2014

Training Manual for Trainee Supervisor

Quality Assurance Department

"Change is the end result of all true learning"
(Leo Buscaglia)

Masood Textile Mills
JAN-2014

Train to Gain

ACKNOWLEDGEMENT

All the praises to **ALLAH ALMIGHTY** who enables us to prepare this training syllabus.

We are very thankful to our seniors for their helpful guidance throughout this effort. Without their guidance and moral support, it is impossible for us to do this valuable work. This is combine effort of Training & Development and QA team under the supervision & guidance of *Mr. Qamar Javed* (Sr. Manager). They support us in every way throughout this effort.

We are also very thankful to other departments who help us any way to prepare this work.

Developed By: …….....T & D Team
Edition: ……2nd
Date: ……..……....15-JAN-2014
Reviewed By: ……..Q.A. Management

DEDICATION

We dedicate this effort to **THE HOLY PROPHET (PBUH)** without whose guidance our life is meaningless. Whose preaching always guided the human being to the right path.

We dedicate the fruit of our thoughts and study to our "Department & Organization" who gave us recognition.

We also dedicate this humble effort to all those who wish and pray for our successes in this life and the life hereafter.

May Allah help us to get the desired results of this humble effort.

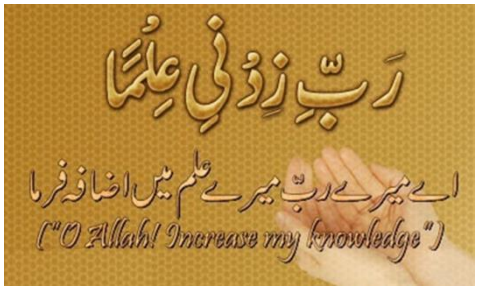


Table of Contents

Masood Textile Mills Ltd.

CHAPTER 1

Introduction

Company Introduction

Masood Textile is an apparel manufacturing company based in Pakistan. The company is operating 550 knitting machines, 5,800+ sewing machines, serving almost all top 10 brands in world retail market including Adidas, Abercrombie & Fitch, Tommy Hilfiger, PUMA, Target, PVH, Reebok, Forever 21, Russell, Macy's, SAM's Club, Tom Tailor, Levis, Head, Foot Locker, Under Armor, JC-Penney, Polo Ralph, TCP, Wal-Mart, Sears, Kohl's. The manufacturing process at Masood Textile Mills is vertically integrated including all the process involved in garment manufacturing. The in-house capabilities involve Spinning, Spinning Lab, Knitting, Dyeing, Dyeing Lab, Finishing, Finishing Lab, Cutting, Stitching, Laundry, Embroidery, Printing, Garment Finishing and Packing functions.

- **Masood' mission is** "*To be the best apparel company in the world by producing and delivering high quality products to its customers*".

Masood believe that the high level of quality product will strengthen our bond with valued customers and it will help to eliminate quality claims and rejections.

Quality Assurance Department

Quality Assurance department is assuring the quality of products at each stage of manufacturing through its team of professionals and effective procedures. QA setup in MTM is fully equipped to conduct inspections as per buyer's defined standards/expectations.QA Department has established and maintains quality management system which is fully documented, effective and based on preventions which provides data (Audit results) to the Quality Control Department for effective corrective and preventive measures. QA has established methods for determining and measuring products quality based on AQL sample plans. QA department is playing an advisory, supportive and monitoring role in MTM and working as ears and eyes of Masood' Customers.

Objectives of Training Manual

The main purpose of this training manual is…..

- To communicate the working Infrastructure / Processes, working SOPs, criteria and quality Standards of QA department for trainee supervisor.
- To enhance the knowledge of the Q.A staff to meet daily working requirements.
- To give them technical knowledge & understanding regarding back processes involved in garment manufacturing.
- To improve the quality of work & skill level of the staff.
- Giving them knowledge & reducing the chances of mistakes of the staff.

Values / Rules in Q.A

Punctuality & Regularity
Team Work
Quick Learning & Hardworking
Loyalty & Honesty
Positive Attitude
Integrity & Respect

Role of Quality Assurance Department

Implementation and Monitoring Quality Systems

To update the quality manual with updated quality standards, systems & procedures.
To develop SOP and working guidelines to Q.A staff.
The Q.A department is required to induce the Q.C dept. to implement standard quality systems required by the customers to improve and maintain required OQL.
The implemented quality system should be monitored on daily basis so that the system runs without any stoppage.
The quality system should be very strong so that nothing could penetrate through & result in failure of audits or re-screening.

Training & Evaluation of Quality Staff

It is the prime responsibility of the senior quality staff to train all the Q.A staff to achieve skill level within a short frame of time.
The Q.A dept. should train the Q.A team to achieve skill level.
A training program should be designed which will enable to execute simple and proper training to enhance the skill level of Q.A staff up to standard.
The Q.A department will evaluate all the inline quality control inspectors on their performance.
The evaluation will be based on the "Overall Quality Level" (less than 4 %) for any merit or reward systems.

Assuring Quality of Products

Through accessory audits
Through Inline inspector's evaluation / inline audits at inline findings.
Through 100 % batch wise audit of finished goods before packing. The audit will be conducted at A.Q.L 1.5. FPY (First Pass Yield) is also calculated at this stage along with OQL%.
Through internal audits (Packing & Quality) of packed goods at AQL 1.5 by Q.A final auditor.
Through unit's evaluation (by Q.A management staff).

Ethical Guidelines & Code of Conduct for Q.A Auditor

Purpose:
To communicate the integrity, objectivity and capability expected from Q.A auditors, as well as, to provide a means for the Q.A auditors to pledge their commitment to these principles, the integrity of Q.A Auditors establishes trust and provides the basis for relying on their judgments. Q.A auditors must be objective in evaluating, auditing and communicating information about the facts being examined and not be unduly influenced by their interests, or those of others, in making judgments.

Q.A Auditor Shall:

Perform work with honesty, accuracy, fairness, and responsibility.
Not engage in activities that might discredit the audit profession or organization.
Not join in any activity or relationship that may affect his unbiased assessment.
Not accept anything that may damage, or appear to damage his judgments.
Not represent any interest that conflict or compete with the auditor's own interests or that of his associates.
Not accept any bribe, commission, inducement, gift or benefits.
Report to management, if facing any conflict/attitude problem from the person of any other department.
Be truthful and display the utmost professional integrity at the all times.
Perform his duties according to given SOPs.
Assist his seniors to develop audit skills.
Report any complaint to his senior staff.
Act professionally, accurately and in an unbiased manner.
Continually improve the proficiency, quality and value of audit services.
Fully develop all professional competencies necessary to carry out tasks as an auditor.

CHAPTER 2

Introduction to Quality and its Systems

As an employee of "Masood Textile Mills" your Training Program in Quality Assurance Department has been started. The following will be a bench mark for your training program.

What is Quality?

- Standard achieved by process controlling to provide defect free product to the customer.
- A measure of excellence or a state of being free from defects, deficiencies and significant variations.
- Quality is usually perceived as the application's ability to fulfill the reasonable requirements and needs set by the developer or the end user.

Elements of Quality

Performance means Color Fastness / Pilling Resistant / Minimum Shrinkage / Color Bleeding Resistant / Moisture Absorbency & Quick Drying / Assures Comfort /Collar Rolling up Elimination.
Features mean prominent parts of quality.
Reliability means trust & confidence of customer.
Conformance means Certification / Confirmation that goods / services meet the requirements of legislation, accepted practices, prescribed rules & regulations, specified standards & terms of a contract.
Durability means time period of usage without any problem.
Serviceability means service rendered without affecting any of the mentioned factors.
Perceived means understanding customer requirements.
Aesthetics means The Art / Design / Fashion / Style.
When the above eight elements are fulfilled in an excellent way, then we can say that our product is up-to the standards required by the customer. Any failure in full or part of the above will be of poor quality. Hence we can say that the above eight elements are the standards that we should meet to satisfy the customer.

What is Quality Assurance?

- **"Quality Assurance"** is the process of determining whether products meet customer's requirements.

It indicates the development of controls to ensure a quality system or Preventive measures taken to ensure the quality of both product & quality system.

- Preventive action taken to eliminate defect.

What is Quality Control?

- "**Quality Control** is a process that is used to ensure a certain level of quality in a product or service".
- The ISO definition states that "**Quality Control"** is the operational techniques & activities that are used to fulfill requirements for quality.

Quality Control Systems

1. Feeding / Loading System

In the process of feeding / loading, the feeder or loader should ensure that the sequence of cut parts in the bundles is not disturbed.
At the time of feeding / loading, any conspicuous defect should be returned or replaced with part of same shade.
The feeding / loading quantity should be counted and ensured that it is correct according to quantity mentioned at barcode of the bundle.

2. 7-0 System (Seven-Zero System)

3. Traffic Light Control System

4. 5 Part Ticket System

5. On the Spot Defect Recovery System

All above mentioned systems (7-0 system, Traffic Light Control System, 5 Part Ticket System & on the Spot Defect Recovery System) work together at the time of implementation.
All machines will have green flags at starting time.
The rowing Q.C or Q.C inspector should randomly select seven pieces from each bundle, of all operations.
The 7 pieces should pass at (0) zero defects. If a single defect is found, the total bundle fails (Rejected).
Then the green flag at machine will be replaced by Q.C inspector with a yellow flag. The first part of 5 part ticket is issued to the machine operator one at this time.
Operator who stitched the bundle will have to inspect the full bundle for faults in his operation & rectify defects immediately (on the spot) up to specification or replace the defective pieces with whatever appropriate.
If the rowing Q.C or Q.C inspector identifies the same mistake for second time (in same operator) then the yellow flag is replaced with red flag & second part of 5 part ticket is issued. The operator has to fallow the same procedure as before. Now the rowing Q.C or Q.C inspector will do a follow up inspection of 3 consecutive bundles of the same operator, by issuing the balance 3 follow up tickets (one at a time).If the 3 follow up inspection results passes, then green flag is re-installed. If any of the follow up inspection results fails, then 3 follow up re-starts from that point.
The rowing Q.C or Q.C inspector should inspect critical operations every hour. Other operations could be confined to an inspection of once, twice or thrice according to the criticality of faults.

6. Inspection of Every 5th Piece By Machine Operator

The operator should inspect his operation, on every 5^{th} piece to determine any faulty during stitching.

7. End –line Inspection (100% Inside-Out)

All pieces that complete all operation should be checked inside out by end line inspectors.
Clipping Inspection
Clipping (Trimming of Thread) should be inspected for broken stitches, hang threads & clipper cuts. This is a 100% inspection.

8. Pressing Inspection

Pressing tables should be marked with length and width of all sizes of garments according to buyers specifications.
Pressing Inspection is done to evaluate.
Correctness of Shape of Neck / Shoulder / Sleeve / Side Seam / Bottom Hem in Uppers / Tops & Shape of Waist / Side Seam / Inseam / Leg Opening in Bottoms.
No Shine Marks /Crease Marks on seams.
No Excessive moisture by steam.
No Color Fading.
No Dust Marks / Stain Marks / Oil Marks.
Pressing as required.

9. Final Inspection

Final inspection should inspect 100% garments to filter any defect / fault passed by previous practices.
This inspection should verify trims and accessories used.
Any defect identified should be addressed immediately (A recovery of the defect or replacement for rejection should be done).
Inspection is conducted to evaluate the first passed yield (FPY).That is the first time pass percentage on an hourly basis.
The defects identified are segregated into 3 main categories.

- **Rafu / Mending**
- **Stain**
- **Repairing (Alteration)**

Very Important Factors

A) Visible darning: - is not acceptable.

Operational darning could be accepted. If it is not conspicuous / visible.
Any fabric fault mended by knitting needle (Knitted) and not prominent to the naked eye, could be accepted.
Any defect that is not according to the above factors should be discarded as totally rejected items.

B) Stain: - If any Dust spot, Oil Spot or any other stain spot could be removed by either stain removers or light washing without affecting the Color, Appearance, Hand Feel, & Specs could be accepted.
Any slight patch dispersed as a result of the above process, should be discarded as a reject.

C) Repairing (Alteration): - If any sewing defect could be recovered by re-work, without effecting seams or body quality standards, it is acceptable.
If the rework results are miss-shape, specs variation, miss alignment, or any other defect, then product should be discarded as reject.
Any garment having uncut / loose threads should not be moved to packing area.

Measurement Audit

100% of garments should undergo critical specs inspection. (For Tops-Body length, Chest, Sleeve length, neck, armhole & shoulder) (For Bottoms-Side seam, inseam, waist and leg opening).
All other measurements as defined by the particular buyer should undergo for random measurement audit as per requirement.
Any garment that is not within the specified tolerance limit should be discarded as fault.
Please note this does not mean that all garments should be within tolerance. This tolerance limit is allowed to accommodate any human error which rarely occurs.

Folding & Presentation (or Hanger Pack)

The inspector should ensure that there is no dust, fluff or loose thread inside of the packaging area. Appearance should be attractive and eye catching.
The folding should be even and balanced & according to the specifications.
The accuracy in the position of label, accurate shape after folding, not looking miss-aligned after folding and all other factors pertaining to folding should be given extra care.
Accuracy of labels, stickers, tags or any other attachments should be ensured.
Accuracy of measurements, marks, numbers, sealing & opening of the poly bag should be ensured.
Accuracy of size and sticker or any other accessories on poly bag should be ensured.
Accuracy of hangers and size stickers, size of hanger, quality of hangers, printing, stamp, alignment & packing performance should be ensured.

Packing Inspection

Please note that there is zero tolerance for any packing error. Packing should be 100% accurate.
Accurate quantity in cartons should be ensured.
Accurate size garments in cartons should be ensured.
Accuracy of pre-packs, ratio packs, catalogue packs, mix packs (if allowed) should be ensured.
Accurate P.O # & Style # should be ensured.
Accurate assortments should be ensured.
Carton dimensions, carton marks & numbers, carton quality, no of plies, shade, sealing ability, hanger packing...etc. should be ensured.
Ensure that security slip is pasted (if required) while sealing carton with inspector signature, Id number, unit number, and P.O code.
Ensure that carton tape/adhesive tape/gum tape / sealing tape adhere properly to cartons without bubbling or cracking.
Ensure that cartons look attractive, clean, without bulking, un-smashed, without damage, without excessive carton tape *protruding* at the corners and stackable without disturbance.
Ensure the accuracy of carton stickers (ASN, MCL, OCR, etc) and undamaged stickers are fixed.

Kinds of Packing

1. **Solid Color Solid Size** (same color & same size in carton)
2. **Solid Color Assorted Size** (same color & different sizes in carton)
3. **Assorted Color Solid Size** (different colors & same size in carton)
4. **Assorted Color Assorted Size** (color & sizes both different in carton)
5. **Catalog Packing** (color & sizes & POs different in carton)

What is difference between QA & QC?

“Quality Assurance” is process & system oriented & focuses on defect *prevention*; while “Quality Control” is product oriented and focuses on defect *identification* and takes *corrective actions*.

AQL (Acceptable Quality Level)

- Probability of acceptance.
- This is the degree to which defect can be accepted in a shipment (or shipped). This describes a level of acceptance of defects in a shipment.
- An acceptable quality level is an inspection standard describing the maximum number of defects that could be considered acceptable during the random sampling of an inspection.

OQL (overall quality level)

- Percentage of occurrence.
- This describes the actual occurrence of defects in process.

What is Audit?

The general definition of an audit is an evaluation of a person, organization, system, process, project or product. Audits are performed to determine the validity and reliability of information & also to provide an assessment of a system's internal control.
It is defined as the random inspection of the population according to given standards.

- **Review**
- **Inspect**
- **Assessment**
- **Exam**

(Random Inspection)

Final Statistical Auditing

1. It enables the supplier to evaluate his product in process controls.
2. It is the supplier's last chance to find problems before shipping.
3. It provides the supplier with information on his outgoing quality level.
4. It enables supplier to maintain OQL at certain level.
5. It enables supplier to take corrective action to produce quality product.

CHAPTER 3

Guidelines for Inspection

General Guide Lines for Inspection

- Identifying a defect depends upon focusing or concentrating on the area of inspection by any inspector.
- The level of inspection or the skill level of the inspector totally depends on his amount of concentration.
- The level of inspection can be either 100% or 0%.There is nothing in-between.
- If the inspector identifies all defects, his inspection level is 100% that means his level of concentration is very good.
- If an inspector misses even one defect, his inspection level is 0 that means his level of concentration is poor.

Inspection Level

Concentration of eyes hands & minds to focus on the area of inspection. This will yield an optimum inspection level where no defect will penetrate through.

Factors Involved In Level of Concentration

The following are the four major factors which are involved in level of concentration.

(a) Hands
(b) Eyes
(c) Mind
(d) Environment

(1) All these factors should be focused at the same time in the same area of inspection to obtain best results.
(2) If the eyes and both hands are focused, but the mind is not, then there is possibility to pass mistakes.
(3) Similarly if only one hand is used and the other doing some other work, mistakes are possible.
(4) Same way if eyes are not focused but the hands are moving, again mistakes are over sighted.
(5) If during inspection extra person gathered there is possibility to pass mistakes.

