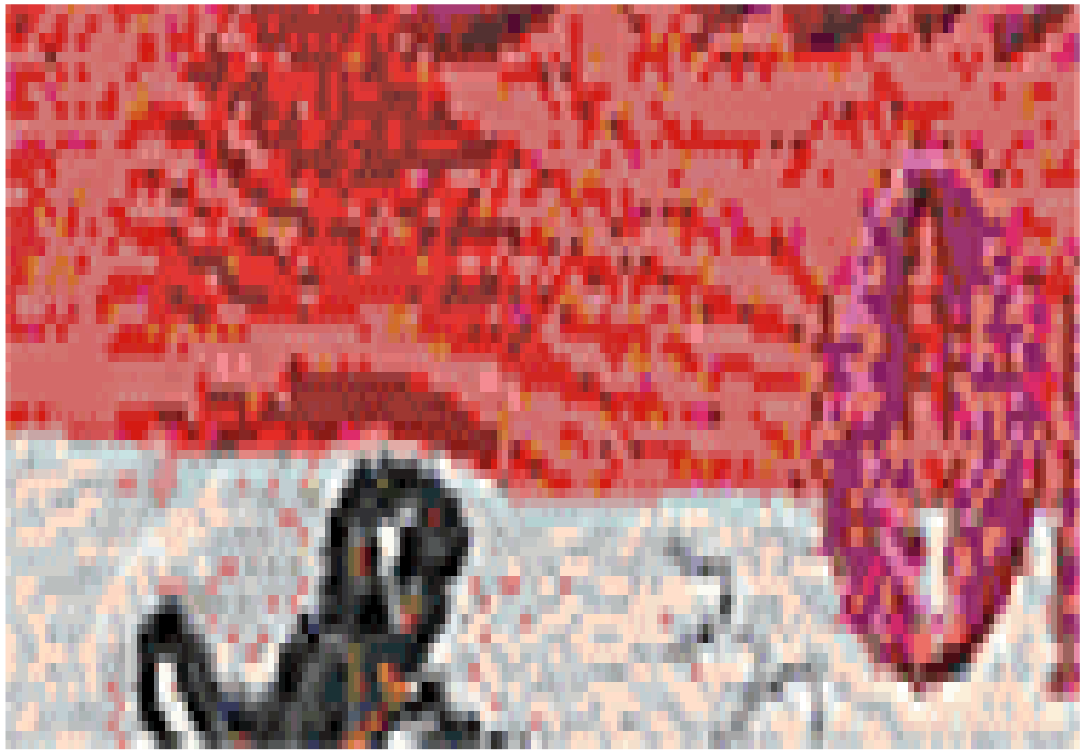
Defects in Embroidery Section

Poor Hooping

Description

- Where the fabric around the embroidery looks distorted and does not lay flat.

Photo



D. Accessories

- Important Rules for Accessories Inspection
  - Both Quality and Quantity should be inspected
  - 10% accessories should be inspected, if any discrepancy is found, 100% accessories will be inspected
  - If any critical defects found, lot will be rejected
  - Hang tags and labels having barcodes printed on them must be checked properly by scanner
  - All trims have to be checked using buyer approved light source: D65, TL84, UV, CWF, FA, and UL3500.
  - After completing Brand labels inspection, its must keep in confirm area with lock and key. Key must be handle store in charge only

Button

- Checking criteria of a button are
  - Size (Ligne)
  - Color
  - Shade variation
  - Broken/Cracked
  - Holes
  - Thickness
  - Logo Position
  - Missing logo
  - Eveness

Zipper

- Checking areas of a zipper are
  - Does slider/runner slides smoothly
  - Sharp teeth
  - Stopper missing
  - Loose stopper/teeth
  - Zipper tape color
  - Zipper tape faulty
  - Wrong type of zipper
  - Wrong material

Label

- Checking areas of a Label are
  - Color
  - Shade Variation
  - Shade
  - Selvedge
  - Length and width
  - Letter missing
  - Illegible letter
  - Word / Space error

Label (Cont…..)

- Spelling mistake
- Wrong barcode
- Excess lettering alphabet
- Care symbol missing
- Wrong care symbol
- Printing blur / unclear/less distinct

E. Quality Control in sewing Section

- Types of Inspection
  - 1. Pre-Production Check **(PPC)**
  - 2. Initial Production Check **(IPC)**
  - 3. During Production Check **(Du-PRO)**
  - 4. Final Random Inspection **(FRI)**

Types of Inspection

- **1. Pre-Production Check(PPC):**
  - This is done before production starts, Where the final verification of the raw material is done;
    - Style, cut and workmanship of the garment or pre-production sample as per the customer requirements
    - All types of accessories are checked – both quality and quantity

Types of Inspection

- **2. Initial Production Check(IPC):**
  - This is done at the start of production where a first batch (test production) of garments is inspected;
    - To distinguish possible discrepancies/variation and to allow for the necessary corrections to be made for bulk production.
    - The inspection in preliminary stage covering mainly style and general appearance, workmanship, measurements, quality of fabrics, components, weight, color and/or printing.

