

Garment Manufacturing Process From Fabric to Finished Apparel Products



Prasanta Sarkar

CCS
online clothing study

Introduction

The clothes and apparel items we wear are mostly made from textile fabrics. The fabric used in making our garments moves through a long path. From the textile mills to fabric processing units to fabric warehouses. Finally, fabrics reach to a garment factory, where the fabric sheets are cut into many pieces as garment components.

The textile fabrics are made of yarns through weaving and knitting process by using looms and knitting machines. Fabrics are converted into wearable garments through the garment manufacturing process in garment factories.

At the time of garment making, functional trims and accessories are attached to the garment at various stages.

This eBook covers how the garments are made and its processes from fabric to the finished product.

Remember, there are different ways of making garments.

The most conventional process of making the readymade garments in mass production is explained in this book.

The major garment manufacturing process, sub-processes and activities involved in each sub-processes are covered in one eBook. To learn the processes completely and in detail, I have given links for your further reading on various terms and processes.

I am assuming that you are a learner, or a would-be garment entrepreneur or you might be planning to start business in the garment manufacturing industry.

You will find a helpful guide once you read this eBook.

Though these are the basic knowledge of the garment manufacturing process, you will get the complete overview of the garment manufacturing processes.

Garment manufacturing workflow

The garment manufacturing process starts from order receiving from a customer and ends it once the finished garments are dispatched to the buyer. The garment production cycle depends on orders. In garment production, some of the processes can be performed in parallel but most of the processes are dependent on the previous process.

A linear workflow chart will explain all the major activities required in garment manufacturing. Refer the workflow chart in the next page.

In another chart, the garment manufacturing process flow chart of a typical garment product is shown in the following page. This chart would help you understand the process flow in a better way.

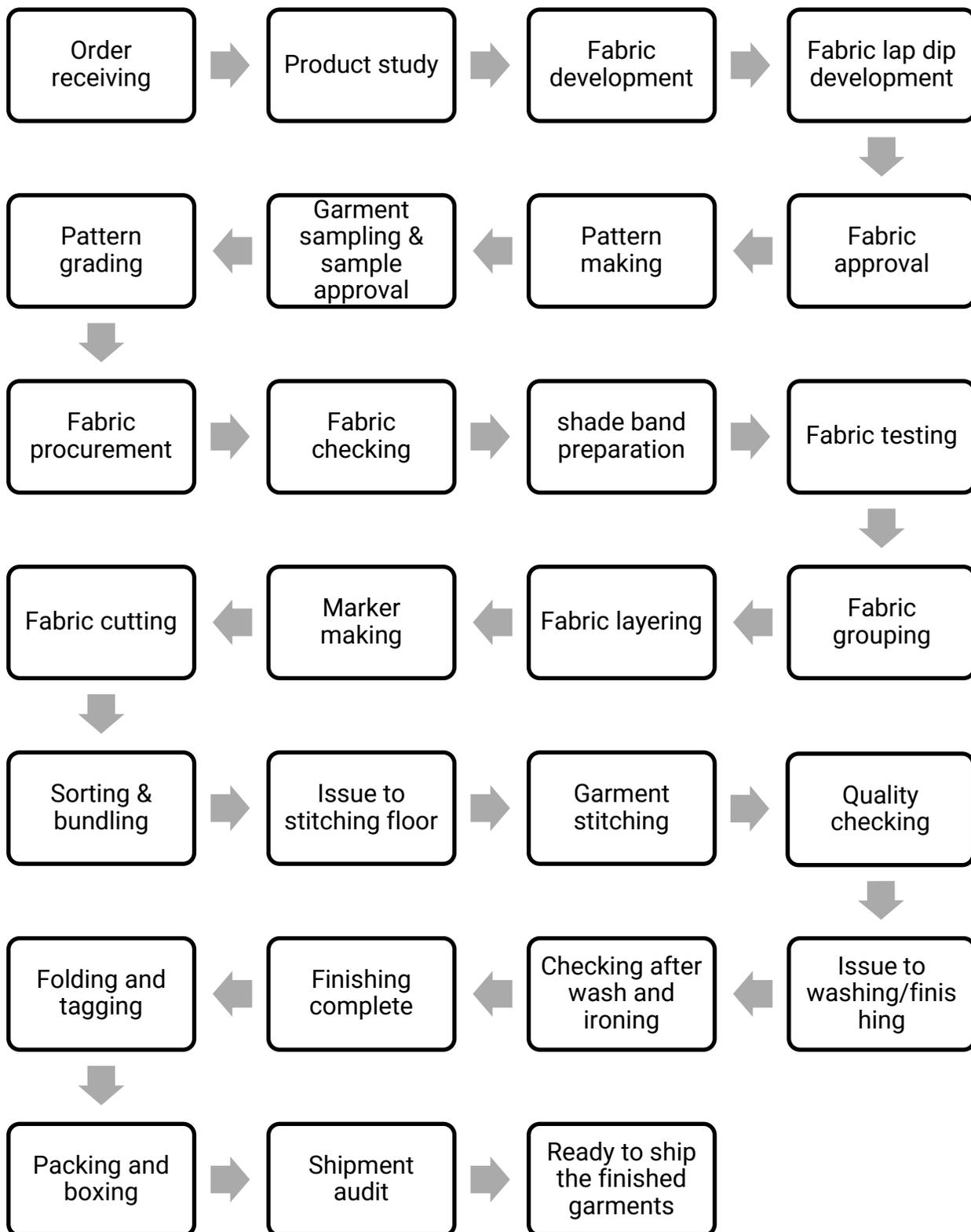
Garment factories normally purchase fabric from the various fabric suppliers. Prior to sourcing the fabric, there are some pre-production processes handled by the factory merchandiser.