Types of Garments

Types of Shirts

1. Polo Shirt
2. Hood Shirt
3. Crew Neck Shirt
4. Sweat Shirt
5. V Neck Shirt
6. Tank Shirt
7. Rugby Shirt
8. Raglan Shirt
9. Mock / Turtle Neck Shirt
10. Henley Shirt
11. High Neck Shirt
12. Muscle Tee

Types of Bottom Wears

Pant Short

Types Of Under wears

Boxer	Brief	Bikini
Mid Rise	Hicut	Hipster
Trunk	Low Rise Hipster	Girls Boy Short

Mock Neck Shirt

V-Neck Shirt

Tank Shirt

Hood Shirt

Hanley Shirt

High Neck Shirt

Polo Shirt

Muscle Tee

Crew Neck Shirt

Sweat Shirt

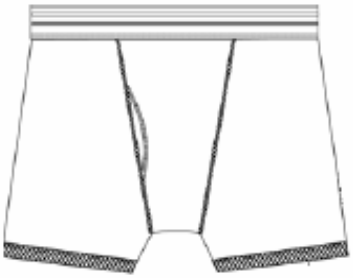
Rugby shirt

Raglan shirt

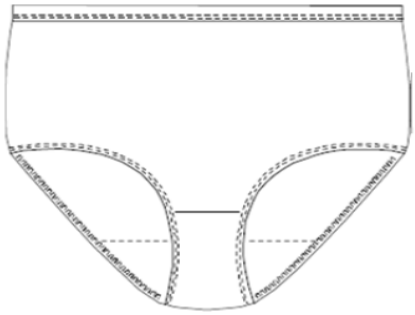
Pant

Short

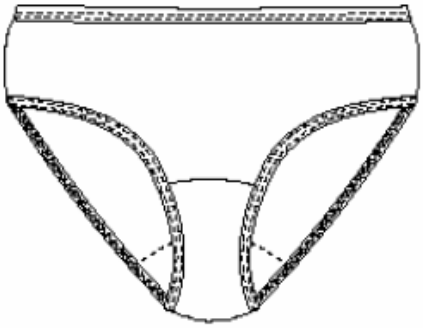
Boxer



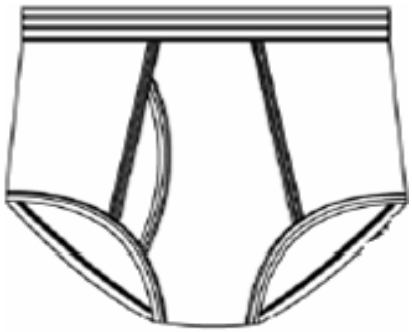
Brief



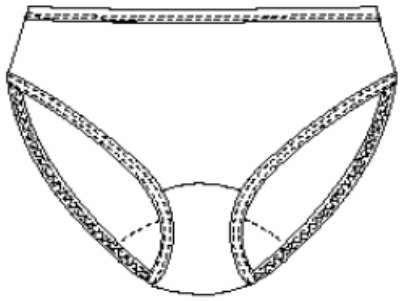
Bikini



Mid Rise

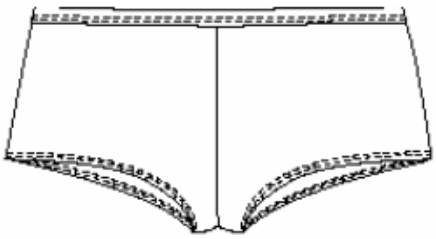


Hicut

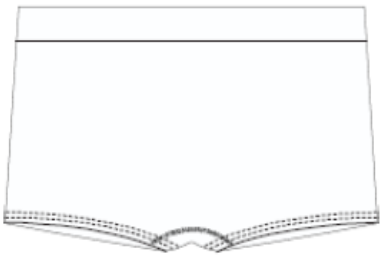


Hipster

Low Rise Hipster



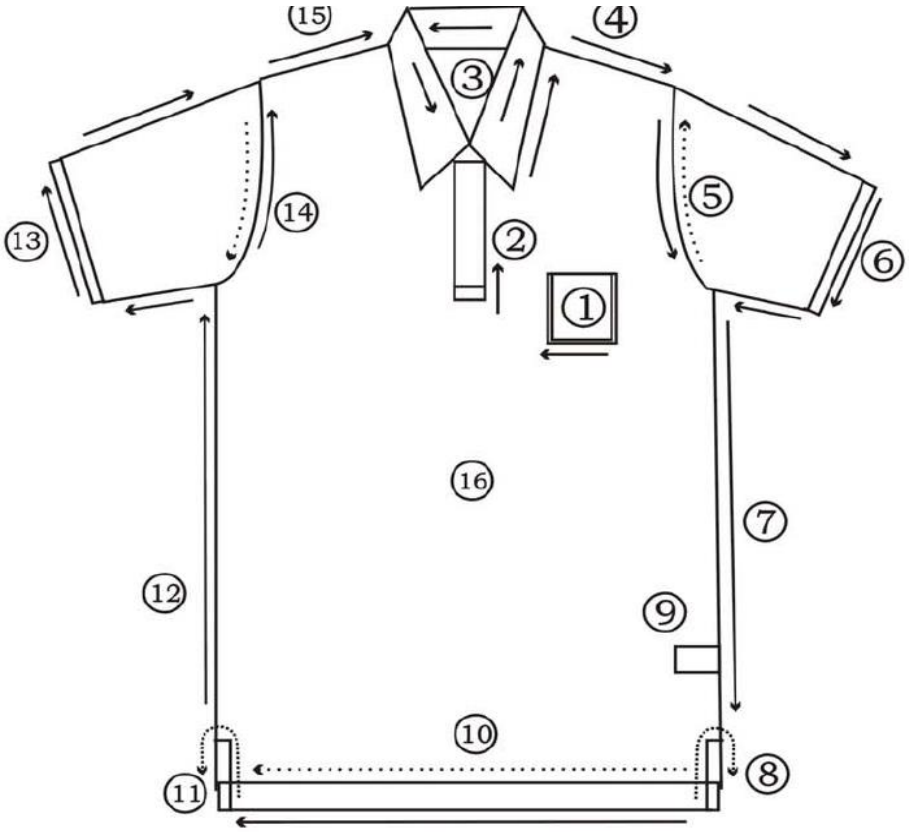
Girls Boy Short



Inspection Sequence

(1) To avoid missing of any operation during inspection, it is ideal to follow sequence In inspection.
(2) Usually recommended sequence for apparels inspection is **Clock Wise** sequence or **Anti Clock Wise** inspection.

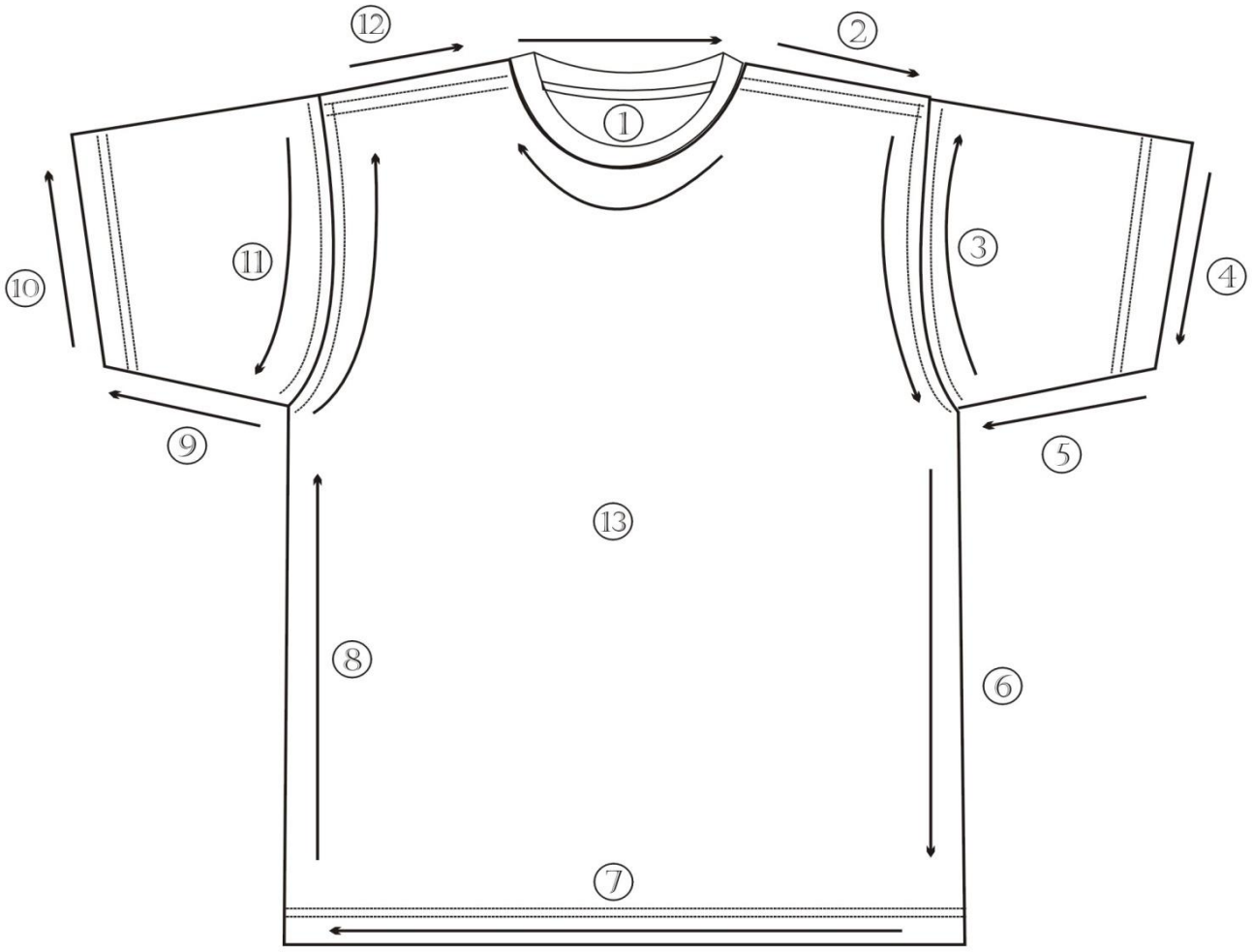
Clock wise Inspection of S/S Polo Shirt



1 :- EMB/Pocket
2 :- Placket
3 :- Collar/Collar closing / Label
4 :- Shoulder (Left)
5 :- Armhole (Left)
6 :- Sleeve hem (Left)
7 :- Side seam (Left)
8 :- Side vent (Left)
9 :- Care label placement (3" above from top of vent opening)
10:- Bottom hem
11:- Side vent (Right)
12:- Side seam (Right)
13:- Sleeve hem (Right)
14:- Arm hole (Right)
15:- Shoulder (Right)
16:- Front Back appearance (For material damage, Oil and Dust stain, Color shading)

Remarks:- All Inspectors need to check both inside and the out side of the Garment.

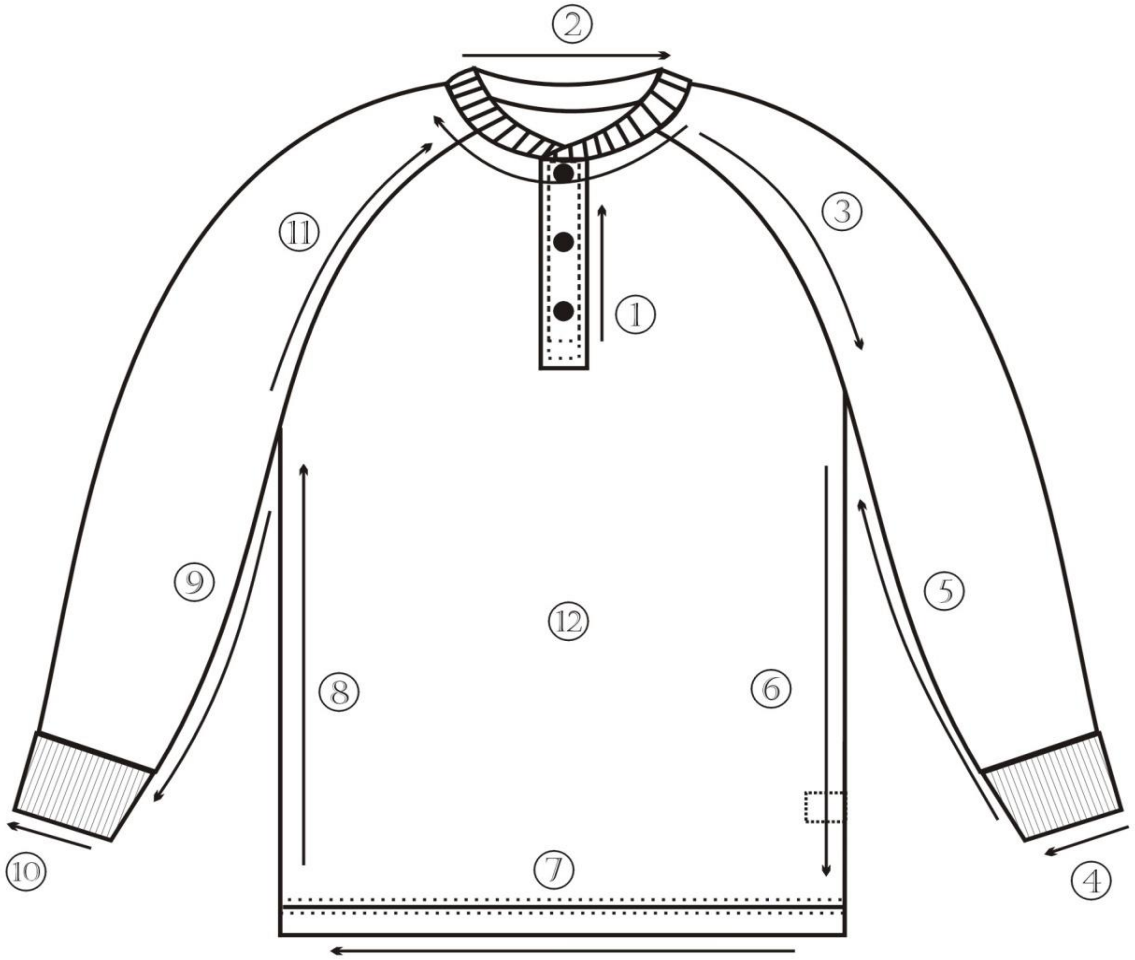
Clock wise Inspection of S/S Crew Neck



01 :- Crew neck / Label
02 :- Shoulder (Left)
03 :- Armhole (Left)
04 :- Sleeve hem (Left)
05 :- Under Arm (Left)
06 :- Side seam (Left)
07 :- Bottom hem
08 :- Side seam (Right)
09 :- Under Arm (Right)
10 :- Sleeve hem (Right)
11 :- Arm hole (Right)
12:- Shoulder (Right)
13:- Front Back appearance (For material damage, Oil and Dust stain, Color shading)

Remarks:- All Inspectors need to check both inside and the out side of the Garment.

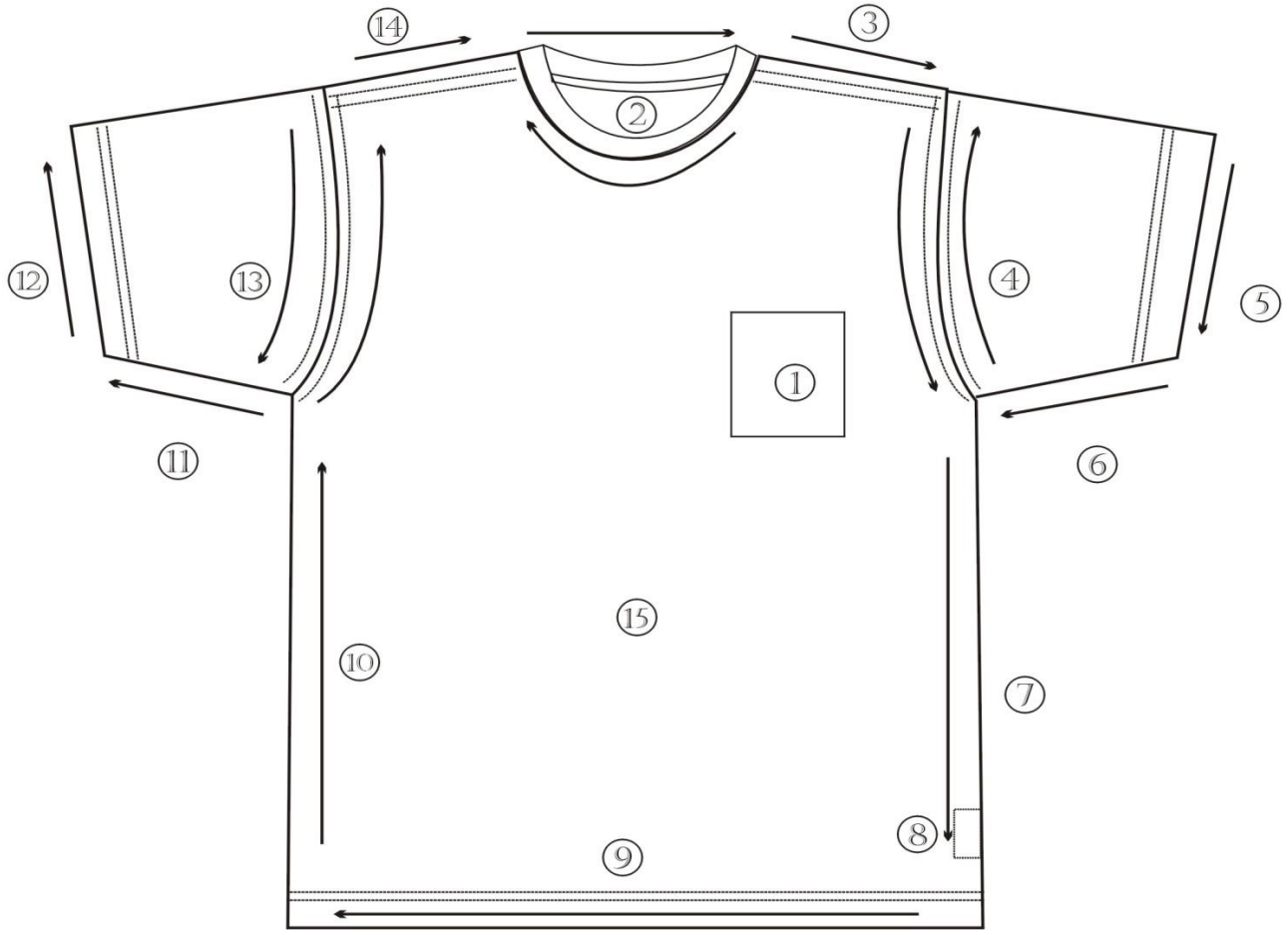
Clock wise Inspection of L/S Raglan



01 :- Placket
02 :- Neck Rib / Label
03 :- Sleeve raglan (Left)
04 :- Cuff rib (Left)
05 :- Sleeve inseam (Left)
06 :- Side seam (Left) & Care label placement (3" above from top of vent opening)
07 :- Bottom hem
08 :- Side seam (Right)
09 :- Sleeve inseam (Right)
10 :- Cuff rib (Right)
11 :- Sleeve raglan (Right)
12 :- Front Back appearance (For material damage, Oil and Dust stain, Color shading)

Remarks:- All Inspectors need to check both inside and the out side of the Garment.