Types of Inspection

- **3. During Production Check(Du-Pro):**
  - This inspection is in fact the follow -up of the initial production check and is generally carried out a few days after the initial inspection;
    - This inspection is carried out to be ensured that the garments are producing correctly
    - To identify any changes of the production from the initial production

Types of Inspection

- **4. Final Random Inspection(FRI):**
  - This is carried out when the production of the total quantity of an order or partial delivery is completed;
    - The AQL sampling inspection may be applied or another inspection system designed by the buyer
    - The number of checked garments are determined by AQL chart which are randomly but proportionately selected

Organization for Inspection and Lab Test

- Usually garments final inspection process and lab test is done by buyers or third party authority. Some third party authority's name are:
- SGS
- TUV
- ITS
- REWE
- ATI
- AHL
- SEGNET

E. Sewn Garments Inspection

- Sewing is the major operation in garments. This operation is responsible for following defects:
  - Open Seam
  - Broken Stitch
  - Un even Stitch
  - Join Stitch
  - Pleat
  - Label Displacement
  - Wrong Label
  - Joint Stitch
  - Needle Mark
  - Part shading

E. Sewn Garments Inspection (Cont)

- Size mistake
- Dirty spot
- Oil mark
- Uncut thread
- Print mistake
- Twisting

E. Sewing Defects: Causes and Remedies

- **Open Seam**
  - Some times stitch are out of the seam line and the seam are opened

Causes	Remedies
Incorrect needle to thread size relationship	Synchronized needle or thread size
Deflected or blunt needle point	Recommended needle size against specified article.
Needle vibrating or deflecting	Reset pressure foot.
Feed dog moves away	Tighten feed dog
Poor and variable control	Change the needle

E. Sewing Defects: Causes and Remedies

- **Broken Stitch:**
  - When a stitch is broken in a seam line

Causes	Remedies
Thread trapped at the thread guide	Use stronger thread or adjust tension
Thread trapped at the base of cone	Use finer thread or coarser needle
Improper off winding from cone	Re guide the thread property
Sharp edge on throat plate hook point, needle guard, bobbin needle grove or eye	Increase thread guide and reduce disc tension
Excessive needle heat, grove or eye blocked with melted fabric.	Polish rough edges, replace needle use better quality

E. Sewing Defects: Causes and Remedies

- **Skip stitch:**
  - Failure of needle to enter bobbin loop is called skip stitch

Causes	Remedies
Failure of needle to enter loop in correct time	Check needle is inserted and aligned correctly
Needle deflection or blend needle	Synchronized needle and thread size
Thread loop failure due to incorrect needle size or thread size	Use recommended needle numbers against specified articles
Incorrect sewing tension in the needle	Re adjust the thread tension
Incorrect sewing tension in the needle	Re adjust pressure foot pressure

B. Sewing Defects: Causes and Remedies

- Uneven Stitch
  - When stiches do not maintain equal distance throughout the seam line

Causes	Remedies
Lack of care of the operator.	Be careful when operate.
Machine defect.	Regular maintenance of sewing machine.
Improper settings.	Setting should be check.

E. Sewing Defects: Causes and Remedies

- Spot
  - Different types of stain present in the garments

Causes	Remedies
Careless handling.	Operator should carefully when handling.
Unclean production place.	Working place should clean up before production.
Natural dust.	Precaution should be taken to avoid natural dust

E. Sewing Defects: Causes and Remedies

- **Puckering**
  - Uneven gathering of fabric in seam line

Causes	Remedies
High tension thread.	Threads tension have to corrected
Fabric feeding problem.	Fabric feeding system should be controlled
Uneven pulling of back and front part of the garment	Feeding mechanism should be changed.

E. Sewing Defects: Causes and Remedies

- Shade Variation
  - When parts of a garments are different shades

Causes	Remedies
Wrong numbering after cutting	Ensure numbering is perfect
Use different shaded fabric	Try to use same shaded fabric
Cutting different shaded fabric together	Make shade band before cutting

E. Sewing Defects: Causes and Remedies

- Four point Up Down

- If the all joint of the garments in sewing is not uniform

E (a) Washing Defects

CAUSES:

- Sometime for the machine problem.
- Operator negligence.
- Incorrect cut mark.
- Some operator not using guide
- For operators unskilled.

REMEDIES:

- Seam open and sewing again correctly.
- If machine measurement problem, then solve it.
- Operators must be careful.
- Train up sewing operator for stitching incorrect seam.

E(a)Quality Control in Washing section

- Color Shade Variation
  - Within Parts
  - Within Garments
  - Piece to Piece
- Crease Marks
- P.P Spot
- Bleach spot
- Stain
- After Wash Hole
- Damage
- Dark Shade
- Light Shade
- Blue Shade

E(a)Washing faults: Color Shade Variation

Definition

- Garment are made by stitching number of fabric parts together. When shade variation is found in between garment parts, is called shade variation in garments. As mentioned above, garment making factory may receive fabric with varied shades of same color. If precaution is not taken in cutting department and sewing floor, fabric lot can mixed easily and as a result will garment with varied shade in between garment components.
-
- Sometimes there appears to be a difference in the depth of shade between the roll to roll & from place to place in the same roll. The defect will show up clearly in the garments manufactured from such fabric.