Following steps are involved in the pre-production stage.

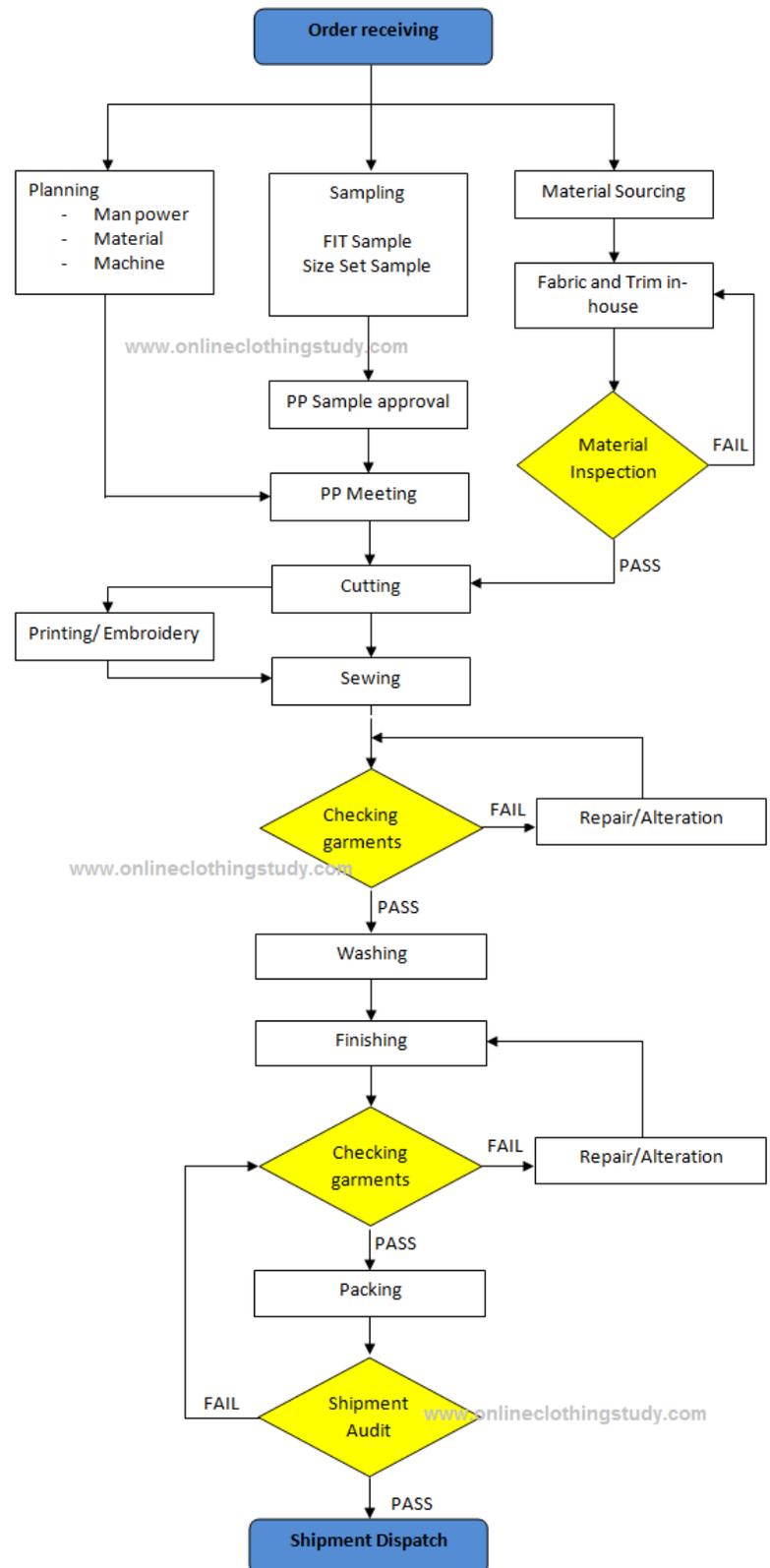
- Product study,
- Pattern making,
- Garment sampling and approval,
- Fabric development,
- Fabrics and trims approval
- Fabric and trims procurement,
- Pre-production meeting.