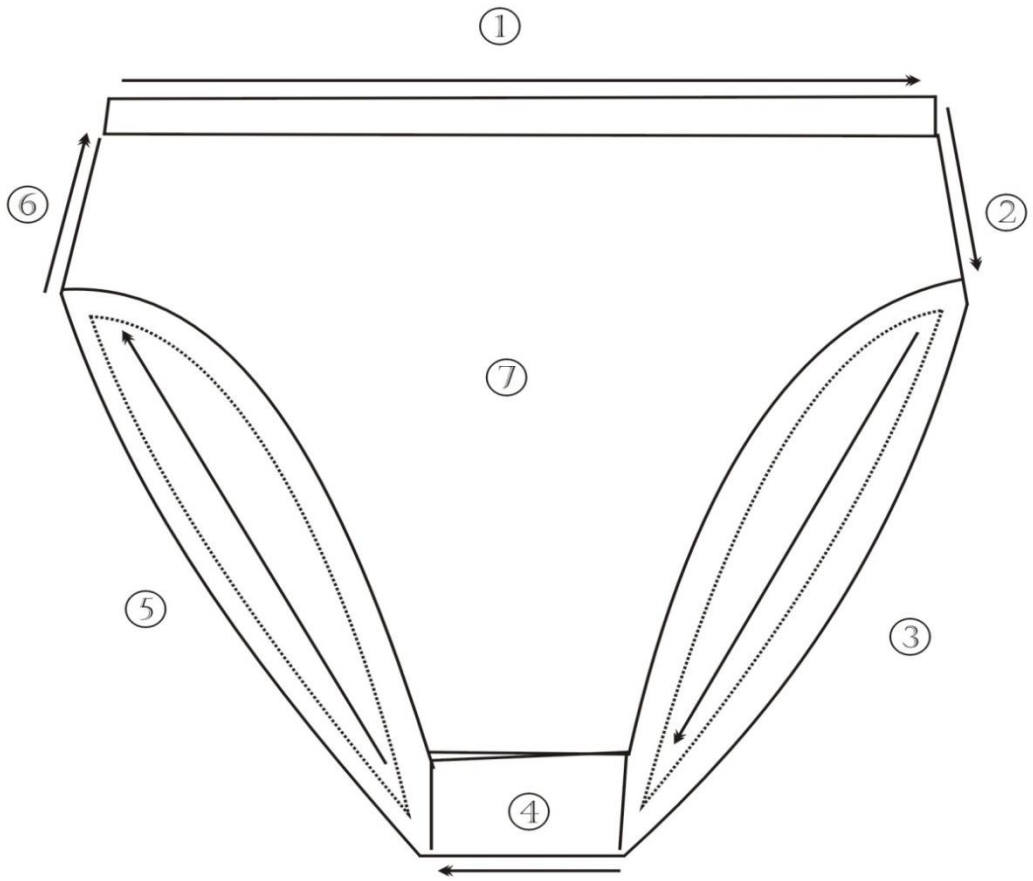
Clock wise Inspection of Pocket Tee



01 :- Pocket
02 :- Crew neck / Label
03 :- Shoulder (Left)
04 :- Armhole (Left)
05 :- Sleeve hem (Left)
06 :- Under Arm (Left)
07 :- Side seam (Left)
08 :- Care label
09 :-Bottom hem
10 :- Side seam (Right)
11 :- Under Arm (Right)
12 :- Sleeve hem (Right)
13 :- Arm hole (Right)
14 :- Shoulder (Right)
15 :- Front Back appearance (For material damage, Oil and Dust stain, Color shading)

Remarks:- All Inspectors need to check both inside and the out side of the Garment.

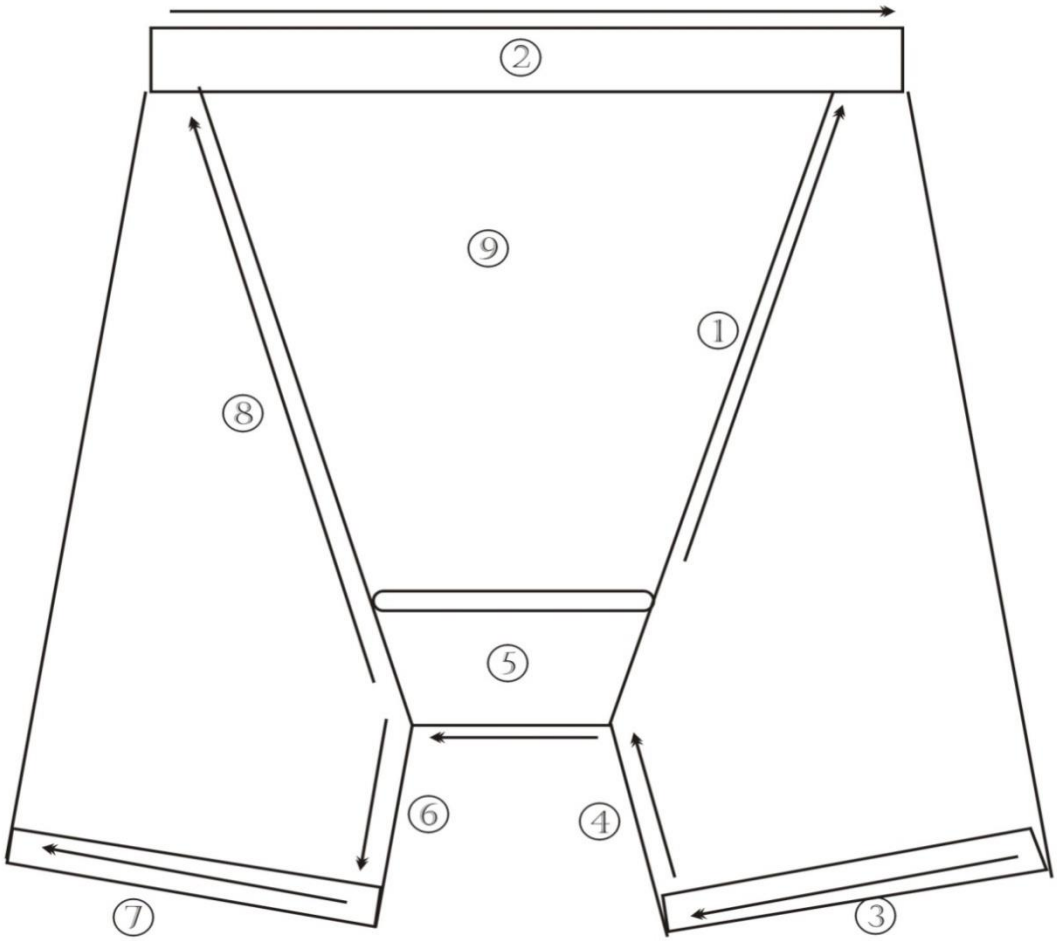
Clock wise Inspection of Panties



01 :- Waist elistic inside and out side / Label
02 :- Out seam (Left)
03 :- Leg Opening (Left)
04 :- Croch
05 :- Leg Opening (Right)
06 :- Out seam (Right)
07 :- Front and back appearance (For material damage, Oil and Dust stain, Color shading)

Remarks:- All Inspectors need to check both inside and the out side of the Garment.

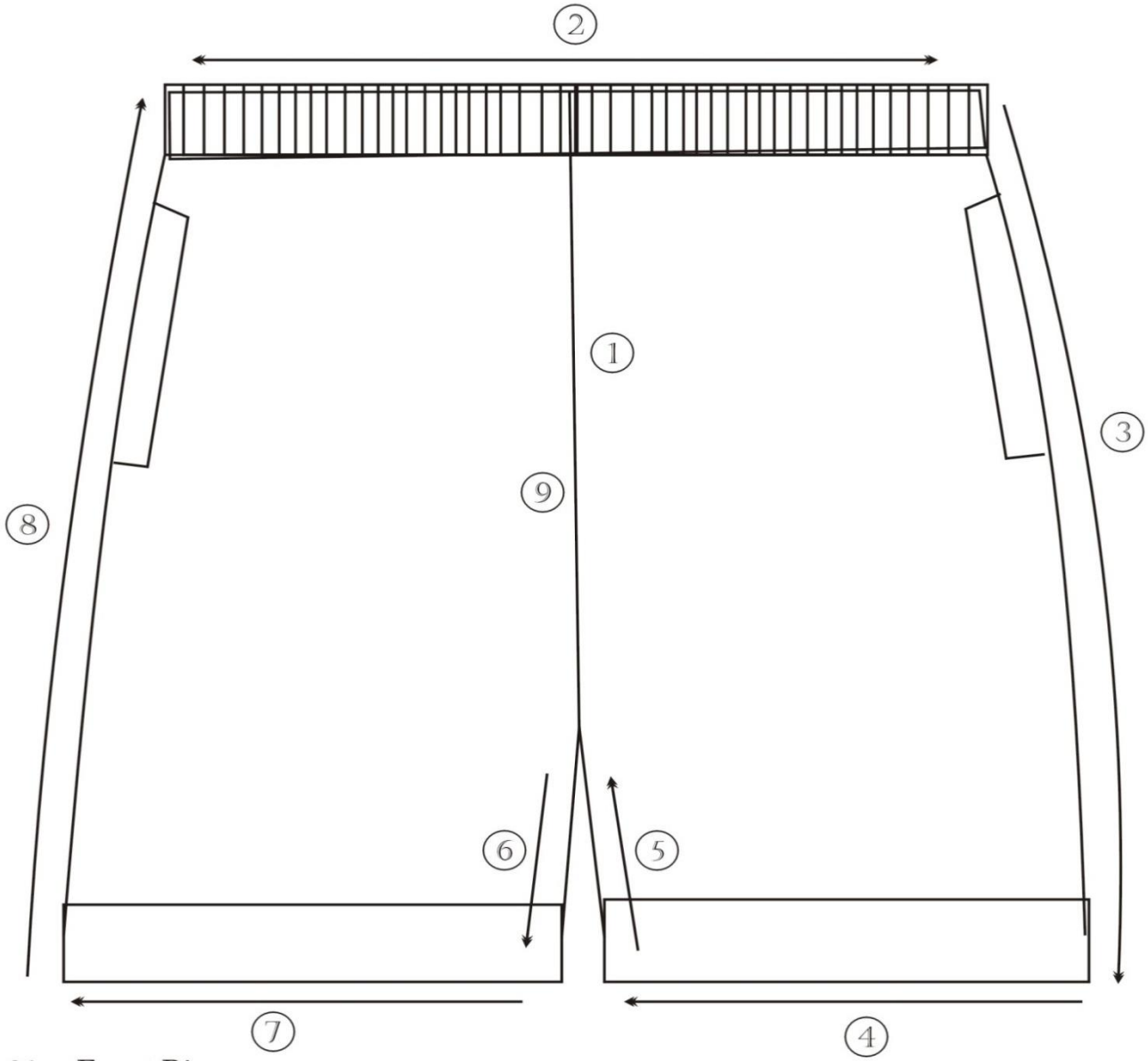
Clock wise Inspection of Brief



01 :- York Seam (Wears Left)
02 :- Waist elistic inside and out side / Label
03 :- Leg Opening (Left)
04 :- Inseam (Left)
05 :- Croch
06 :- Inseam (Right)
07 :- Leg Opening (Right)
08 :- York Seam (Wears Right)
09 :- Front and back appearance (For material damage, Oil and Dust stain, Color shading)

Remarks:- All Inspectors need to check both inside and the out side of the Garment.

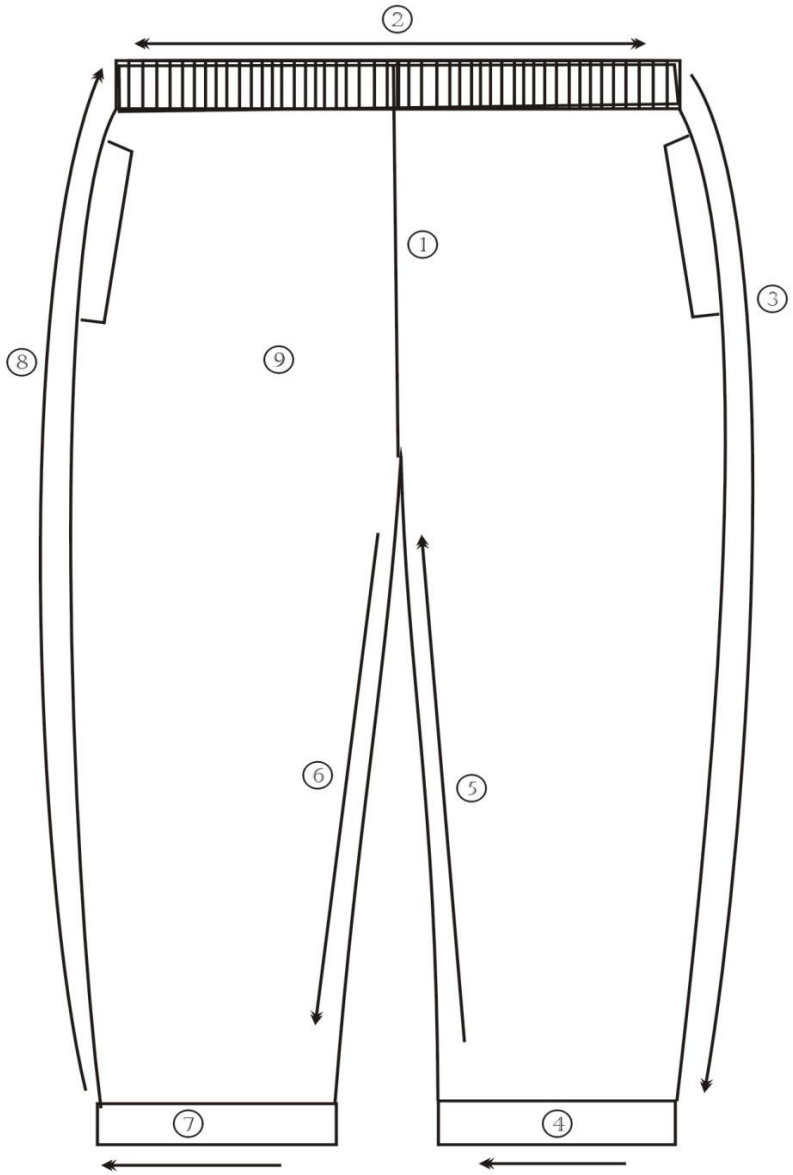
Clock wise Inspection of Shorts.



01 :- Front Rise
02 :- Waist elistic inside and out side / Label
03 :- Out seam and pocket (Left)
04 :- Leg Opening (Left)
05 :- Inseam (Left)
06 :- Inseam (Right)
07 :- Leg Opening (Right)
08 :- Out seam and pocket (Right)
09 :- Back Riseand front and back appearance (For material damage, Oil and Dust stain, Color shading)

Remarks:- All Inspectors need to check both inside and the out side of the Garment.

Clock wise Inspection of Pant



01 :- Front Rise
02 :- Waist elistic inside and out side / Label
03 :- Out seam and pocket (Left)
04 :- Leg Opening (Left)
05 :- Inseam (Left)
06 :- Inseam (Right)
07 :- Leg Opening (Right)
08 :- Out seam and pocket (Right)
09 :- Front and back appearance (For material damage, Oil and Dust stain, Color shading)

Remarks:- All Inspectors need to check both inside and the out side of the Garment.

CHAPTER 4

Guidelines for Measurement

Measurement

01 Inch	=	8 Point
01 Inch	=	2.54 CM
01 Inch	=	25.4 MM
01 CM	=	10 MM
01 Yard	=	36 Inches
01 Yard	=	91.44 CM
01 Yard	=	03 ft
01 Meter	=	39.37 Inches
01 Meter	=	100 CM
01 Meter	=	1000 MM
01 ft	=	12 Inches
01 ft	=	30.48 CM

Measurement tape has 60 inches, 152.54cm, 1525.4mm.

1 Ft has 96 points.

1/8	2/8	3/8	4/8	5/8	6/8	7/8	8/8
1/8	1/4	3/8	1/2	5/8	3/4	7/8	1inch
0.125	0.25	0.375	0.5	0.625	0.750	0.875	1

1/16 2/16(1/8) 3/16 4/16(2/8) 5/16 6/16(3/8) 7/16 8/16(1/2) 9/16 10/16(5/8) 11/16 12/16(3/4) 13/16 14/16(7/8) 15/16 16/16(1icnh)

1/32 2/32(1/16) 3/32 4/32(1/8) 5/32 6/32(3/8) 7/32 8/32(1/4) 9/32 10/32(5/16) 11/32 12/32(3/8) 13/32 14/32(7/16) 15/32 16/32(1/2) 17/32 18/32(9/16) 19/32 20/32(5/8) 21/32 22/32(11/16) 23/32 24/32(3/4) 25/32 26/32(13/16) 27/32 28/32(7/8) 29/32 30/32(15/16) 31/32 32/32= (01inch)

How to Measure

Tops (All Categories)

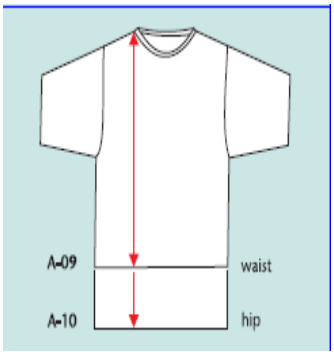
- Neck opening/Neck Circumference (relaxed/extended)
- Shoulder width
- Chest/Body width
- Armhole
- Body length
- Sleeve length
- Sleeve opening

Recommendations:

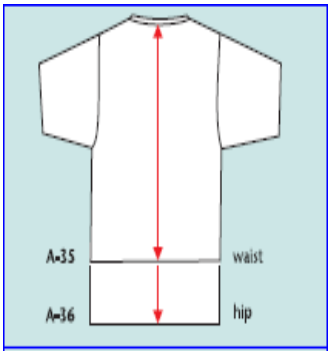
- Garments should be measured the same way as the sketch (example, view of sketch is front view, garment should be front side up).
- Measurements should be taken on flat dry surface.
- Garments should lay naturally, free of tension (unless stated differently).
- Wrinkles or creases should be smoothed out prior to taking measurement.
- Measuring tape should be nylon- reinforced for best results. **Metal tapes are not recommended.**
- If unable to find specific points of measurement then use the concerned buyer's how to measure guideline.

When performing the measurement audit, the following **critical** points of measurement must be reviewed.