Types

Three types of shade variation occurs in washing of garments

- Within parts shade variation
- Within garments shade variation
- Piece to piece shade variation

E(a)Washing faults: Color Shade Variation

Causes

- Shade variation can be as a result of mixing of the, fabrics of two different lots.
- Shade variation is also caused, by the variation in the process parameters i.e. Time, Temperature& Speed etc. from one fabric roll, to the other.
- Shade variation can appear to be, in fabrics with GSM variation, caused due to the uneven stretching, unequal fabric overfeed % etc.

Remedies

- Ensure that the grey fabric used for one shade is knitted/woven from the same lot of the yarn.
- Ensure that the same process parameters (Width, Overfeed, Temperature & Machine Speed etc.) are used for each roll of a dye lot.

E(a)Washing Faults: Crease Mark

Crease marks appear in the woven fabric, as dark haphazard broken or continuous lines.

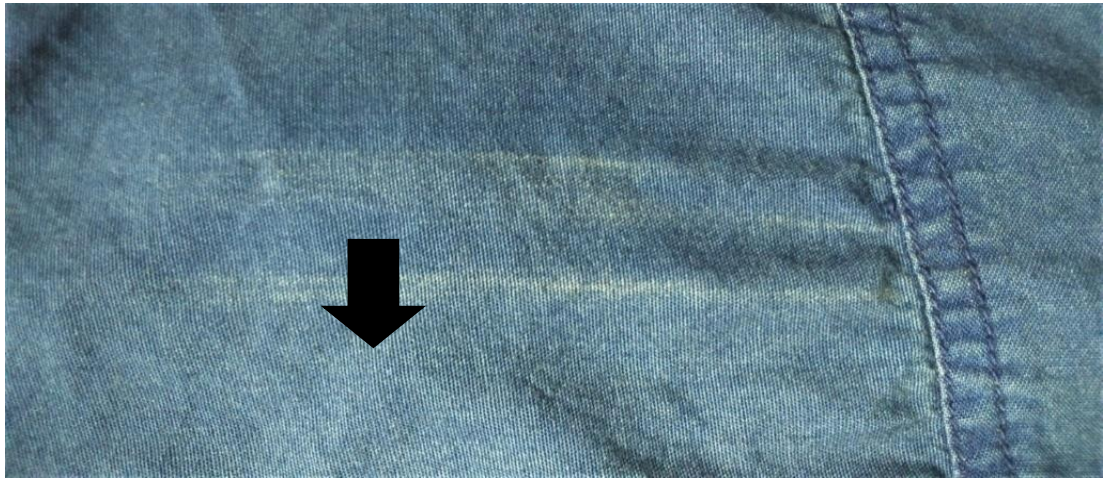
Causes:

- Damp fabric moving at high speed in twisted form, in the Hydro extractor (Centrifuge)
- Over loaded the garments on the washing Machine.

Remedies:

- Use anti-Crease, during the Scouring & the Dyeing process.
- The use of anti-Crease, swells the Cellulose & prevents the formation of Crease mark.
- Spread the fabric in loose & open form & not in the rope form, in the Hydro Extractor.
- Never Over loaded the garments in washings machine.

- Crease Mark



E(a)Washing Faults: PP Spot

- Potassium permanganate spray is done on jeans to take a bright effect on sand blast area. One important thing about potassium permanganate spray is, this is usually a sporting process to increase the effect of sand blast. Potassium permanganate solution is sprayed on blasted area of jeans garment with the help of normal spray gun. Sodium Metabisulphate is most commonly used neutralizer.
- Potassium permanganate sprays concentrations ranges from .25 gm per liter to 15.00 grams per liter depending to required results and fabric types. Usually indigo died fabrics are treated with low concentrations whereas Black Sulfur Fabric requires high concentrations to treat with.

- **Cause:**
- Potassium permanganate sprays concentrations high range.
- Operator skill not good
- After spray keep over the other garments
-
- **Remedies**
- MixPotassium permanganate with water of ordered in low range
- Good Operator Skill
- After spray never keep over the garments

E(a)Washing Faults: Bleach Spot

- Oxygen-based or All-Fabric Bleach works more slowly than chlorine bleach and contains sodium perforate, sodium pre carbonate or hydrogen peroxide. It is safe for use on almost all washable fabrics and colors.
- When this bleach is used in the wash, the chemical ingredient oxidizes to help remove soil and organic matter brightening the fabric and removing stains.
- Bleach aids detergents in the removal of soil and stains. There are two types of bleach: chlorine bleach or sodium hypochlorite and oxygen bleach. Through a process of oxidation, bleach changes the soil into soluble particles to be washed away by detergents in the washing process. Bleach helps to whiten and brighten washable fabrics.

- **Causes:**
- If you use any type of acne or skin bleaching cream or washes, they can cause thediscoloration.
- If any of these ring a bell, you should be able to change your habits and eliminate the Problem.
- Do not use bleach directly.
- **Remedies:**
- Always check for color fastness first, following the instructions on the container, before using either type of bleach.
- Add bleach to washer water, mixing well, before adding clothes.
- Never mix bleach with ammonia which causes caustic fumes.
- Read and follow care instructions and any warnings on the fabric care label regarding the use of bleach.
- Do not use bleach on silk, acetate, wool, spandex, polypropylene foam, some flame retardant fabrics or rubber.
- Repeated use of chlorine bleach can weaken cellulosic or cotton/ramie/linen fibers.