Garment manufacturing workflow



Garment manufacturing process flow

The garment manufacturing process flow is shown in the righthand side chart. This chart represents the manufacturing process flow of a typical garment product. This chart would help you understand the process flow in a better way.



Pattern Making

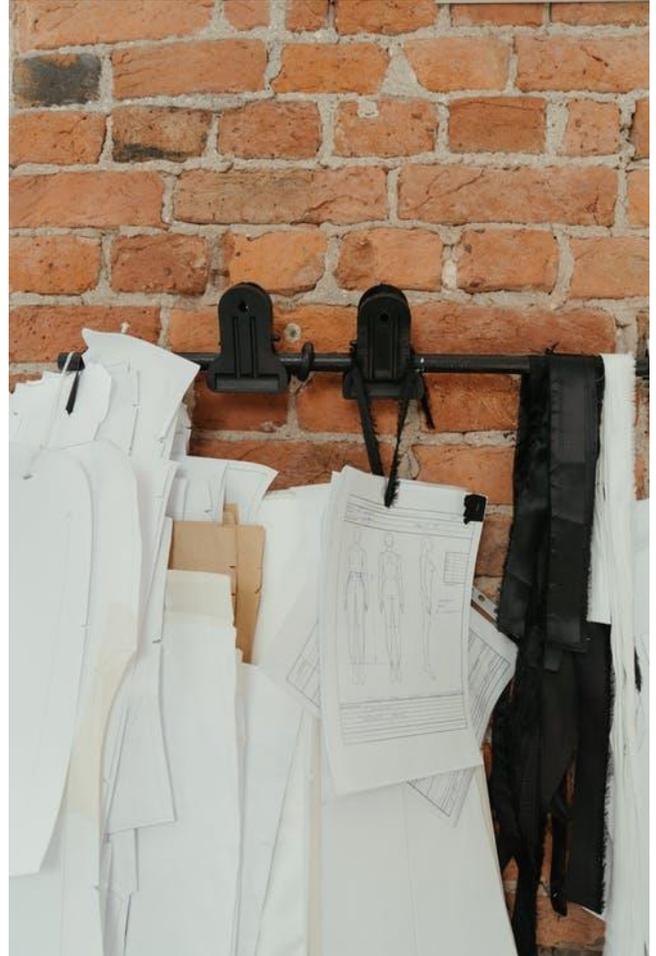
In garment manufacturing, 2D fabric is converted into 3D garments. To make the garments with correct fit and in right shape, pattern plays an important role. From the design sketch and product specification sheet, garment patterns are made by a technical person (also called a pattern master).

To cut the fabric for making any kind of apparel product, you need a template for different body parts. These paper templates are called a pattern.

The first pattern of a design is made at the time of prototype making. The patterns are modified and corrected as the sample development progressed and patterns are graded during size set sample making.

The final patterns are approved after the PP sample approval.

Nowadays most designers and garment factories use CAD system for making the patterns. The CAD system has another advantage in maker making, instead of manual marker making marker papers are printed by a plotter. The markers are efficiently made by CAD system and fabric utilization can be improved.



(Image source: pexel.com)

Garment Sampling

Garment factories develop garment samples and take approvals on the sample from the buyers. Without sample approval, factory is not allowed to start the bulk fabric cutting. Factories also need to develop various types of garment samples at various stages of the sample development.

Garment manufacturers follow the product techpack to prepare the garment sample as well as for the bulk production.

In the sampling stage factory learns the garment construction details and material requirement for a given order.

The sampling department is also work as research and development (R&D) section for the factory. The sampling process helps production team to start the bulk production with better prepared and fewer issues.