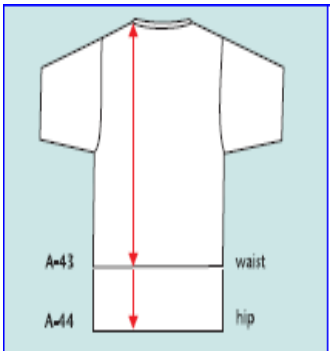
Front Length HPS



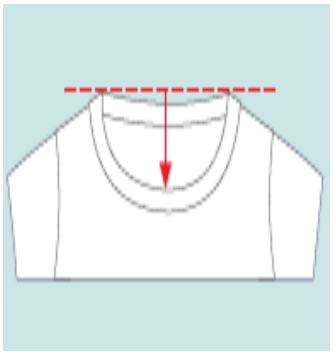
Center Back Length



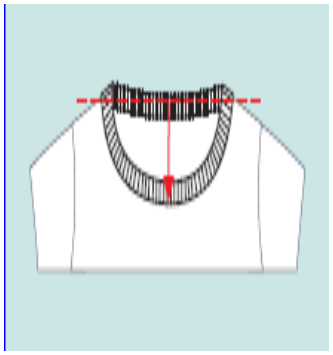
Back Length HPS



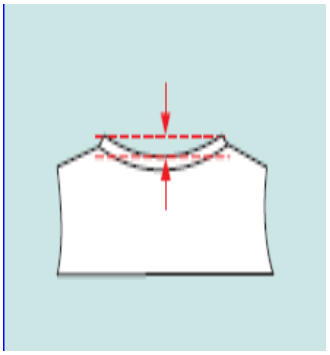
Front Neck Drop to Edge



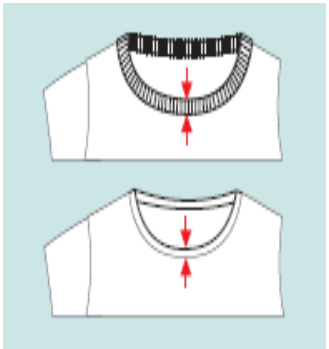
Front Neck Drop to Seam



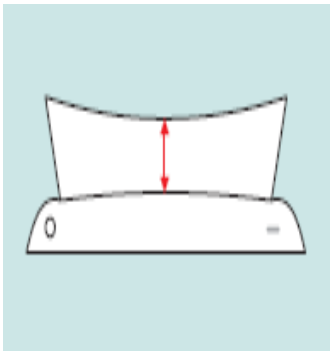
Back Neck Drop to Edge



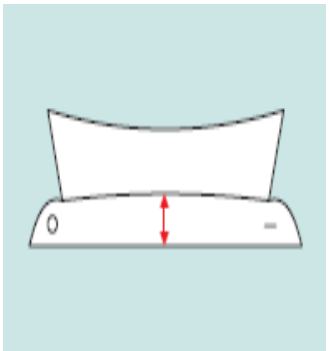
Neck Trim Depth / Height



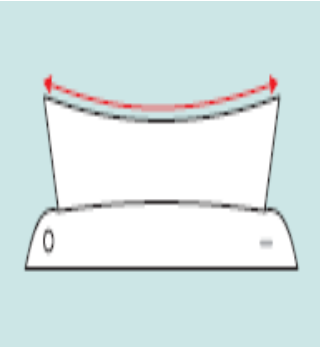
Collar Depth / Height C.B



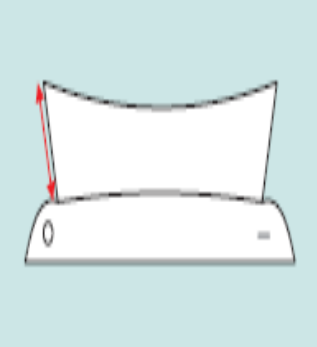
Collar Stand / Band Height C.B



Collar Leaf Length



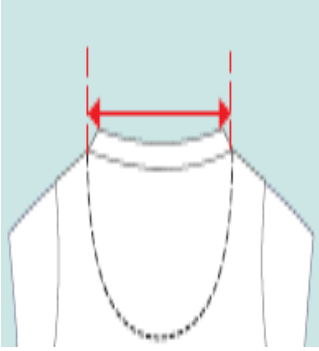
Collar Point Depth / Height



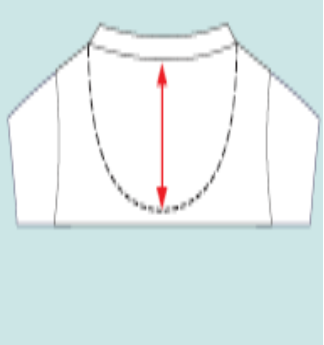
Tai Space

Collar Spread

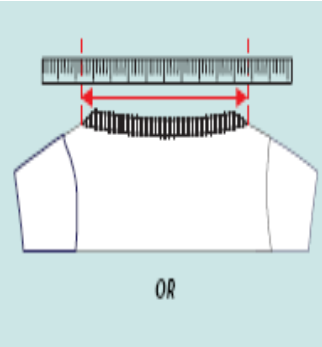
Half Moon Width at Back Neck



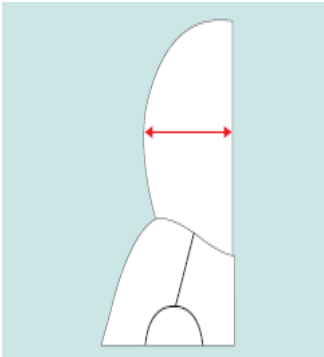
Back Moon Length at CBN



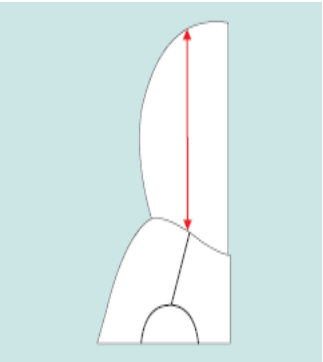
Minimum Neck Stretch



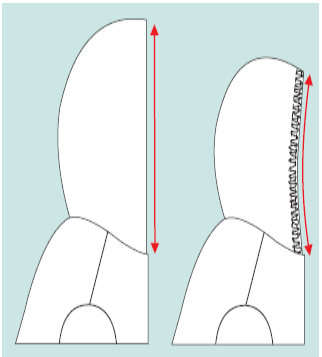
Hood Width



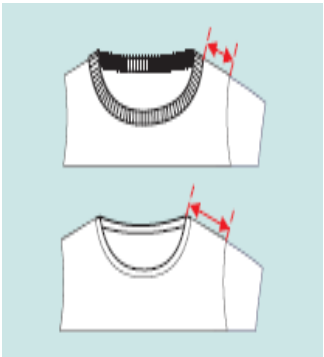
Hood Length from HPS



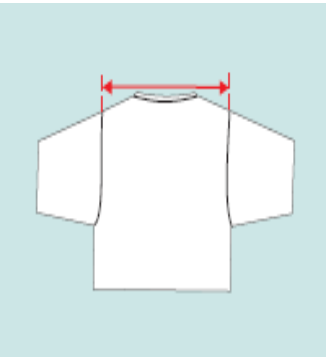
Hood Opening



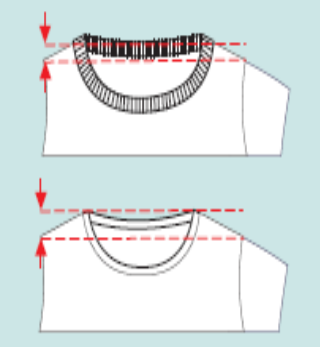
Shoulder



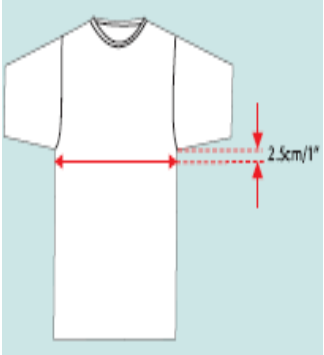
Shoulder Point to Point



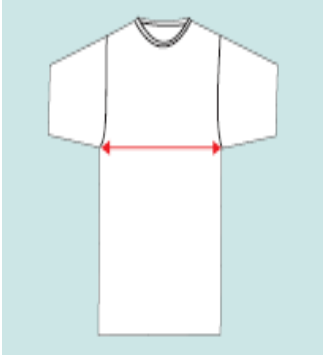
Shoulder Slope / Drop



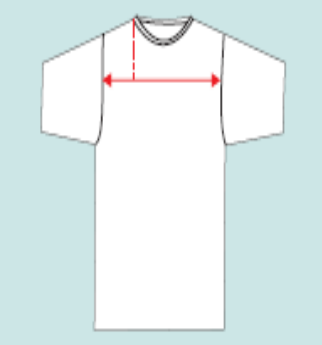
Bust / Chest below Armhole



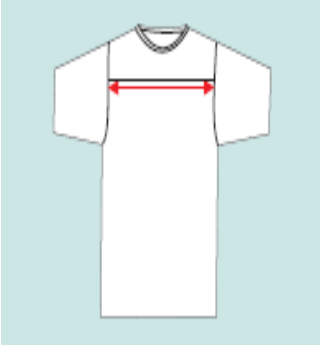
Bust / Chest Width at Armhole



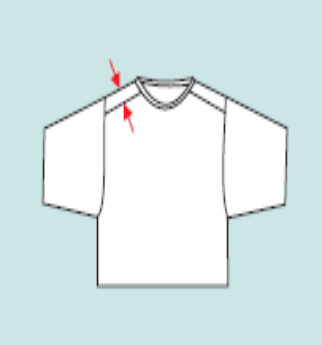
Across Front



Across Front at Yoke Seam

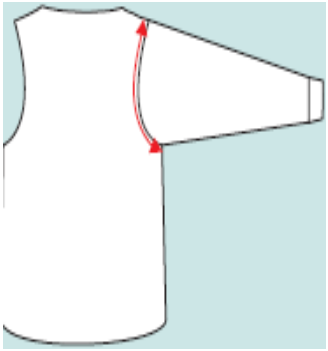


Shoulder Forward

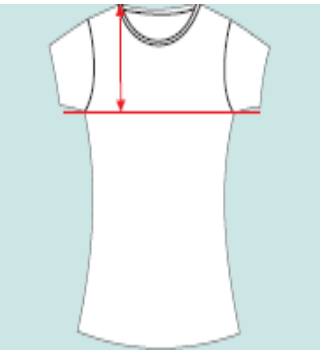


Armhole Straight

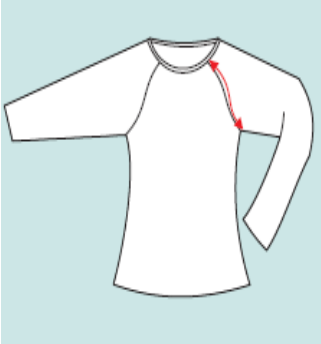
Armhole Curve



Armhole Depth from HPS

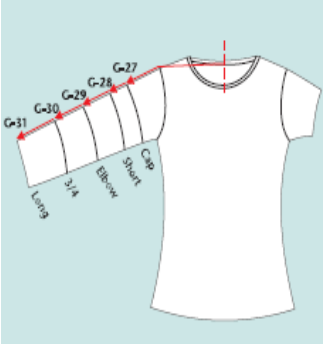


Front Raglan

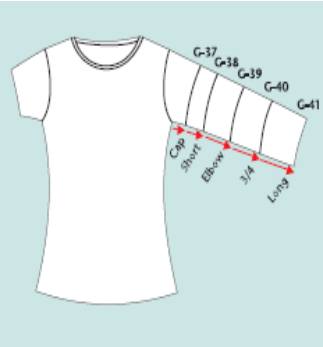


Back Raglan

Sleeve Length C.B

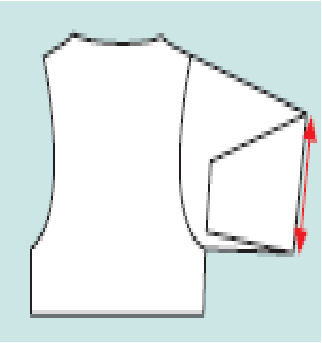


Sleeve Inseam



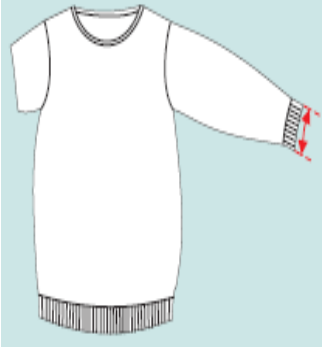
Bicep / Muscle

Elbow



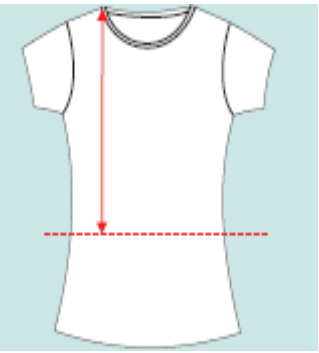
Sleeve Hem Height

Cuff Width Relaxed

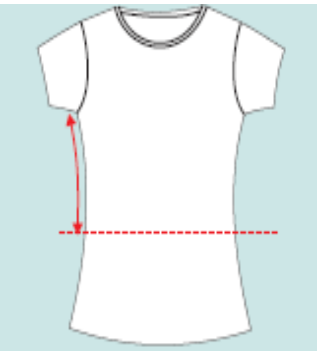


Cuff Depth / Height

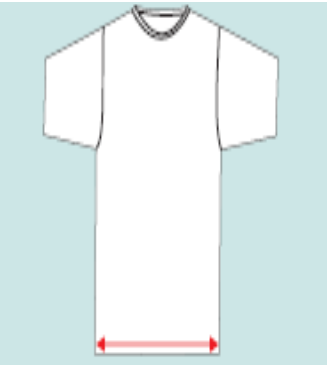
Waist from HPS



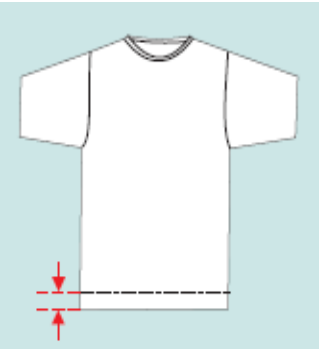
Waist from Underarm



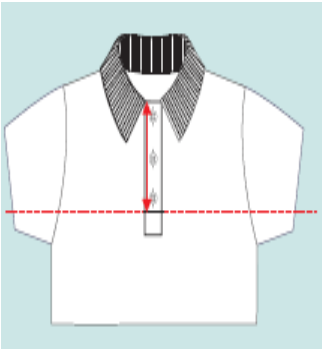
Sweep / Bottom Width



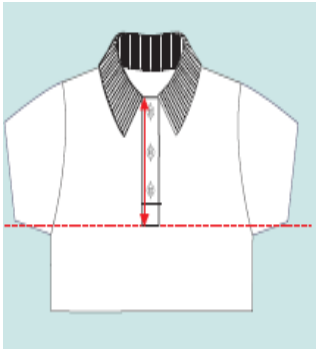
Bottom Hem Height



Placket Opening



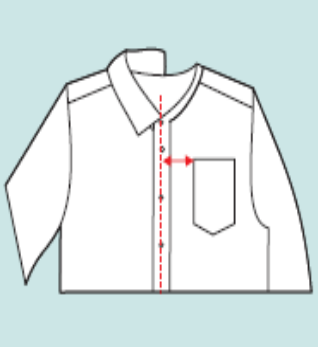
Placket Length



Placket Width

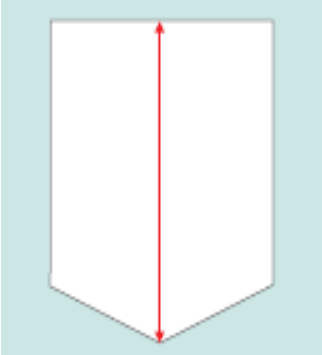
Pocket Position from HPS

Pocket Position from C.F

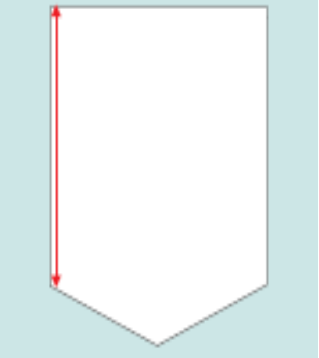


Button Spacing

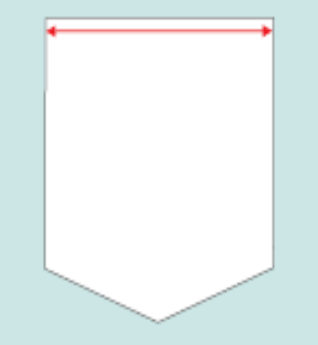
Center Pocket Length



Pocket Side Length

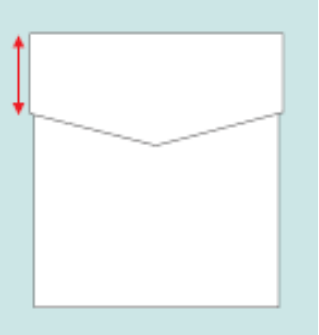


Pocket Width

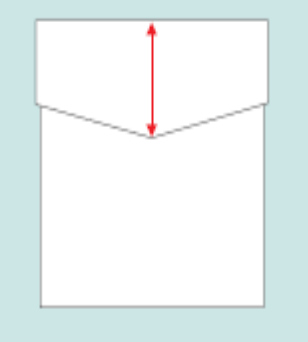


Pocket Flap Width

Pocket Flap Length (Side)



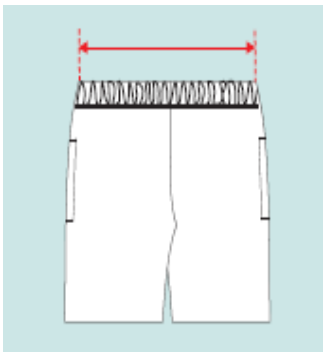
Pocket Flap Length (Center)



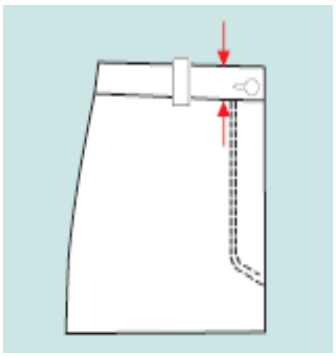
Bottoms (All Categories)

- Waist (relaxed/extended)
- Hi/Low Hip
- Front/Back Rise
- Thigh
- Inseam
- Leg opening