E(a)Washing Faults: Stain

- Different types of stain may added on the washing process and after wash

- **Cause:**
- Dirt in the fabric and after wash seen the mark
- Storage problem.
- Dirt in the yarn.
- **Remedies:**
- Very carefully storages
- Check the garments before wash

E(a)Washing Faults: After Wash Hole

Causes

The top reasons for holes rips and tears in from an automatic washing machine are:

- Overloading
- Poor quality clothing
- Incorrect cycle or program use
- Incorrect detergent use
- If you are using too much chlorine bleach or not allowing the bleach to thoroughly mix with Water before putting in clothes, this will cause holes.
- This not only affects cleaning but also can cause garments to get hooked on zippers, decorations and pulls on other clothing.

Remedies

- Take necessary steps to avoid overloading.
- Check fabric quality very carefully during it can be stored.
- Operating system can be done carefully by skilled full person to avoid this fault.
- Detergent can play a vital role during washing. Excess use of detergent may harms for garments for that wash hole can found after washing. So, limited detergent can be used during washing. Here detergent quality may vary for the garments.

E(a)Causes and Remedies of Washing Faults

- Damage: Damage of washed garments means any part of the garment destroyed due to various reasons. Damage is found mainly in heavy washed garments.

- **Causes:** Amount of chemical and stone is higher, RPM of the machine is higher and cycle program is incorrect, Overloaded quantity in the machine
- **Remedies:** Appropriate amount of chemical, stone should be used; Machine cycle and machine rpm should be accurate, Capacity of the washing machine should be respected.

E(a)Washing Faults: Dark Shade

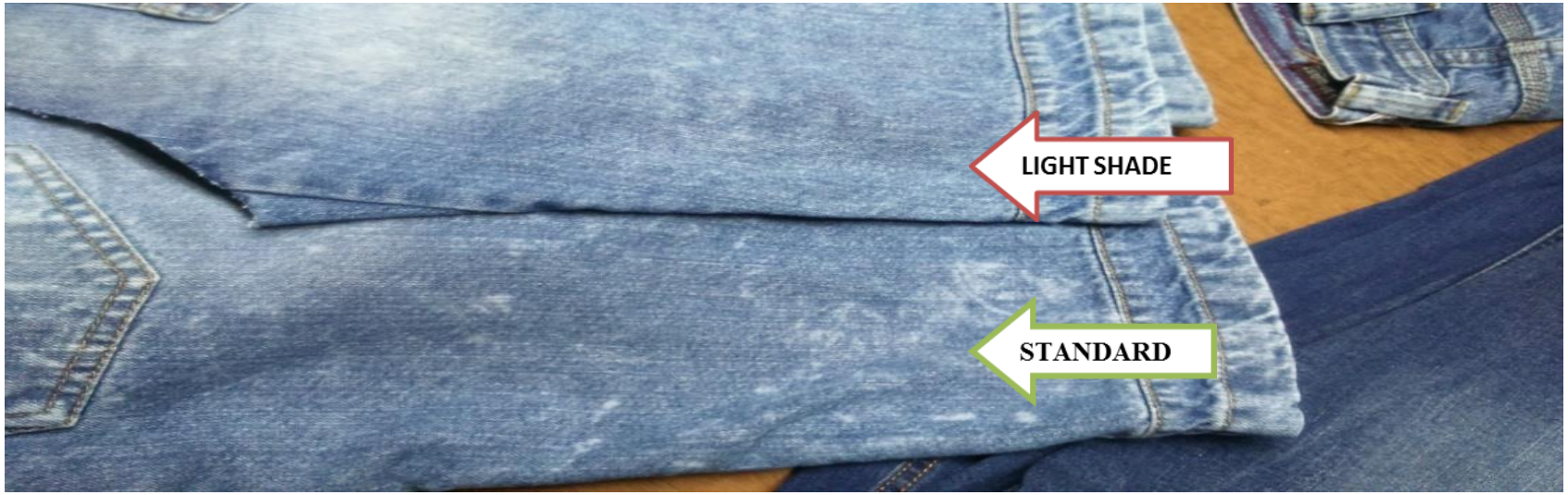
- **Dark Shade:** When garments remain darker then its standard sample then it's called light shade problem

Figure : Dark Shade Problem on Denim Washed Garments.

- **Causes:** If the shade % is less than 1.5% then we consider this as dark shade. It cause if proper enzyme or bleaching process is not done.
- **Remedies:** Enzyme process should do perfectly. And the rate of bleach will slightly increase then before.

E(a)Washing Faults: Light Shade

Light Shade: When garments become more lighter then it's standard sample then it's called light shade problem.



Causes: If the amount of bleach is higher or the timing of bleaching process is longer.
Remedies: On time of bleaching process the garments should check after time to time.

E(a)Washing Faults: Blue shade

Blue Shade: When garments remain or become bluer than standard then this problem is known as blue shade problem.

Blue Shaded Garments

Standard Garments

- **Causes:** If standard mistake or any problem in recipe is occurred.
- **Remedies:** Washing should done as per as standard & should apply the actual recipe.

E(a)Washing Faults: Bleeding on Pocketing

- Bleeding on Pocketing Fabric: When color of garment stained the pocketing fabric is known as ‘pocket bleeding’ or bleeding on pocketing fabric.