A pre-production meeting is conducted at the factory by the merchandising team. In this meeting product design, production schedule and job responsibilities, buyer's requirement in all aspect of the product quality, and production completion deadline are discussed.

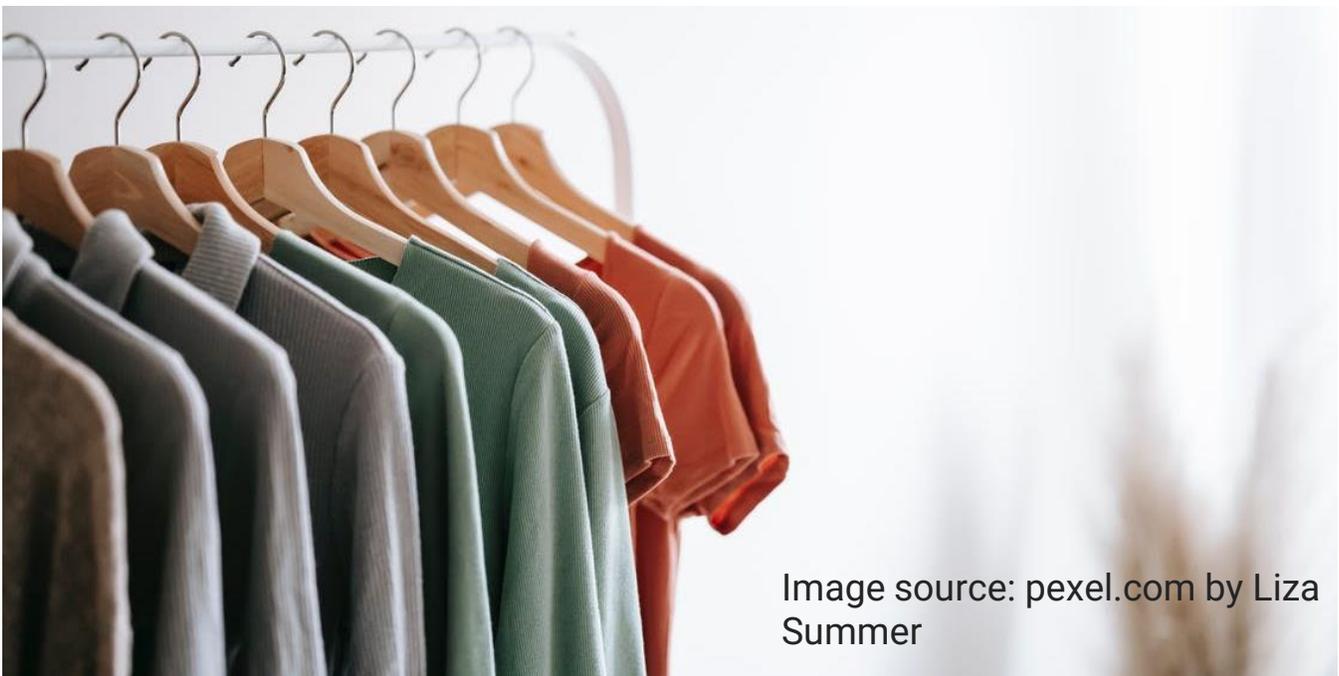


Image source: pexels.com by Liza Summer

Fabric Development

Textile fabrics are available in three main categories - knitted, woven and non-woven fabrics. Fabrics are manufactured in textile mills, and power looms. Later, the greige fabrics are finished as per the buyer's requirement (design specification). The factory only needs to find the fabric(s) that is required for the style/design.

Selection of fabrics:

There are thousands of fabric designs and fabric quality available. Fabric selection is done based on fabric quality, like fabric color, fibre content, surface texture, hand feel, physical and chemical properties. If the required fabric is already available in the market, factory purchase those fabrics from the stock. For this factory need to explore various places for finding the required fabrics. Otherwise,

they work with the fabric supplier to develop the desired (new) fabric quality.

Fabric development:

The garment maker gives the fabric quality requirement to the fabric supplier for developing a new fabric design. At this stage, the negotiation of fabric price is done with the fabric vendors. Lab dip or desk loom is developed at this stage prior to bulk fabric ordering. Prior to bulk sourcing, fabric sample is tested to check whether the desired quality is matched with the developed fabric or not. For yarn dyed stripes knits fabric knit-down is developed.

Garment manufacturers take approval of bulk fabric by submitting a fabric swatch to their buyer.



Bulk Fabric and Trims Procurement

Fabric sourcing: How much fabric is needed for each garment? What is the average fabric consumption for bulk production?