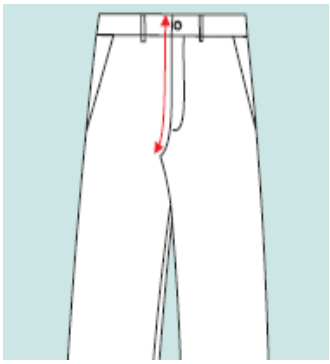
Waist



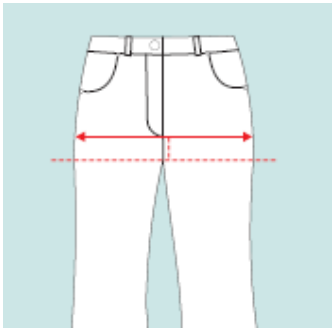
Waistband Depth / Height



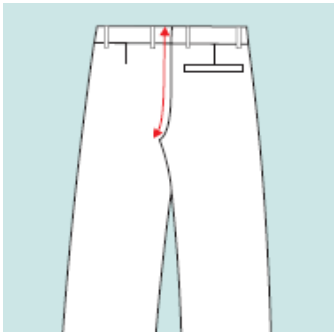
Front Rise



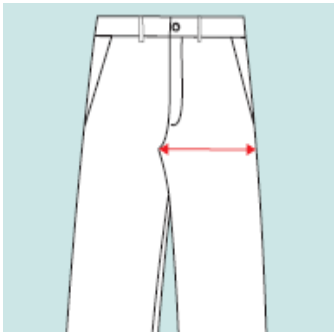
Hip from Crotch Seam



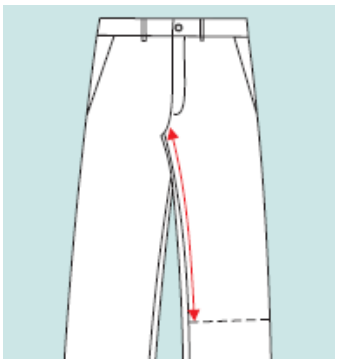
Back Rise



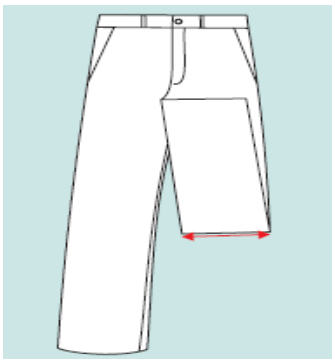
Thigh at Crotch



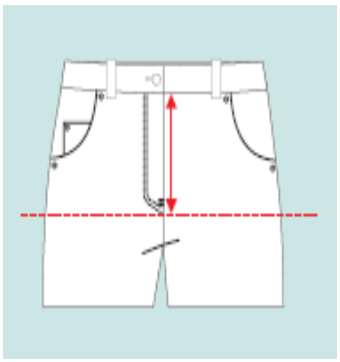
Knee at Half Leg



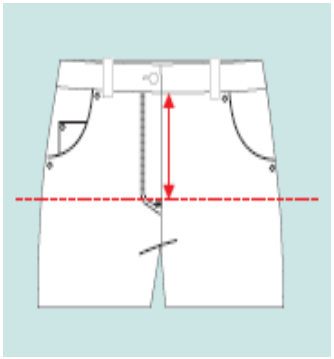
Knee Position



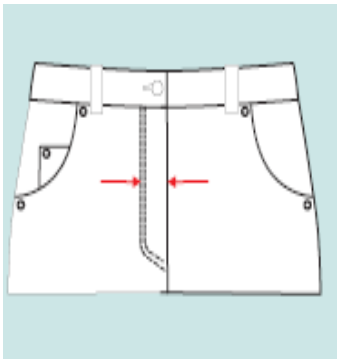
Fly Length



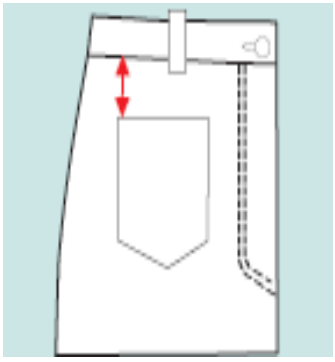
Fly Opening



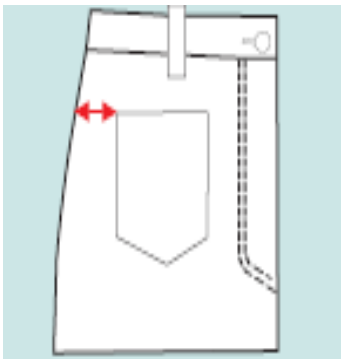
Fly Width



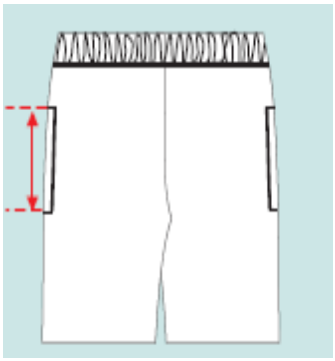
Pocket Position (Waist Seam)



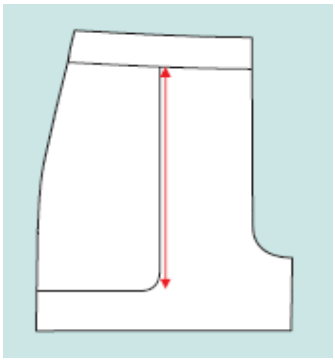
Pocket Position (Side Seam)



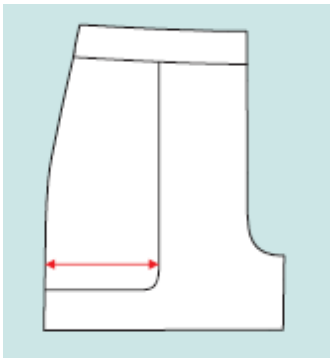
Side Pocket Opening



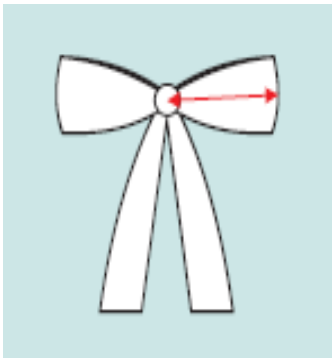
Pocket Bag Height



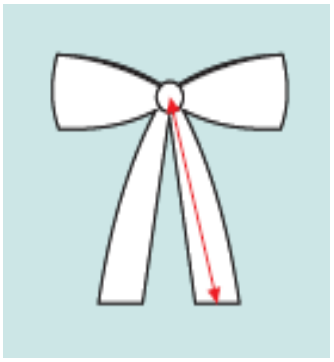
Pocket Bag Width



Bow Width

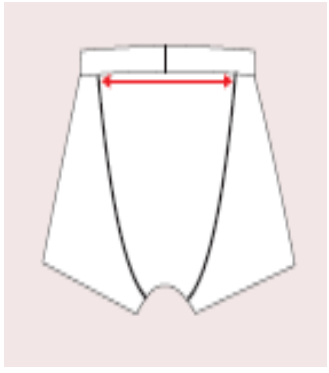


Bow Length

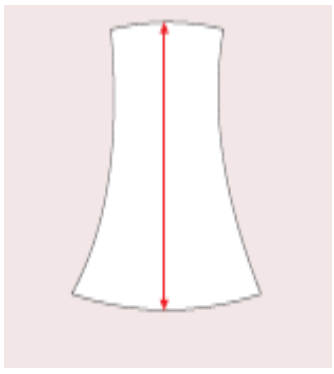


Front Panel Width

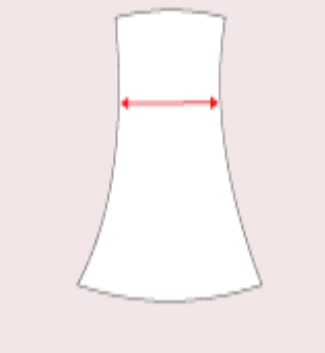
Back Panel Width



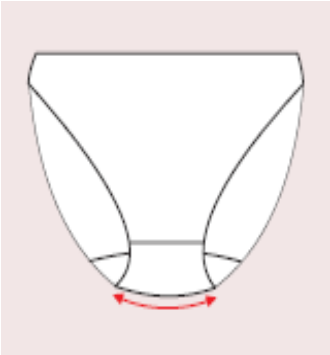
Gusset / Liner Length



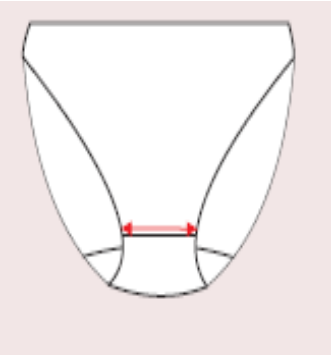
Gusset / Liner Width (Narrow Point)



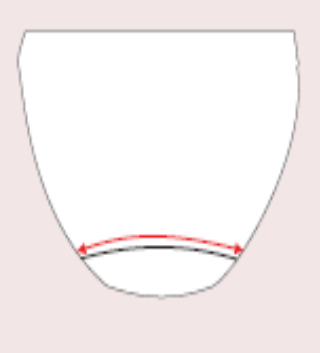
Crotch Width at Fold



Front Seam Width



Back Seam Width



CHAPTER 5

Stages of Garment Manufacturing Process

Ginning

It is a process in which cotton lint and other contaminations in the cotton are eliminated. Purified cotton is compacted to bales for commercial use.

Spinning

It is combination of all processes which are involved in conversion of fiber into yarn. In textile when we say spinning then we mean to say about the final process in the transformation of fiber into yarn.

- ***Mixing:*** Mixing of different lots of cotton.
- ***Blowing:*** Input is mixed cotton & output is ***"Lap"***, like a sheet of paper rolled over a steel rod.
- ***Carding:*** Input for carding is lap which is obtained from blowing section & output is "***Sliver"***, like rope.
- ***Drawing:*** Drawing is a process in which different slivers are combined together to produce single sliver. Normally 8 slivers are feeded behind one drawing machine and get an end product in form of single sliver.
- ***Combing***: If fine yarn is required then this process is added.
- ***Simplex***: Simplex is almost the finishing stage of the spinning. In the Simplex process, sliver is fed and "***Roving"*** is manufactured. Finished sliver is drafted and very low twist is inserted to form Roving.
- ***Ring***: In this section roving from simplex section is turned into fine & sophisticated yarn of different counts.
- ***Auto Cone***: The primary objective of this process is to assemble a packaged form suitable for subsequent procedures such as weaving and knitting.

Yarn Count

Count is the fineness of yarn. Number of hanks per pound is called count (one hank is equal to 840 yards). We may say that if one pound cotton makes one hank count will be 1. If same weight of cotton makes 10 hanks then count will be 10 and if it makes 20 hanks then count will be 20. Count can be measured by given formula,

"Count = length in hanks/Weight in pound".

Single yarn having 20 count can be written as 20/1, if 20/2 it means 20 double, if 20/3, 20/4, 20/5 it means count 20 is three ply, four ply, or five ply etc.
Count always irreversibly proportion to diameter. If count is fine e.g. 20 or 22 yarn will be fine and thin. If count is coarser e.g. 12 or 10 then yarn will be thick. The woven or knitted fabric with higher count will be fine and smooth but it may not be durable.

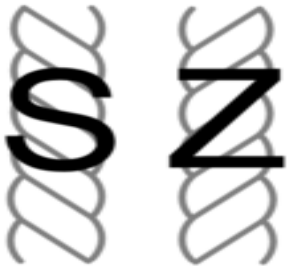
Different Counts of Yarn

10 Single	22 Single	32 Single
12 Single	24 Single	36 Single
16 Single	26 Single	40 Single

20 Single 30 Single 50 Single

Counts from 10 single to 16 single are coarser, from 20 single to 30 single are medium and from 32 single to 50 single and upwards are fine.

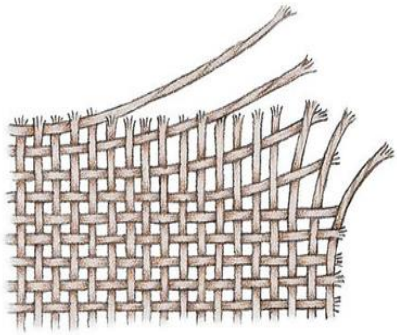
Twist Direction of Yarn



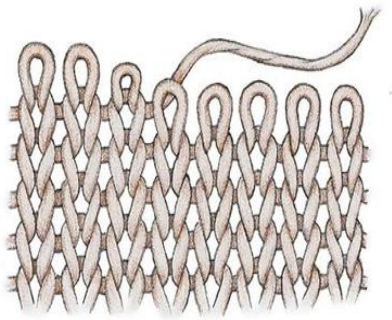
- S-Twist (Clock Wise)
  The yarn used in weaving and knitting is mostly S-Twist, and rarely produce Z-Twist yarns for knitted fabric.

- Z-Twist (Anti Clockwise)
  Z-Twist yarn mostly use for thread making and sewing purpose.

Fabrication



woven material



knit material

Generally there are two types of fabric.

1. Woven Fabric
2. Knitted Fabric

Weaving is defined as the process of making fabric by interlacing yarns.

Knitting It is a process of making fabric by interloping one or more yarns, instead of two sets of yarns crossing each other in weaving. Tubular machines are used for knitting. Machine gauge and setting will be different for the different fabric types.

Types of Knitting Machines

- Flat Knitting
- Circular Knitting

Types of Knitted Fabric

There are basic two types of knitted fabric.

1. **Warp Knit Fabrics**
   i. Single Knit Fabrics
   ii. Double Knit Fabrics
2. **Weft Knit Fabrics**

i. Single Knit Fabrics
- Single jersey
- Fleece
- Pique
  - Honey Comb Pique
  - Locast Pique
  - Bird Eye pique

ii. Double Knit Fabrics
- Interlock
- Rib
  - Flat-back rib

- Waffle / thermal etc.

*****The knitted stitches that occur in vertical columns are called Wales, and those in horizontal rows are called courses.

Types of Stripes in Garments

- ***Feed Stripes*:** Those have a small repeat of the stripe design, which generally fits within 1.9 inches.
- ***Auto Stripe*:** Those have larger repeats of the stripes i.e. more than 1.9 inches.
- ***Engineered Stripe*:** A design of the stripes which is not repeated in the garment. The size of the repeat depends on the size of the garment. Where one repeat ends in the fabric during knitting, the next garment starts.

Feed Stripe

Auto Stripe

Engineered Stripe

Dyeing

It is the process of coloring the fabric according to the required color and shades through different processes in different stages such as,

- ***Singeing*:** The process by which loose, hairy projecting fibers are removed.
- ***De-sizing:*** By this process gummy and size materials are removed.
- ***Scouring:*** This process is performed for removing impurities of the textile materials.
- ***Bleaching:*** This process removes the natural color of the material.
- ***Mercerization:*** It is an additional treatment. It increases the strength and luster of the material.

Types of Dyes:

- Direct Dyes
- Reactive Dyes
- Disperse Dyes
- Sulpher Dyes
- Vat Dyes

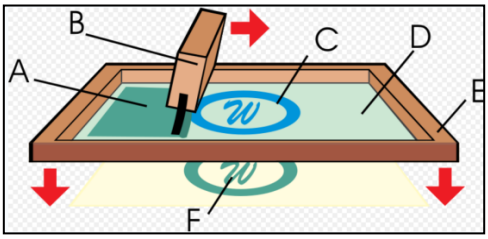
Fabric Finishing In this process, fabric is treated with some mechanical or chemical process before or after dyeing or printing to give the fabric a fancy/novelty touch to make it more durable, flexible, soft and good in appearance & handling.

Cutting is the process of converting fabric into sew-able cut parts. It consists of following processes

- ***Getting the fabric***: Issuance from fabric store.
- ***Spreading:*** Manually or through computerized spreading machine.

- ***Pattern marking***: Manually or through computerized GGT pattern making.
- ***Cutting***: Hand cutters or with modern automatic cutters.
- ***Bundling***: All cut part according to roll or lot.

Printing and its Types



Screen Print:

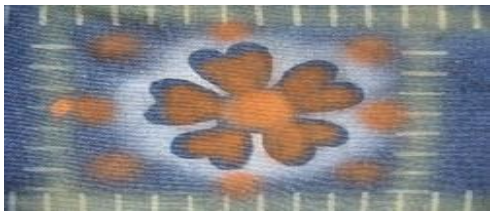
A process, where ink is mechanically applied to a surface with the use of a screen

Pigment Print:

These penetrate the fabric more and create a much softer feel. Also useful for larger area prints where texture is important

Flock Print:

This process involves printing of glue on the fabric first, applying the fibre flock on the gel printed by keeping the fabric on special table (electro statically charged).



Discharge Print:

Used to print lighter colours onto dark background fabrics, they work by removing the dye already present in the garment.

Foil Print:

This printing method is based on the use of metallic foil paper of alu

Puff Print:

An additive to Plastisol inks which raises the print off the garment, creating a 3D feel.

Heat Transfer Print:

Heat transfer printing is a method of transferring a desired pattern via heat onto a substrate.

Printing Defects

Poor Coverage

Poor with light ink coverage resulting in coverage is prints the fabric color bleeding through the print, or too much ink where the ink builds up is too heavy often resulting in a blurry print or varying color intensity within a heat transfer.

Cracking

Cracking is link that is cracked or cracks when garment is stretched.

Color Migration

The transfer of dye from print onto fabric of garment or other colors within print.

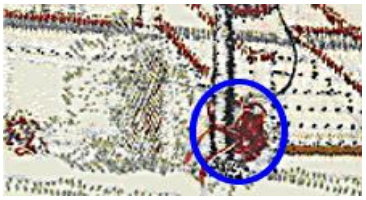
Embroidery

Embroidery is an art form that uses close or overlapping stitches to form intricate, three-dimensional, surface designs to embellish piece goods, trims or garments. Embroidery is a flat trim that adds interest and differentiation to a product.
Embroidered designs may be applied directly to piece goods, garment components, finished garments, or as individual emblems that are an add-on type of trim.

Direct Embroidery: Direct embroidery becomes an integral part of garment structure as stitching cannot be removed without damaging piece goods. Garment components such as pockets, shirt fronts and collars may be embroidered with designs or logos prior to assembly to facilitate handling and manipulation of materials.

Emblems: Emblems are individual embroidered designs with finished edges. They are mass-produced trims known as embroidered patches, appliqués, insignia, or badges frequently used on outerwear.
Compared with direct embroidery, emblem designs are often larger, more complex and use more stitches, colors and thread.

Embroidery too Thick



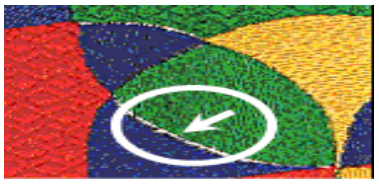
Where the embroidery is too thick and uncomfortable. Can be caused by too high of a stitch density or not using the correct backing for the application.

Bunching at Corners

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

Fabric Grin Through or Gapping

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



Sewing is the process of converting fabric cut parts into garment with the help of different machines according to the specified seam classes and stitch types **or** the process in which conversion of two dimensional fabrics into three dimensional fabrics is called sewing.

Finishing in this process stitched garments are inspected for further purification of defects occurred in the sewing process.

Packing is the stage in which finished garments (after finishing) are packed according to the buyer's requirement using different packing accessories and different quantities in the carton.

Internal Audit-External (Buyer's) is the stage of random inspection of the finished packed goods ready for shipment either by internal Q.A (pre-final or final) or by the buyer's auditors or third party inspector in case of any ambiguity.

Shipment Move if OK Otherwise Re-Screen If the shipment is ok then it is moved. Otherwise it will be 100% rechecked to meet the required quality standard.

Stitches & Seams

Stitch: Is a formation of thread for the purpose of making a seam or stitching / a loop of thread or yarn resulting from a single moment of needle in sewing or knitting is called stitch.