- Causes: Less or no use of anti back staining chemical
- Remedies: Proper use of anti back staining chemical

E(a)Causes and Remedies of Washing Faults

- Dry Wash Faults:
  - PP more: If PP Spray is applied more than the standard on garments.

- **Causes:** Using more pp on the garments surface. If the concentration of pp is higher. Inactiveness of worker.

- **Remedies:** PP should spray properly. Concentration should be accurate. Worker should be active on time of spraying.

E(a)Causes and Remedies of Washing Faults

- Dry Wash Faults:
  - PP less: If PP Spray is applied less than the standard on garments.

- **Causes:** Using less pp on the garments surface. If the concentration of pp is lower. Inactiveness of worker.

- **Remedies:** PP should spray properly. Concentration should be accurate. Worker should be active on time of spraying.

Causes & Remedies of PP More (4%)

If PP Spray is done more than the standard GMTS.

Causes: Using more pp on the garments surface. If the concentration of pp is higher. Inactiveness of worker.

Remedies: PP should spray properly. Concentration should be accurate. Worker should be active on time of spraying.

Causes & Remedies of PP Less (6%)

If PP Spray is done more than the standard GMTS.

Causes: Using less pp on the garments surface. If the concentration of pp is lower. Inactiveness of worker.

Remedies: PP should spray properly. Concentration should be accurate. Worker should be active on time of spraying.

F. Finishing Defects

- Defects usually found in finishing section are
  - Broken button
  - Poor Ironing
  - Wrong Hang tag
  - Uncut thread
  - Label Mistake
  - Incorrect shape
  - Wrong Polybag
  - Incorrect packing
  - Incorrect Packaging

PSI: Acceptable Quality Level (AQL)

Definition:

A statistical measurement of the maximum number of defective goods considered acceptable in a particular sample size.

The 3 general inspection levels

- **Level I**
  - Has this supplier passed most previous inspections? Do you feel confident in their products quality? Instead of doing no quality control, buyers can check less samples by opting for a level-I inspection.
  - However, settling on this level by default, in order to spend less time/money on inspections, is very risky. The likelihood of finding quality problems is lower than generally recommended.
- **Level II**
  - It is the most widely used inspection level, to be used by default.

The 3 general inspection levels

- **Level III**
  - If a supplier recently had quality problems, this level is appropriate. More samples are inspected, and a batch of products will (most probably) be rejected if it is below the quality criteria defined by the buyer.
  - Some buyers prefer level-III inspections for high-value products. It can also be interesting for small quantities, where the inspection would take only one day whatever the level chosen.

Defects

- Visual defects are categorized as Critical, Major and Minor depending on the intensity and area of the defects.

Types of defects considered in AQL

- **Critical Defects:** are those that render the product unsafe or hazardous for the end user or that contravene mandatory regulations.

  Example:

Presence of insects, broken needle in the garment, etc.

Types of defects considered in AQL

- **Major defects:** can result in the product's failure, reducing marketability, usability.

  Example:

Broken Stitch, Stain, etc.

Types of defects considered in AQL

- **Minor Defects:** do not affect products marketability or usability but represents workmanship defects that make the product fall short of defined quality standard.

  Example:

Minor stain, Puckering in small scale, etc.

Defect Zone

- Visual defects are categorized as Major, Minor and Critical defects. In some cases, a major defect can be considered as minor based on the location of the defect in a garment. This location is called as zone. Zoning is done for fair evaluation of the garment during visual audit.

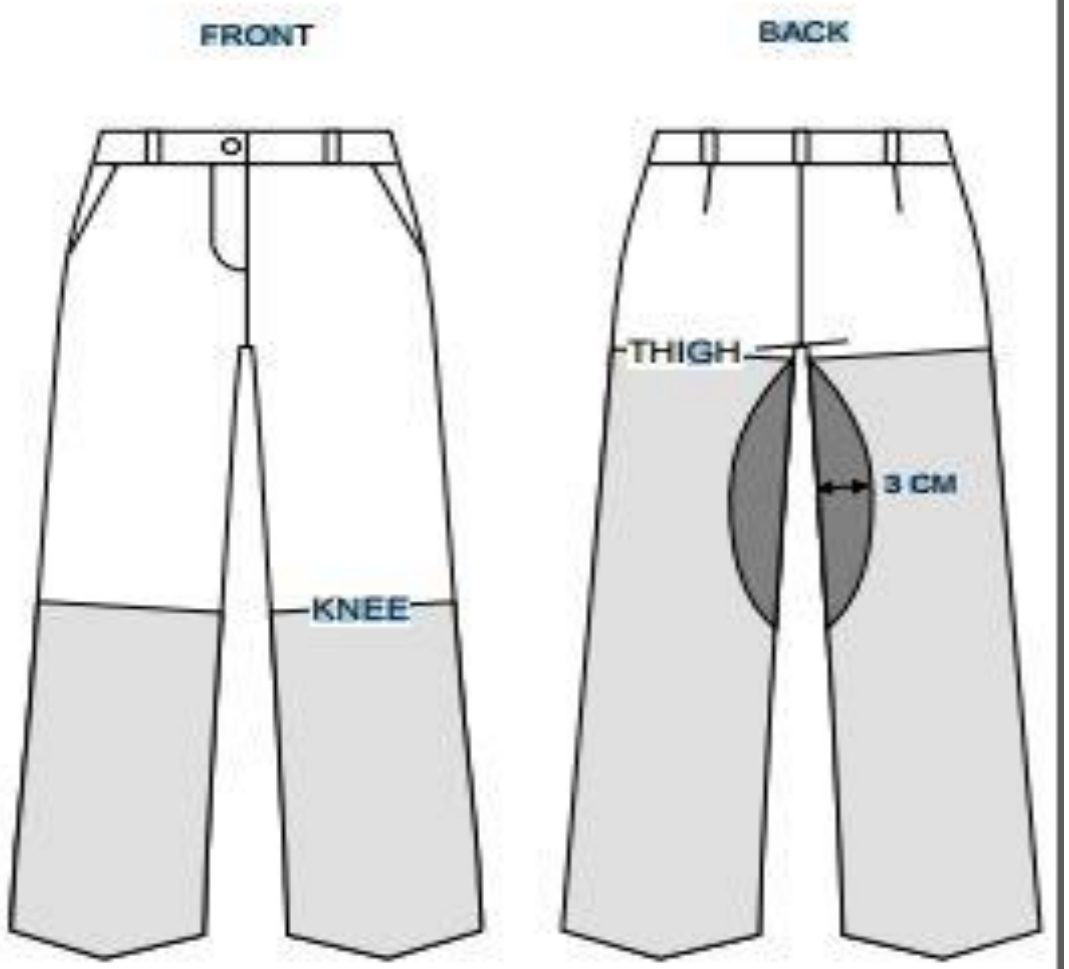
- A garment can be divided up to 3 zones, like A, B and C.

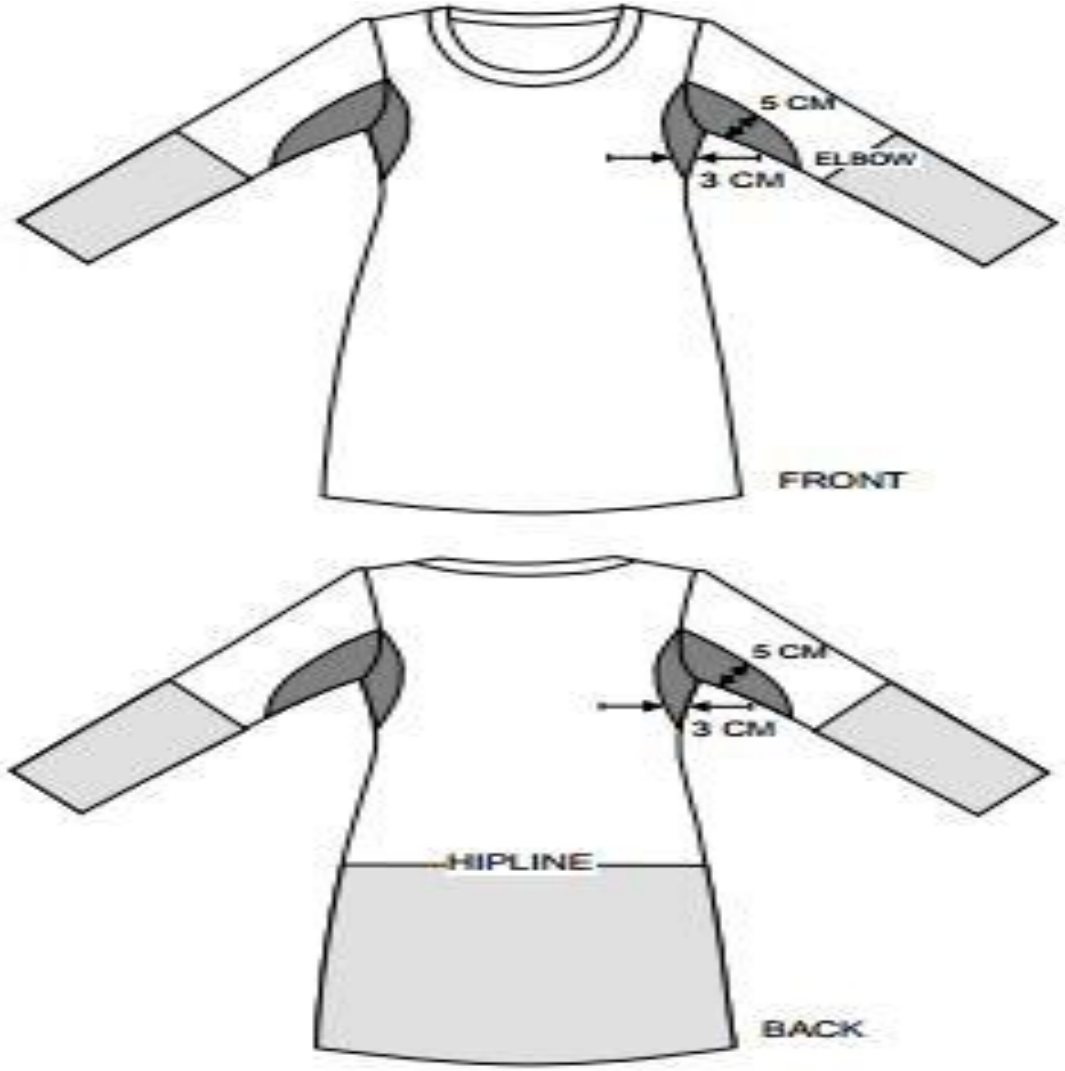
Defect Zone

- Most of the cases apparel buyers provide garment figures with marking zones in their quality manual. And provide a list of defects that fall under major or minor categories. In the following figure (source: Gap Inc.) a knitted top has been shown with zones A and B. At the front sleeves and upper front is considered as zone ‘A’ and lower front considered as zone ‘B’. On the back of the garment, under arms and back bottom is considered as zone ‘B’