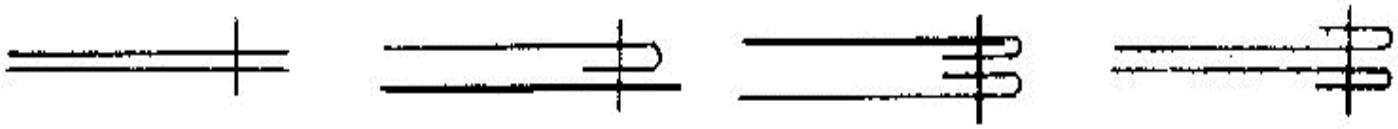
Types of Stitches

There are two basic types of stitches

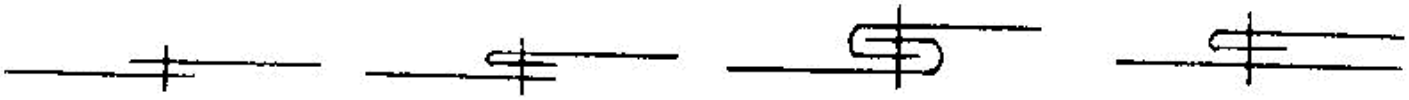
1. Lock Stitch (Examples for lock stitch are zigzag & button hole).
2. Chain Stitch (Examples for chain stitch are over lock & flat Lock & usually used loopers).

Seam: Consists of a series of stitches used to join two or more plies of material / fabric.
They are classified into following types.

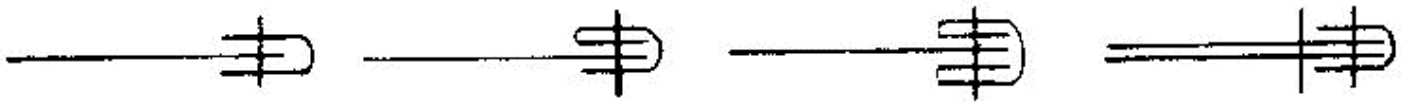
1. **Super Imposed Seams:**
   Seams in which two or more plies of fabric are superimposed on each other.



2. **Lapped Seams:**
Seams in which two or more plies of fabric are superimposed and/or folded on each other.

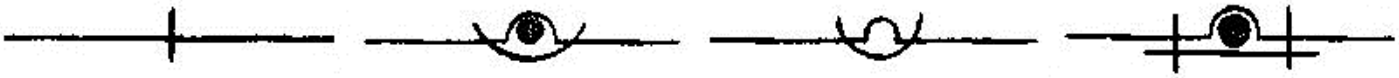


3. **Bound Seams:**
Seams in which one ply of fabric is sewn over the edge of two or more plies of fabric.

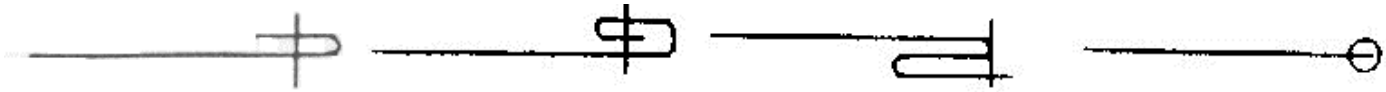


4. **Flat Seams:**
Seams in which two or more plies of fabric are sewn together at the edges.

5. **Ornamental Seams:**
Ornamental stitching is stitches sewn on one ply of fabric.



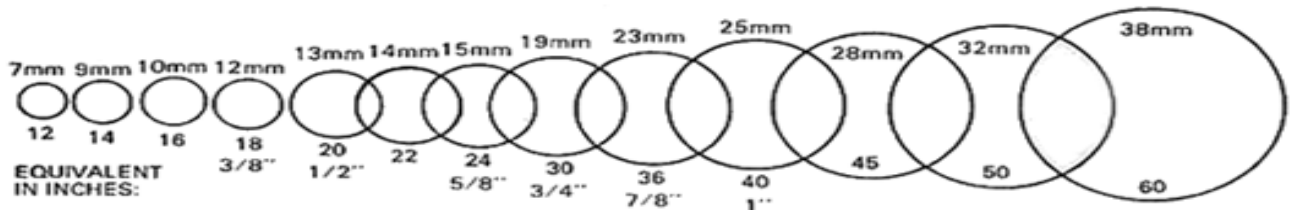
6. Edge Neatening Seam:
Fabric edge is finished with stitching.



Button Specification

Ligne	14	16	18	20	22	24	30	36	45	55	70
Inches	1/3"	3/8"	7/16"	1/2"	9/16"	5/8"	3/4"	7/8"	1-1/8"	1-3/8"	1-3/4"

*** Ligne:** A button's legne refers to a button's size. The word ligne is a French word that became the standard reference used by German button manufacturers in the early eighteen century. Ligne is the international recognized standard.



Machine Types Being Used In Garment Flow

Lock stitch

There is one bobbin and one bobbin case in this machine. In single needle lock stitch, one needle is used. At one time two needles can be used in double needle lock stitch machine. Machines under this type are

- Single Needle Lock Stitch
- Double Needle Lock Stitch
- Button Hole
- Button Attach
- Bar Take
- Embroidery Machine
- Zig Zag Machine

Over Lock

Over lock can be 3thread, 4thread and 5thread .In three threads over lock, there are two loopers and one needle. In 4 threads over lock, there are two loopers and two needles.
In 5 threads over lock, there are two loopers and three needles.

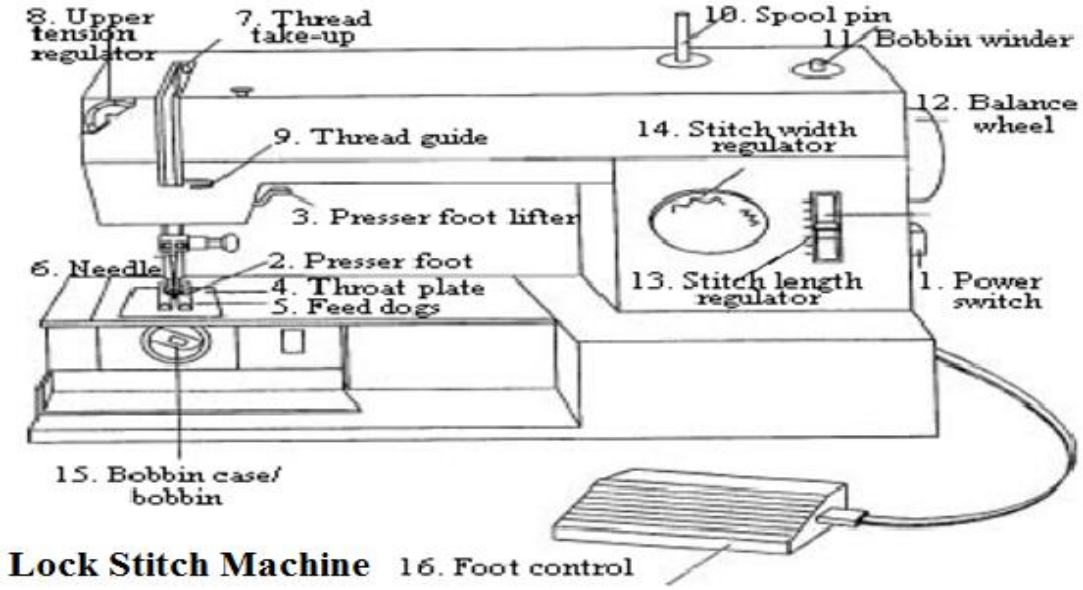
Flat Lock

Flat lock machines can be 2 thread, 3thread, 4thread and 5thread.It also can be a
1-Cylinder Bed
2-Mini Cylinder,
3-Plain Bed
4-Feed of The Arm (Feedo Machine)
5-Flat Seaming
6-Multi-Needle Flat Locks.
In three threads flat lock, there are one looper and two needles. In four thread flat lock, there is one looper and three needles or two needles, (one loopers & one spreader). In five thread flat lock, there are three needles, one loopers and one spreader.

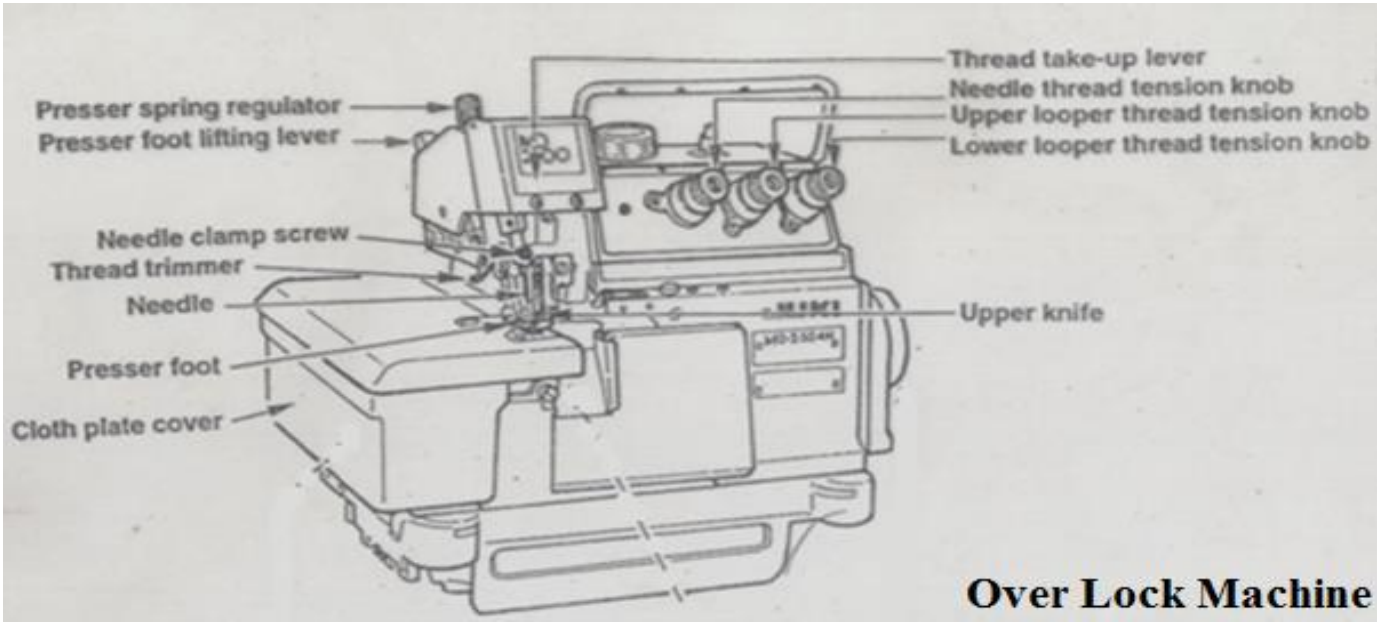
Lock Stitch Machine

Over Lock Machine

Flat Lock Machine



Lock Stitch Machine



Over Lock Machine

Heat Transfer Label Machine

It is used to attach the labels with heat .The temperature should be 150°C to 300°C. The timing should be of 02 to 05 seconds. Pressure should be 40 to 60PSI.

Description of Sewing Machine Parts

Bobbin Case - The bobbin is either dropped into the case or the case is removed and the bobbin is inserted vertically.
Bobbin Winder Spindle - This is where you put the bobbin to wind it.
Bobbin Winder Stop - Press the bobbin against this when winding it. When the bobbin is fully wound, it will usually stop or "pop".
Feed Dogs - Helps guide the fabric through as it is stitched.
Free Arm - This can be left on for a flat bed or removed for free arm. Useful when you want to sew circles around things such as sleeves, pant cuffs etc.

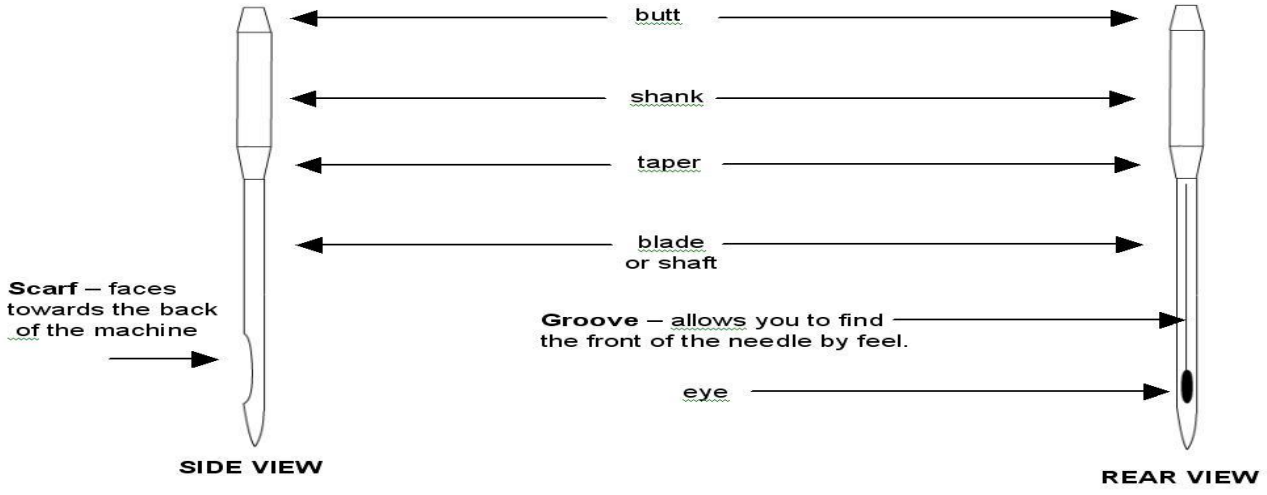
Hand Wheel Or Fly Wheel - Used to moves the needle up and down slowly by hand.
Presser Foot - Hold fabric flat as it is fed through the machine.
Presser Foot Lever - This raises and lowers the foot so that you can change it and move fabric in and out.
Reverse Button - When pressing this button, it switches your machine into reverse mode. Used for back stitching to secure the beginning and end of your stitching.
Thread Spindle Or Spool Pin - Holds the thread spool.
Stitch Length Selector - Determines how long your stitches are.
Stitch Selector - A key pad that allows you to choose between computerized monograms or stitch witchery.
Stitch Width Selector - Determines how wide you want your stitches. Useful in zigzag or decorative stitches.
Stop Motion Or Clutch Wheel - Stops the machine from stitching while allowing the wheel to move. Used when winding the bobbin.
Tension Selector - Allows you to work with thread tension.
Thread Guide - Keeps your thread in line before it enters the take up lever or tension mechanism.
Thread Take-Up Lever - As your machine turns, this take up lever moves up and down synchronizing with the movement and amount of thread needed for stitching.
Throat / Needle Plate - Fits over the feed dogs and usually has markings that indicate seam allowance distance from the needle position.
Needle & Needle Clamp Screw - The needle is held in place by this screw.

Needle Specifications According To Machine

Needle	**M/C Type**			**Needle Type**			**Needle Height**			
	Over lock			DC			**1** 1/4"			
	Lockstitch			DB			**1** ½"			
	Flat lock			DV			**1** ¾"			
Size ranges	**Lightest**				↔				**Heaviest**	
	American	8	9	10	11	12	14	16	18	19
	European	60	65	70	75	80	90	100	110	120

Note: DC, DB, DV & UY etc are the needle identification numbers as per machine type which mostly needle manufacturers are using in the world.

Parts of Stitching Machine Needle



CHAPTER 6

Quality Assurance Systems & Procedures

Accessory Audits

Q.A conducts accessories audit in stores where accessories (sewing, packing) from different vendors received. Q.A auditors conducts accessories audits as per below given criteria and SOPs.
Q.A has documented system for all types of accessories audits.

Audit Criteria

Accessories Audit Inspection: Audit able quantity (10% minimum) is selected randomly from population. This selection is not followed by any prepared direction or procedure.

Accessories Audit Level (According To Qty)

From	To	Insp.%
01	100	60%
101	500	40%
501	1000	30%
1001	10000	25%
10001	Above	10%

Audit @ O.Q.L 2 %.

SOPs

1. Take Chillan/ I.G.P/ G.R.N and read carefully and identify/verify the items as per Chillan/ I.G.P/ G.R.N.
2. Verify the quantity of accessory and take random sample as per criteria.
3. Conduct audit carefully as per given guidelines accordingly & verify as per customer's provided sample.
4. For stitching thread, heat transfer label, woven labels & elastic etc. take laboratory tests.
5. Above listed items will not be moved / forward without laboratory test.
6. If any laboratory test shows any concern then that G.R.N should be **Hold / Reject** till further decision.
7. After completing above audit criteria, maintain audit report and mention all findings and also prepare accessory approval card for final merchandiser's approval.
8. If any G.R.N's O.Q.L exceeded 2.0% that G.R.N should be rejected.
9. After Merchandiser's approval, the concern G.R.N should be forward to for further process.
10. Keep audit report & approval card in proper way for future query.

In-Line Audits

QA Conducts In-Line Audits at sewing stage of garments' manufacturing as per following criteria and SOPs.

Audit Criteria

- General Inspection Level II (MIL-STD-105E)

SOPs

1. Identify population (lot to be audited).
2. Select sample size (before End Line Inspection).
3. Audit for quality of stitches, seams, construction and measurement.
4. Garment should be checked clockwise and when a defect is found it must be marked, but the inspection of the garment must continue until the whole garment has been reviewed.
5. Conduct quality audit at least two times a day.
6. Perform measurement audit according to the sample size and make specs report (attached in appendix).
7. Measure all Points of Measure (POM) of each garment of the selected sample size and record the results on the Spec/Measurement Chart. Any measurement out of tolerance must be circled.
8. Perform stretch test of Heat transfer label/printing as follows,
    - Allow 5 minutes peeling off time before stretch test for every specimen/garment.
    - Hold the specimen 2cm away from both sides and stretch up to fabric extend and hold till 10 seconds. Perform stretching in horizontal and vertical directions.
    - Examine carefully to ensure proper adhesion and that the heat transfer is not peeling off.
    - Any evidence of cracking or lifting should report immediately.
9. Any problem/ambiguity should be addressed immediately to the concerned Production/QC supervisors. Any problem should not be carried forward to the following hour/session/day.
10. No segregation of major and minor (a defect is a defect).
11. Quality control inspectors should be evaluated as per above criteria.
12. Calculate OQL % at the report closing and take sign of concerned QC Inspectors and QC Supervisor/Assistant Manager. Report format is attached in appendix.
13. Check the trims' (cuffs, collars, zippers, buttons, labels etc) attaching operations at least twice in a shift against approved trims card. Any ambiguity should be immediately addressed to the concerned Production/QC staff.
14. Audit should be fair and reporting should be authentic.

Special Instructions:

- Always inspect the complete sample size. Do not assume, after inspecting a few piece, the lot is good – the inspection must be completed before making such an assessment.
- Population size (for selecting sample size) verify through SAM sheet.
- Operational breakdown and SPI (stitches per inch) verify through SAM sheet.
- Before starting Inline Audit, it is required for QA Inline Auditor to make sure the availability of following **items/tools,**
    - Appropriate inspection table/area with appropriate lighting
    - Approved Sample
    - SAM sheet
    - PPC file
    - Trims card (merchandiser's approved)
    - QA Inline Audit Report
    - Pen
    - Sampling Plan(MIL STD 105E)
    - SPI gauge
    - Measuring Tape
    - Faults Catalogue
    - Faults' stickers

Finishing/Batch Audit

QA Conducts Batch Audits at finishing stage (after pressing) as per following criteria and SOPs.

Audit Criteria

- Inspection Level: S-1 (For Measurement Audit), G-II (For Quality Audit).
- A.Q.L 1.5

SOPs

1. Perform batch audit of the Finished Lot on hourly basis.
2. Count the finished lot (Quantity offered for Batch Audit).
3. Conduct random sampling as per above given criteria (Inspection Level).
4. Perform Measurement Audit with maintaining the specs report.
5. Any measurement fault will be highlighted on specs report and will be delivered on Batch Audit report.
6. Perform Audit for Quality (Workmanship / Fabrication / Soilage / Labeling / Pressing issues etc.)

7. Garment should be checked clockwise and when a defect is found it must be marked, but the inspection of the garment must continue until the whole garment has been reviewed.

8. If any quality issue will detect that will be mentioned on Batch Audit report.

9. Final decision of the batch audit will be made at above given AQL along maintaining Batch Audit report.

10. All findings of the batch Audit will be shared with concerned Finishing Supervisor / In-charge /A.M (for appropriate corrective / preventive measures).

11. Prior to conduct re-audit (of failed lots), make it sure that proper re-screening has been performed.

12. For conducting re-audits of the failed lots, follow the SOPs from start.

13. Calculate FPY & OQL % at the report closing.

FPY = (1st Pass Quantity / Total Quantity) X 100

14. After closing report take sign from concerned finishing Supervisor / AM and submit the report in QA office (for data punching / record keeping).

15. Audit should be fair and reporting should be authentic.

Special Instructions:

- Batch Audit of the finished lot with mixed POs/Styles will not be conducted.
- Always inspect the complete sample size. Do not assume, after inspecting a few piece, the lot is good – the inspection must be completed before making such an assessment.
- If any batch audit failed 3rd time consecutively, QA Batch Auditor will stop re-audit and will inform to the concerned QC Manager.
- Before starting Batch Audit, it is required for QA Batch Auditor to make sure the availability of following items/tools,
    - Appropriate inspection table/area with appropriate lighting
    - Approved Sample
    - SAM sheet
    - PPC file
    - Trims card (merchandiser's approved)
    - QA Batch Audit Report
    - Pen
    - Sampling Plan (MIL STD 105E)
    - SPI gauge
    - Measuring Tape
    - Faults Catalogue
    - Faults' stickers

Internal Audit

QA conducts Internal Audits of packed goods as per following Criteria and SOPs.

Audit Criteria

- Packing Audit: General Inspection Level II, Zero Tolerance Level
- Measurement Audit: Special inspection Level , S-3
- Quality Audit: General Inspection Level II, A.Q.L 1.5

Note: For Lot/shipment with six/more colors, sampling criteria will be as follows.

- Packing Audit: General Inspection Level III
- Measurement Audit: Special inspection Level , S-4
- Quality Audit: General Inspection Level III

SOPs

1. Take packing list and make sure either they paste ASN/DTS or not if no then audit should not be start, if paste and then make sure the calculation after it take down the sample size in pieces and cartons .
2. Then count the number of cartons according to the packing list color wise or size wise as well as check ASN/ Barcode information, after confirmation paste the stamp and mark cartons as per sample plan.
3. Before opening carton, check seal and security slip is there both sides.
4. Every auditor should check appropriate signature of specific mark.
5. Now open the cartons and check Qty of Garments which is required, either solid packing or assorted.
6. After checking Qty, check accessories according to accessory card and contract; check color code, lot #, P.O# and size code with respect to ASN/DTS / Barcode detail.
7. In hanger packing, check the hanger whether it at front side or reverse and always showing like question mark on front.
8. During checking packing we have to select sample sizes for measurements & Quality audits. If packing audit rechecks then Quality audit stopped.
9. After it perform measurement audit according to the sample size and make specs report (attached in appendix E).
10. Any Measurement that is out of tolerance needs to be circled and recorded on the measurement sheet.
11. After measurements audit start Quality audit as per audit criteria.

12. Garment should be checked clockwise and when a defect is found it must be marked, but the inspection of the garment must continue until the whole garment has been reviewed.

13. Upon completion of audit, the defective units are tallied and the following action is taken:

- If the number of defective units found is/are equal to or less than the acceptable level, the lot will be considered acceptable.
- If the number of defective units found is/are equal to or greater than the reject level, the lot will be failed (re-screen).

14. Make the packing and quality audit reports (formats attached in appendix E), and show the OQL % of the shipment.

15. If audit is OK then paste green slips on top of the cartons and move to store, if recheck then paste pink slip and move to unit, if packing recheck then paste yellow slip and move to unit, if Quality audit 2nd time OK then also use yellow slips and move to Store.

16. Conduct re-pack audit.

Special Instructions:

- Always inspect the complete sample size. Do not assume, after inspecting a few piece, the lot is good – the inspection must be completed before making such an assessment.
- QA not allows the audit of lot with mixing of different styles or POs. Each style and PO will be audited separately.
- Take snaps of faulted garments of failed shipments.
- For re-screened/failed shipment, the concerned unit/QC will take corrective action to bring the lot's quality to an acceptable level. The concerned unit will be responsible for 100% re-inspection of the lot to sort out and/or correct all defective garments. The concerned unit will present lot to QA re-audit after re-inspection (100%). The concerned unit is not allowed to put rejected pieces back into the failed lot during/after re-inspection. The rejected pieces must be corrected or removed from the lot prior to present QA Audit.
- If any audit failed third time, QA will not conduct its re-audit until the approval of Director Operations.

Audit Tools / Requirements

Before initiating an audit, it is required for Q.A auditor to make sure the availability of following tools…….

Tools (correct & updated)

- Sampling Plan (MIL STD 105E)
- Approved Pre-Production Sample
- Defects Catalogue
- How to Measure Guide (Q.A Quality Manual or Customer Quality Manual)

- Calibrated Measurement Tape
- PPC File / Product Package
- Contract File
- Approved Trims & Accessory Card
- Packing List
- Defect Stickers
- Q.A Reports
- Pen / Marker
- Stitch Counter
- Calculator
- SAM Sheet
- Barcode Scanner (Optional)
- Stamps & Pad

Audit Room

Q.A final audits have been conducted in audit room which is fulfilling the below listed requirements

- Inspection tables with **"Munsell Grey Surface"**
- Minimum illumination of **"1075 To 1100 lux"**
- Clean & dry area
- Organized and quiet

Pick & Pack Audits

Q.A performs pick & pack audits at warehouse. Only packing audits performed as per following criteria.

Audit Criteria

Audit Type	General Inspection Level	Tolerance Level
1. Complete Packing Audit	II	0
2. EDI Packing Audit	II	0
3. Group Lot Packing Audit	II	0
4. Catalog Packing Audit	II	0
5. Re-Ticketing Packing Audit	II	0
6. Re-Packing Audit	II	0
7. ASN Audit	II	0

SOPs

1. Take packing list & make sure either they paste ASN/ MCL stickers on the cartons or not. If no then audit should be stopped. If they paste then make sure the calculation of cartons, after it take the sample size in cartons
2. Packing audit @ general inspection level II.
3. Then count the number of cartons according to the packing list color wise or size wise as well as check ASN / MCL, Barcode information, after confirmation mark cartons as per sample plan.
4. Before opening the cartons, check seal and security slip. It should be pasted up & down both sides of the cartons.

5. Every auditor should check appropriate signature of specific mark & should stack the marked cartons color & size wise.
6. Now open the cartons color wise & size wise & check qty of garments as per barcode & ASN / MCL, which is required, either solid packing or assorted.
7. After checking qty, check accessories according to accessory card and contract; check color code, lot #, P.O# and size code with respect to ASN / MCL, Barcode detail.
8. In hanger packing, check the hanger whether it is at front side or reverse. It should always like question mark on front.
9. Then make the packing audit reports, and show the OQL of the shipment.
10. O.K shipments should be moved & stack properly.

NOTE:

- Federal Trade Commission (FTC) requires that each item will be labeled to show fiber content, the name or registration number of the manufacturer, importer or seller and care instructions.

Sampling plan

By keeping in view the quality standard & requirements of MTM's valued customers, Q.A is determining & measuring the quality of all products by using sampling plan MIL-STD-105 E.

- **MIL-STD-105E:** is a random sampling inspection method and is the most widely accepted method of sampling by attributes based on the mathematical theory of probability. It provides the number of samples to be inspected in a given shipment / lot size. It also provides specific criteria for acceptance or rejection of a shipment / lot based on the number of defects found, and provides a fair assessment, to both buyers and sellers, related product quality.
- **AQL (Acceptable Quality Level):** is the quality level which is for purposes of sampling inspection. It is the limit of satisfactory manufacturing process.

How TO PICK SAMPLE SIZE

"For Pieces Sample"

Total Pieces in (color, size) / Total Pieces in (shipment) X Total sample Pieces.

"For Cartons Sample"

Total Cartons in (color, size) / Total Cartons in (shipment) X Total sample Cartons.

Sampling Plan For Audits

Military Standard (MIL- STD-105E)

Table I ----- Sample Size Code Letters

Lot Size	Special Inspection Levels				General Inspection Levels		
	S---1	S---2	S---3	S---4	I	II	III
2 --- 8	A	A	A	A	A	A	B
9 --- 15	A	A	A	A	A	B	C
16 --- 25	A	A	B	B	B	C	D
26 --- 50	A	B	B	C	C	D	E
51 --- 90	B	B	C	C	C	E	F
91 --- 150	B	B	C	D	D	F	G
151 --- 280	B	C	D	E	E	G	H
281 --- 500	B	C	D	E	F	H	J
501 --- 1200	C	C	E	F	G	J	K
1201 --- 3200	C	D	E	G	H	K	L
3201 --- 10000	C	D	F	G	J	L	M
10001 --- 35000	C	D	F	H	K	M	N
35001 --- 150000	D	E	G	J	L	N	P
150001 --- 500000	D	E	G	J	M	P	Q
500001 --- OVER	D	E	H	K	N	Q	R

Packing Audit	Packing Audit is conducted Normally on Inspection Level II, In Special Cases Adopt Level III .						
Lot Size	Insp.	Acp.	Rej	Lot Size	Insp.	Acp.	Rej.
151 --- 280	32	0	1	1201 - 3200	125	0	1
281 --- 500	50	0	1	3201 - 10000	200	0	1
501 --- 1200	80	0	1	10001 or More	315	0	1

Sampling Plan For Audits

Military Standard (MIL- STD-105E)

Table II --- Single Sampling Plan for Normal Inspection (Master Table)

Sample Size Code	Sample Size	Acceptable Quality Levels (Normal Inspection)											
		0.65		1.0		1.5		2.5		4.0		6.5	
		Acp	Rej	Acp	Rej	Acp	Rej	Acp	Rej	Acp	Rej	Acp	Rej
A	2												
B	3												
C	5											0	1
D	8									0	1	1	2
E	13							0	1	1	2	2	3
F	20					0	1	1	2	2	3	3	4
G	32			0	1	1	2	2	3	3	4	5	6
H	50	0	1	1	2	2	3	3	4	5	6	7	8
J	80	1	2	2	3	3	4	5	6	7	8	10	11
K	125	2	3	3	4	5	6	7	8	10	11	14	15
L	200	3	4	5	6	7	8	10	11	14	15	21	22
M	315	5	6	7	8	10	11	14	15	21	22		
N	500	7	8	10	11	14	15	21	22				
P	800	10	11	14	15	21	22						
Q	1250	14	15	21	22								
R	2000	21	22										

Sizing Chart	Sizing Audits conducted on One Size range with Less than 1200 Units, Measure 0, Allow one out of Tolerance POM (Point Of Measurement)	
Lot Size	Measure	Allowed
1 - 3200	13	2
3201 - 30000	20	3
30001 or More	32	4

Supporting Documents

SAM Sheet

What Is SAM? It stands for **"Standard Allowed Minutes"**
A Sam sheet contains

1. Operational breakdown of garment.
2. Types & number of machines.
3. Daily production target.
4. Stitch bite.
5. Needle gauge.
6. Number of needles & thread for an operation.
7. Needle size.
8. SPI.
9. Operational time & time of completion of Garment.

PPC File

What Is PPC? It stands for production planning & control
A PPC file contains

1. PO & style.
2. Buyer name.
3. Description of garment & fabric (GSM & fabric contents).
4. Color & size breakdown.
5. Cutting details.
6. Sewing details of garment.
7. Measurement sheet.
8. Packing details (fold size, poly bag size, carton size & type of packing).

Accessories / Trim Card & Approved Swatches for All Colors

Purpose of accessories / trim card & swatches is to assure that the accessories / trims & colors of fabric being attached are correct. It should be approved by concern merchandiser / customer.

Accessories / Trim Card Contains;

For Stitching

1. Main Body Fabric
2. Trims (Collar & Cuff Rib, Leg Binding, Fly Binding Tape Etc.)
3. Elastic
4. Mobilin Tape
5. Twill / Canvas Tape
6. Stitching Thread
7. Labels Etc.

For Packing

1. Pieces Poly Bag
2. Master Poly Bag
3. UPC/OCR/SKU/Bailer Bag Sticker/Carton Stickers
4. Size Stripe Sticker/Size Wrapper
5. Style Description Sticker
6. Tissue Paper
7. Hanger & Tag Pin
8. J-Board/ Insert Card etc.

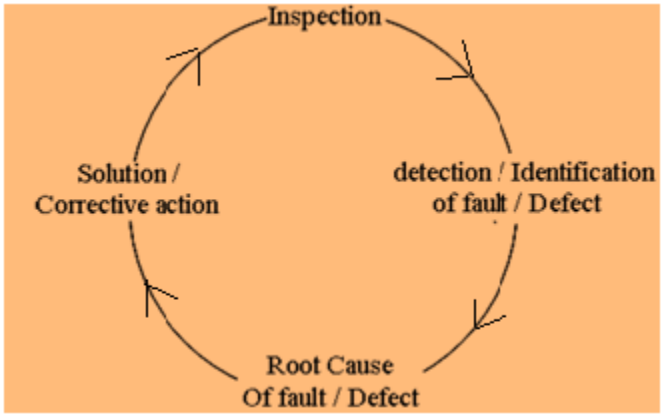
CHAPTER 6

Faults and Corrective Action

What is Defect?

Defect is lack of something necessary for completeness or perfection.
Defects are prominent.
Affect the sale-ability of a product.
Affect the desirability / durability / serviceability of a product.
Significantly different from the specification of the product.

How to Identify A Defect and Corrective Action (CLCA – Close Loop Corrective Action)



Classification of Defects / Faults

The defects can be classified into three below categories.

Critical Defects / Faults

A defect that is likely to result in a hazardous or unsafe condition. This type of defect results in rejection. Critical defects cannot be shipped under any circumstances.
For examples, sharp edges on glass items or metal items, labels which violates legal requirements.

Major Defects / Faults

A serious defect affecting appearance, performance or durability to such a degree that the customer would not buy the item if they saw the defect or the defect will result in dissatisfaction when used under normal conditions.
Note: For further major & critical faults classification, see the up dated DCL (Defect Code List) in system.

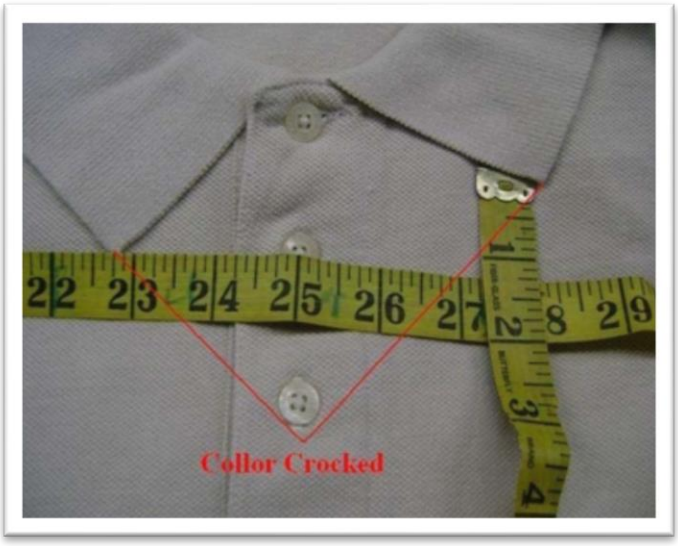
Some Major Faults and Corrective Actions

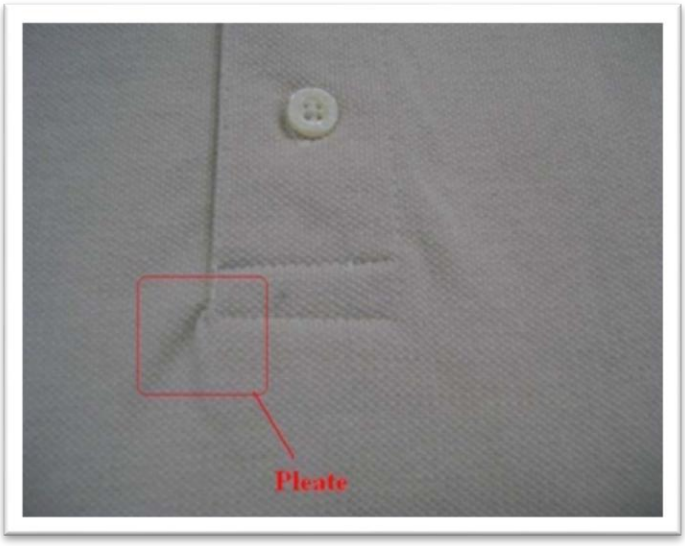
Sr.#	Fault Description	Root Cause	Corrective Action
1	Drop Stitch	It will occur, when the timing of needle & loopers / shuttle is out.	Machine mechanic should check the machine & should correct the needle & loopers / shuttle timing.
		When we are putting the thread, but not following the thread path given at machine.	While putting the thread in machine, should follow the thread path.
		When we are using low quality thread & TPI are not as per required standard.	Should use the quality thread to stop the problem.
		When needle is clamped improperly.	Needle should be clamped properly when needle is changed.
		Twist direction should be accurate.	For sewing thread, the twist direction should be (Z) clock wise.
		When thread tension is too tight.	Thread tensions should be checked & it should be normal.
2	Broken Stitch	When thread tension is too tight.	Should check the thread tensions & it should be proper.
		When thread strength is too low & using wrong ply thread.	Should use the correct ply thread, keeping in view the fabric type & quality of fabric.
		When using low quality thread which has some hairiness.	Thread should be properly waxed & there should not be hairiness at thread.
		Negligence of clipping operator.	Make sure to follow clipping S.O.Ps.
		Due to handling problem of machine operator when he completes his operation & pulling out the garment from machine.	Machine operator should control handling problem & he must be educated to cut the extra thread by machine cutter.
3	Needle Cut	When wrong type & size needle is used.	Wrong type needle should not be used & needle size should be correct.
		When use the damage needle.	Should replace the needles time by time.
		When re-dyed fabric is used & as it become harsh by re-dying.	Use the special needle for re-dyed fabric to avoid the needle cuts.
		When needle will heat up.	Follow machine wise standard R.P.M.
4	Puckering	When operator pulls the fabric not properly & fabric parts are not equal in length.	Cutting parts should be equal & should control the operator handling as well.
		When upper & lower thread tension is tight but fabric is relaxed, it will create puckering.	Upper & lower thread tensions should be properly adjusted.
		When different kinds of fabric are stitched together. They will create puckering due to fabric behave.	Operator should carefully stitch such fabrics keeping in view the fabric behave.
		After washing, when fabric shrink but thread not shrink & vice versa.	Fabrics shrinkage should be controlled. It should not be more than or less than given shrinkage tolerances.