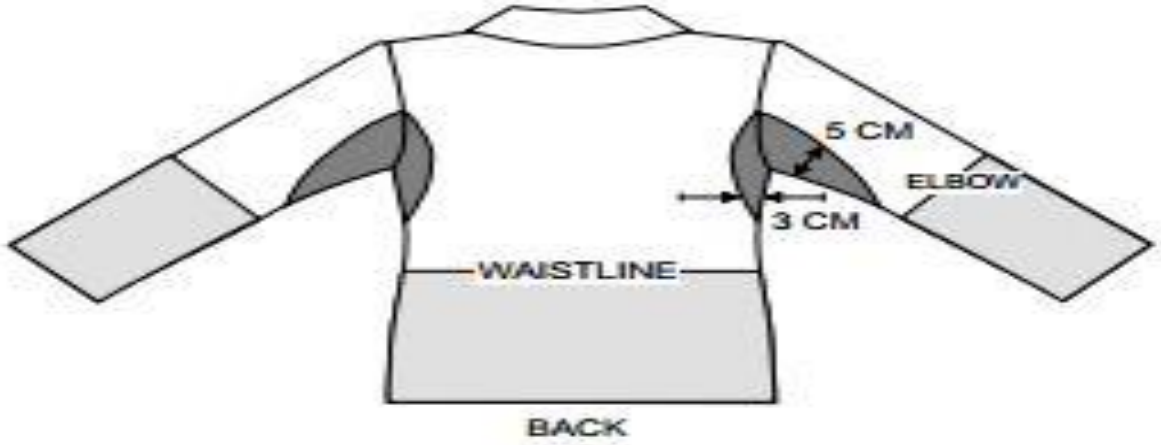
Defect Zone of T-Shirt

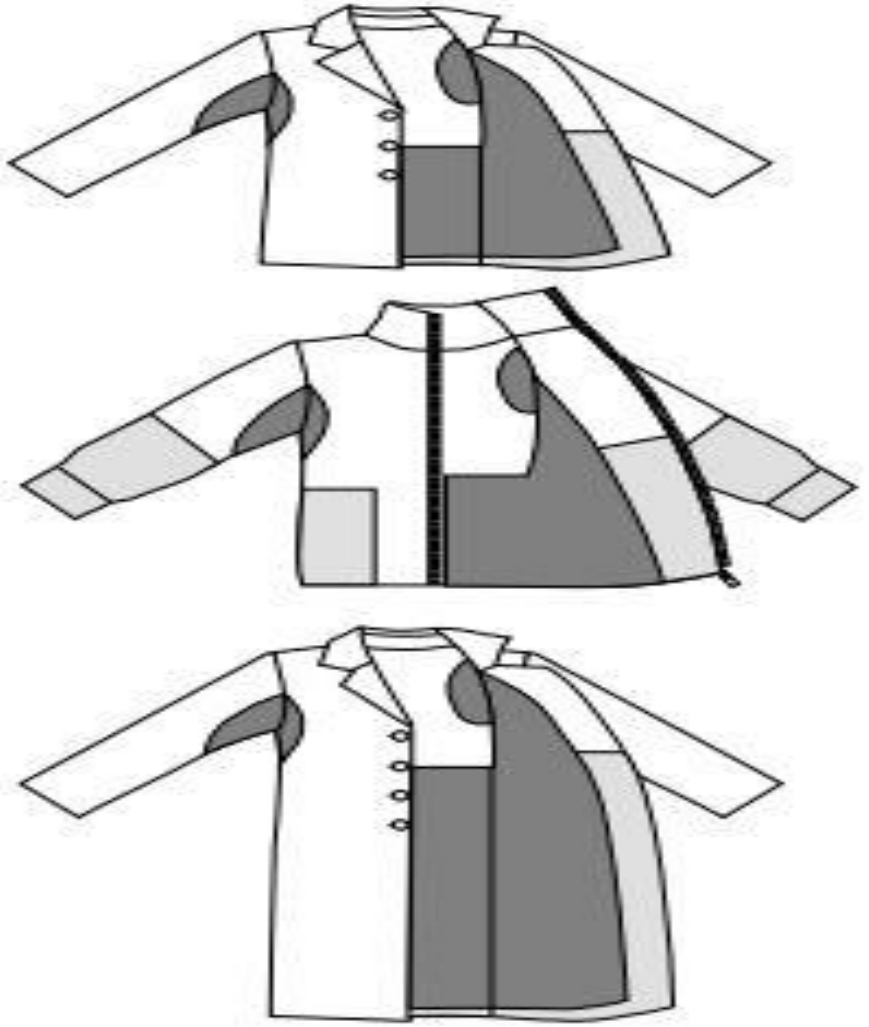
Pants and LS Ladies Dress





Blazer and Coat





AQL Chart

Footwear Industry Standard Final Inspection Sampling Plan (Normal)*								
Lot Size or Quantity Audited	Acceptable Quality Level (AQL) Level							
	1.5		2.5		4		6.5	
	Inspect	Accept	Inspect	Accept	Inspect	Accept	Inspect	Accept
Less than 150	20	1	20	1	20	2	20	3
151 – 280	32	1	32	2	32	3	32	5
281 – 500	50	2	50	3	50	5	50	7
501 – 1,200	80	3	80	5	80	7	80	10
1,201 – 3,200	125	5	125	7	125	10	125	14
3,201 – 10,000	200	7	200	10	200	14	200	21
10,001 – 35,000	315	10	315	14	315	21	315	21
35,001 – 150,000	500	14	500	21	500	21	500	21
150,001 – 500,000	800	21	800	21	800	21	800	21
500,001&Over	1250	21	1250	21	1250	21	1250	21

Checking areas in Inspection

- Material Conformity
- Style Conformity
- Quantity Conformity
- Workmanship (AQL)*
- Measurement
- Shade Conformity
- Packing and Packaging Conformity

Selection of garment and carton

- Buyers instruct about the required AQL
  - Usually Major – 2.5
  - Usually Minor – 4.0
  - Usually Critical – zero tolerance
- Cartons should be randomly selected
- Numbers of carton to be selected = $\sqrt{n}$
- All color and size should have the proportionate representation on the garments to be inspected
- Measurement should cover all color and size that are to be inspected

Selection of Sample

- Calculate the numbers of sample to be selected from different size, if order quantity=12000 pieces, numbers of color=1, Size wise quantity, S= 1500, M= 2500, L=4000, XL=2500 XXL= 1500.
-

List of Defects and their Categories (Fabric)

Sl#	Name of Defects	Critical	Major	Minor
01	Presence of Broken Needle	x		
02	Presence of Insects in the Garments	x		
03	Hole (any Size)		x	
04	Needle Mark (Knitting)		x	x
05	Sinker Mark		x	x
06	Fly		x	x
07	Starting Mark		x	x
08	Patta /Barre Mark		x	
09	Lycra Out		x	

List of Defects and their Categories (Fabric)

Sl#	Name of Defects	Critical	Major	Minor
10	Warp Missing		x	
11	Slub		x	x
12	Thick Yarn/Thin Yarn			x
13	Knot		x	x
14	End Out		x	
15	Crease Mark		x	x
16	Stop Mark		x	x
17	Missing Yarn		x	
18	Patch Mark		x	x

List of Defects and their Categories (Fabric)

Sl#	Name of Defects	Critical	Major	Minor
19	Yarn Contamination		x	x

List of Defects and their Categories (Sewing)

Sl#	Name of Defects	Critical	Major	Minor
1	Broken Stitch		x	
2	Puckering		x	x
3	Poor Neck Shape		x	x
4	Mismatch Stripe/Check		x	x
5	Uncut Thread			x
6	Skip Stitch		x	
7	Size Mistake		x	
8	Label Mistake		x	
9	Back Tape run off Stitch		x	

List of Defects and their Categories (Sewing)

Sl#	Name of Defects	Critical	Major	Minor
10	Uneven Body Hem		x	x
11	Wrong placed Button/Up-Down		x	x
12	Button Missing		x	
13	Incomplete Button Stitch		x	
14	Shade Variation between Parts		x	x
15	Poor Shaped Pocket			x
16	Raw Edge		x	
17	Uneven Width of Placket		x	x
18	Slanted Pocket		x	x

List of Defects and their Categories (Sewing)

Sl#	Name of Defects	Critical	Major	Minor
19	Slanted Pocket			x
20	Slanted Zipper attachment			x
21	Chalk mark			x
22	Open Seam		x	
23	Thread not DTM			x
24	Poor Neck Shape			x
25	Uneven Sleeve Length		x	
26	Loose Stitch		x	x
27	Blind Stitch Visible		x	

List of Defects and their Categories (Sewing)

Sl#	Name of Defects	Critical	Major	Minor
8	Uneven Stitch		x	x
29	Button Hole Damaged		x	
30	Incomplete Button Hole Stitch		x	
31	Pleat		x	x
32	Placing Mark			x
33	Skipped Stitch		x	

List of Defects and their Categories (Finishing)

Sl#	Name of Defects	Critical	Major	Minor
01	Dirty Spot		x	x
02	Oil Spot		x	x
03	Hang Tag Missing		x	
04	Wrong Hang Tag		x	
05	Iron Mark		x	x
06	Poor Iron			x
07	Gum Mark of Interlining		x	x
08	Loose Thread			x
09	Wrong Hang Tag		x	

List of Defects and their Categories (Miscellaneous)

Sl#	Name of Defects	Critical	Major	Minor
01	Printing Spot		x	x
02	Misplaced Print		x	x
03	Slanted Print		x	x
04	Incomplete Embroidery		x	
05	Misplaced Embroidery		x	x
06	Presence of insects	x		
07	Presence of broken needle	x		
08	Sharp edge of Rivet	x		