5	**Open Seam**	Uneven cutting of parts / components.	Uneven cutting of parts should be controlled from cutting department.
		Operator's mishandling will create open seam.	Operator handling should be controlled.
		When seam allowances are not proper.	Seam allowances should be proper & operator should stitch the parts carefully.
6	**Wrong Size Label**	Negligence of machine operator.	Sizes of garment should be marked at operator table & he should measure the garment first before pasting the label. (H.T.L operator should follow I.D label, if I.D label wrong, we should communicate with back process).
		Mix size label received from vendor.	Size should be checked for all labels in box received from vendor & vendor should also take action to stop mixing.
		Mix size label at machine.	At a time, only one size label should be issued to machine operator.
7	**Feed Cut**	Due to excessive pressure of pressure foot.	Pressure of pressure foot should be adjusted.
		When feed dog height is too much.	Feed-dog height should be adjusted.
		When using the damage feed dog.	Damaged feed dog should be replaced.
		Operator's mishandling will create feed cuts.	Operator should control handling problem while he is putting the garment in machine & pulling it out.
		When feed dogs too sharp.	Use Sand paper to minimize sharpness of feed dogs.
8	**Shade Variation / Shaded Parts**	When sequence of the fabric is not followed in sewing.	Sequence of the fabric should be followed before stitching the cut parts.
		When parts / component are mixed in sewing.	There should not be any mixing of parts in sewing by operator or inline inspector.
		Missing parts / components in bundling.	Bundling should be proper & cut parts should be equal in numbering.
		Due to dying problem & PTP shade in lot.	Dying process & dying recipes should be reviewed.

9	Oil Spot	When the oil level is not consistent between lower & upper level.	Should maintain the proper oil level in machine.
		When oil seals are worn out.	Seals should be checked on daily basis & worn out seals should be replaced immediately.
		Excessive lubrication at external parts of machine.	Should avoid the excessive lubrication at external parts of the machine.
		Improper cleanness of machine (machine's oil, fluff could drop oil on fabric).	Machine should be cleaned and covered at the end of each working shift.
10	Soil / Dust Spot	Induction poly bags burst due to mishandling in the sewing flow.	Mishandling of bundles should be controlled in production flow.
		Dirty hands of operators, inline inspectors, final inspectors.	Operators, inline inspectors, final inspectors should clean / wash their hands before starting the work.
		Machines & tables are not properly cleaned by machine operator.	Machine & tables should be cleaned by operator before starting the work.
		Dusty environment or due to floor's dusting.	Garments should be covered with fabric in proper way.

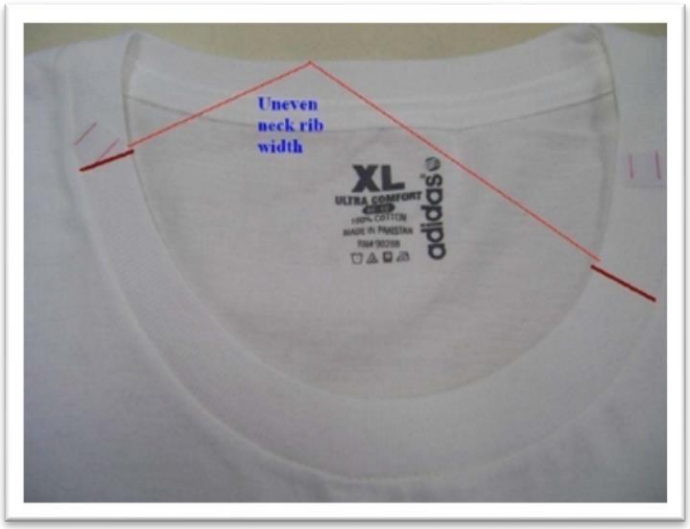
Faults Snaps



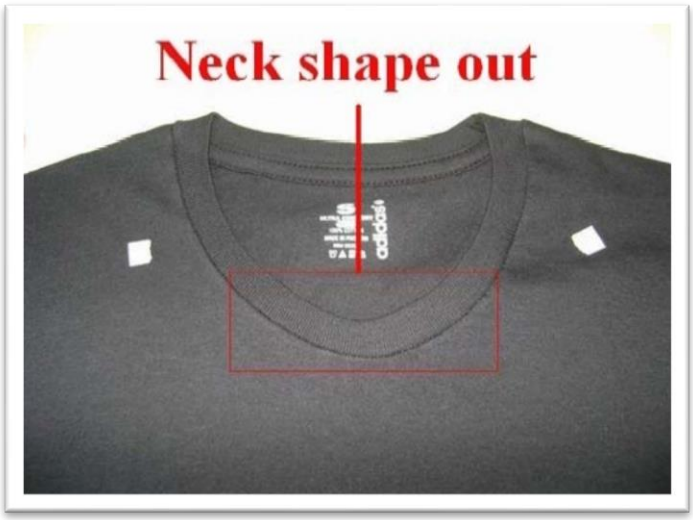



Misalligned button


Sweep shape out


Uneven
neck rib
width
XL
adidas


Label centerout & slant
M


Neck shape out


Lable Center Out


Sleeve inseam twist


Side Length Variation
Hanes


Hanes
Leg Opening Variation


Side Length Variation


Hanes
Leg Open Variation


Leg Opening Variation
Leg Opening Variatio


Puckering @ waist


Miss Shaped Garmen


Blooming @ Waist Elas


Fly opening variation within one size


Puckering @ Fly & Pannel Seams


Puckering @ Pannel Seams


Poor Presentation Du
To Wash


Side Seam
Twisted

CHAPTER 7

Care Symbols and Abbreviations

Care Symbol	Written Care Instructions	What Care Symbol and Instructions Mean
Wash		
	**Machine Wash, Normal**	Garment may be laundered through the use of hottest available water, detergent or soap, agitation, and a machine designed for this purpose.
	**Machine Wash, Cold**	Initial water temperature should not exceed 30C or 65 to 85F.
	**Machine Wash, Warm**	Initial water temperature should not exceed 40C or 105F.
	**Machine Wash, Hot**	Initial water temperature should not exceed 50C or 120F.
	**Machine Wash, Hot**	Initial water temperature should not exceed 60C or 140F.
	**Machine Wash, Hot**	Initial water temperature should not exceed 70C or 160F.
	**Machine Wash, Hot**	Initial water temperature should not exceed 95C or 200F.
NOTE: SYSTEM OF DOTS INDICATING TEMPERATURE RANGE IS THE SAME FOR ALL WASH PROCEDURES.		
	**Machine Wash, Permanent Press**	Garment may be machine laundered only on the setting designed to preserve Permanent Press with cool down or cold rinse prior to reduced spin.
	**Machine Wash, Gentle or Delicate**	Garment may be machine laundered only on the setting designed for gentle agitation and/or reduced time for delicate items.

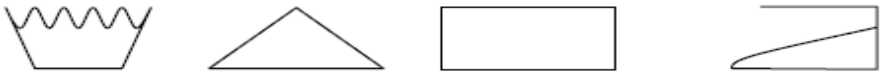
	**Hand Wash**	Garment may be laundered through the use of water, detergent or soap and gentle hand manipulation.
	**Do Not Wash**	Garment may not be safely laundered by any process. Normally accompanied by Dry Clean instructions.
Bleach		
NOTE: All (98+%) washable textiles are safe in some type of bleach. IF BLEACH IS NOT MENTIONED OR REPRESENTED BY A SYMBOL, ANY BLEACH MAY BE USED.		
	**Bleach When Needed**	Any commercially available bleach product may be used in the laundering process.
	**Non-Chlorine Bleach When Needed**	Only non-chlorine, color-safe bleach may be used in the laundering process. Chlorine bleach may not be used.
	**Do Not Bleach**	No bleach product may be used. The garment is not colorfast or structurally able to withstand any bleach.
Dry		
	**Tumble Dry, Normal**	A machine dryer may be regularly used at the hottest available temperature setting.
	**Tumble Dry, Normal, Low Heat**	A machine dryer may be regularly used at a maximum of Low Heat setting.
	**Tumble Dry, Normal, Medium Heat**	A machine dryer may be regularly used at a maximum of Medium Heat setting.
	**Tumble Dry, Normal, High Heat**	A machine dryer may be regularly used at a High Heat setting.
	**Tumble Dry, Normal, No Heat**	A machine dryer may be regularly used only at No Heat or Air Only setting.

NOTE: SYSTEM OF DOTS INDICATING TEMPERATURE RANGE IS THE SAME FOR ALL DRY PROCEDURES.		
	**Tumble Dry, Permanent Press**	A machine dryer may be regularly used only at the Permanent Press setting.
	**Tumble Dry, Gentle**	A machine dryer may be regularly used only at the Gentle setting.
	**Do Not Tumble Dry**	A machine dryer may not be used. Usually accompanied by an alternate drying method symbol.
	**Do Not Dry**	A machine dryer may not be used. Usually accompanied by an alternate drying method symbol.
	**Line Dry**	Hang damp garment from line or bar, in or out doors.
	**Drip Dry**	Hang dripping wet garment from line or bar, in or out doors, without hand shaping or smoothing.
	**Dry Flat**	Lay out horizontally for drying.
	**Dry In Shade**	Usually added to Line or Drip Dry. Dry away from direct sunlight.
Wring		
	**Do Not Wring**	Do not Wring.
Iron		
NOTE: IF IRONING IS NOT A NECESSARY, REGULAR CARE PROCEDURE IT NEED NOT BE MENTIONED.		
	**Iron, Any Temperature, Steam or Dry**	Regular ironing may be needed and may be performed at any available temperature with or without steam is acceptable.
	**Iron, Low**	Regular ironing, steam or dry, may be performed at Low setting (110C, 230F) only.

	**Iron, Medium**	Regular ironing, steam or dry, may be performed at Medium setting (150C, 300F).
	**Iron, High**	Regular ironing, steam or dry, may be performed at High setting (200C, 290F).
NOTE: SYSTEM OF DOTS INDICATING TEMPERATURE RANGE IS THE SAME FOR ALL IRONING PROCEDURES.		
	**Do Not Steam**	Steam ironing will harm garment, but regular dry ironing at indicated temperature setting is acceptable.
	**Do Not Iron**	Item may not be smoothed or finished with an iron.
Dry clean		
	**Dry clean**	Dry Clean, any solvent; any cycle any moisture, any heat.
	**Dry clean, Any Solvent**	Dry Clean, any solvent. Usually used with other restrictions on proper dry cleaning procedure.
	**Dry clean, Petroleum Solvent Only**	Dry Clean using only petroleum solvent. Usually used with other restrictions.
	**Dry clean, Any Solvent Except Trichloroethylene**	Any dry cleaning solvent other than trichloroethylene may be safely used.
	**Dry clean, Short Cycle**	May be used with A, P, or F solvent restriction.
	**Dry clean, Reduced Moisture**	May be used with A, P, or F solvent restriction.
	**Dry clean, Low Heat**	May be used with A, P, or F solvent restriction.
	**Dry clean, No Steam**	May be used with A, P, or F solvent restriction.
	**Do Not Dry clean**	Garment may not be commercially dry cleaned.

Home & Commercial Laundering Symbols

Wash:



Wash Bleach Dry Iron

Wash don't dryclean:

Wash Bleach Dry Iron DryClean

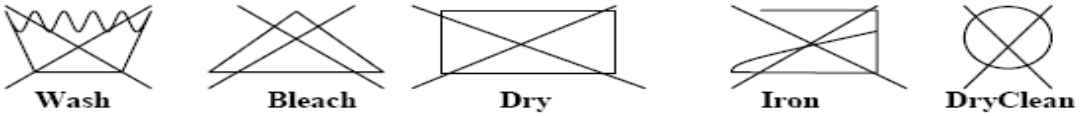
wash or dryclean

Wash Bleach Dry Iron DryClean

wash,
Don't dry-clean

Wash Bleach Dry Iron DryClean

Don't wash
Don't dry-clean



Wash Bleach Dry Iron DryClean

Abbreviations

ABBREVIATIONS			
SOP	Standard Operational Procedures	**SKU**	Stock/shipment keeping Unit
Y/D	Yarn Dyed	**OCR**	Optical Character Reader
TPI	Twist Per Inch	**CAT**	Catalogue
PPK	Product Package	**ASN**	Advance Shipment Note
CMT	Cutting Manufacturing Trim	**IGP**	Inward Gate Pass
LTL	Lot To Lot	**DTS**	Direct To Store
DTC	Dye To Cut	**ASRT**	Assorted
GSM	Gram per Square Meter	**MCL**	Master Carton Label
FMS	Fabric Management System	**AMS**	Apparel Management System
GGT	Garber Garment Technology	**TMS**	Time Management System
ID	Identification Label	**GMS**	Gate Management System
SAM	Standard Allowed Minutes	**FMS**	Fabric Management System
HTL	Heat Transfer Label	**IMS**	Inventory Management System
PPR	Pre-Production Review	**RPM**	Round/Revolution per minute
SPI:	Stitch Per Inch	**ASAP**	As Soon As Possible
CLCA	Close Loop Corrective Action	**CAP**	Corrective Action Plan
PPC	Production Planning & Control	**IGP**	Inward Gate Pass
IE	Industrial Engineering	**KPI's**	Key Performance Indicators
HTM	How to Measure	**CAP**	Corrective Action Plan
HPS	High Point Shoulder	**ASRT**	Assorted
CBN	Center Back Neck	**GRN**	Goods Receipt Note
LPS	Low Point Shoulder	**WRAP**	World Wide Responsible Apparel Production
DTM	Dye to match	**ISO**	International Standard Organization
CTN	Carton	**DTS**	Direct To Store

CHAPTER 8

Lab Testing

Shrinkage Test

Shrinkage is the process in which a fabric becomes smaller than its original size, usually through the process of laundry.

Bursting Strength Test

Bursting strength test is to test how much the strength of the fabric is. It is done on a specific machine on which meter is showing the strength of the fabric in Lbs. It is named Mullen USA.

Washing Test

Washing test is for the bleeding of dyed fabric. Fabric washed with the white fabric and the effect on white is compared with the standard and decided to give the appropriate points. (1-5)

Crocking Test

Dyed fabric is rub with white fabric on a specific machine and color of changed white is match with standard as the results the report is written. About 3-4 is acceptable in wet and 4-5 is acceptable in dry crocking test.

Piling Test

Piling testing machine is to test the pile on the fabric after same time. A wooden box is rotated having fabric in it specifically stitched on the rubber pipe. Then the fabric is checked.

pH Test

The pH of the fabric is tested through a procedure. Fabric is dipped in water and boiled 4-5 minutes. The water is cooled and ph is tested by two methods.

1- PH strips are dip in that water and compared with given standards and 1-7 points are decided on comparison.
2- PH testing equipment is to test the ph value of fabric, the glass rod of ph meter is dipped in the fabric water and the value is appeared on the screen of ph testing instrument. Ph 6-9 is acceptable for the customer in most cases.

Shade Variation

Light Box is use for checking the shade variation with the standard we check this fabric in different types of lights for the shade matching.

Button Pull Test

Button pull test is used to determine the holding strength between the button and the fabric to which it is attached. Holding strength is the force required to separate the button from the material (fabric / garment).

GSM (Grams per Square Meter)

GSM Cutter Sheet

This is a special rubber sheet on which fabric lay down & cut with GSM cutter.

GSM Cutter

GSM cutter helps to cut the fabric in round shape.
There are very sharp blades fixed inside the body of this cutter which cut the fabric in round shape.

GSM Weight Scale

GSM weight scale weight the fabric in grams. The round shape fabric lay at this machine for weight.

GSM Finding Methods

With Cutter

Multiply the weight of sample by 100 to calculate the GSM of sample fabric.

Without Cutter

If you don't have a round cutter. You can measure fabric GSM by using following formula.

$$GSM = \frac{\text{Weight of the sample in gram}}{\text{Area of sample in } m^2}$$

Torque

Deviation of the wale & courses of the fabric from 90° angle after washing, it is called torque. The D-shape of fabric after washing is called Torque. The %age of Torque can be checked by,

$$= \frac{\textbf{Total deviation of fabric from orignal place x 100}}{\textbf{Total shrinked length}}$$

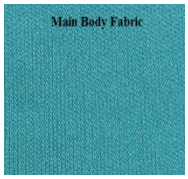
Accessories / Trim Card & Approved Swatches for All Colors

Purpose of accessories / trim card & swatches is to assure that the accessories / trims & colors of fabric being attached are correct. It should be approved by concern merchandiser / customer.

Trims

The raw materials used in sewing room other than fabric are called Trims. On the other hand materials are directly attached with the fabric to make a garment are called trims. Like:

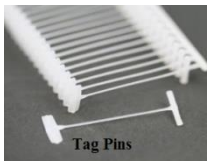
- Threads,
- Buttons,
- Lining,
- Interlining, (Interlining is used as shape forming / preserving materials.)
- Zippers,
- Labels,
- Care labels,
- Eye Lets
- Shoulder Tape
- Elastic
- Main Body Fabric
- Collar , Cuff, Leg & Fly Binding Tape
- Moblin Tape
- Twill / Canvas Tape



Accessories

The material, which is used to make a garment attractive for sale and packing, other than the fabrics and trims are called accessories.

- Poly Bag
- Hang Tag
- Size Stripe / Size Sticker / Sizer
- Master Carton
- Hanger
- Tissue
- Carton Sticker
- Tag Pin
- J-Board



Sundries

Sundries are the packing material which is not attached directly with the garments but only lay inside folded garment for better presentation. Sundries retain shape of the garments in its natural form. e.g;

- Tissue paper inside the garment
- Card board inside the dress shirt like plastic clip
- Neck Board
- Back Board
- Safety pin
- Collar stand