At this stage there are few calculations on fabric consumption per garment. This work is done by pattern making department (CAD department). Based on the fabric consumption, total fabric requirement for an order is calculated and the same is procured from the pre-approved fabric suppliers.

The fabrics are in-housed and stored in the factory or in a central warehouse of the company.

Fabric quality inspection: Whether fabrics are purchased from the buyer nominated fabric suppliers or from the open market, factories are not sure whether all the fabrics are fault free. So, fabric checking is done verifying fabric quality. Fabric may be required to check 100% or can be checked randomly based on fabric quality received. For an example, 4-Point System is used by the factories for fabric inspection and fabric quality grading.

Some fabric tests like fabric GSM, fabric shrinkage, and color bleeding in washing are done by the factory. If the fabric shrinkage is more than the

Allowance (+/- 2%), fabrics are pre-shrunk prior to bulk cutting. Sometimes patterns are modified according the fabric shrinkage which gives correct measurement in the garment after washing.

Fabric sorting and shade band preparation: It is a common fact that when fabrics are purchased in bulk, the fabrics are processed in different lots (batches) depending on dyeing machine capacity. So, there are chances of having shade variation of fabrics of same colors. To avoid shade variation in garments, shade band is prepared by the factory.

Sourcing for trims and accessories: Like the fabric sourcing, all required garment trims and accessories are purchased. Trims and accessories are sourced in advance to the production start. Trims requirement is calculated based on the trim consumption per garment. Later, cutting is done by layering the same shaded fabric together.

Quality checking of trims and accessories: Quality of the trims are inspected and approved for production. Trims like laces, twill tapes, button, zippers, and draw cords are tested for color bleeding. Defective and damaged trims are separated and are not attached to the garments.

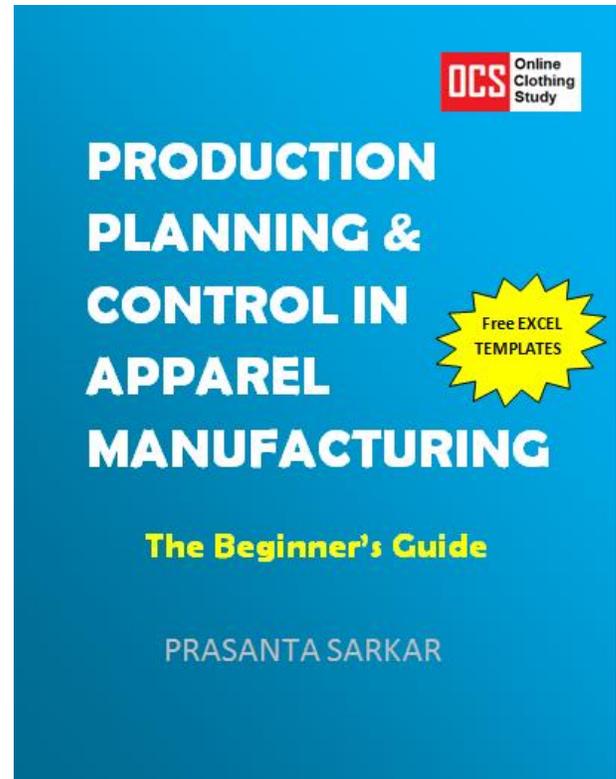
Production Planning and Scheduling

All the processes and activities are planned and scheduled in advance by the production planner. Production planning team executes and controls the production activities as per the scheduled plan. They keep track of the actual process activities to ensure on-time order completion.

In case some process are lagging behind the schedule planner needs to step in and find a way to speed up the production processes.

A time and action calendar is prepared by the planning team for production scheduling and controlling. Mostly the T&A is made by a merchandiser.

My book "*Production Planning and Control in the Apparel Manufacturing*" would be a very helpful aid in learning production planning areas in the apparel manufacturing.



Learn more about [the PPC book](#).

Fabric Cutting Process



Fabric is the costly item in garment manufacturing. About 60-70% cost of the garment is incurred in fabrics. For this reason, garment factories wisely utilize fabrics. Some of these fabric saving tips in the cutting room surely help garment makers to save fabric as well as money.

The bulk cutting is done by means of cutting machines. Different types of fabric cutting machines are available for bulk cutting. Before the cutting of fabric, cut order plan is prepared and fabric is taken from the fabric store according to the requirement.

Following steps are followed in the cutting section.

Fabric spreading:

First the fabric rolls are opened and spread on a cutting table layer by layer. This process is done by hand or by using an automatic spreading machine.

The length of the layer is decided based on the marker size and marker length. Multiple numbers of fabric layers are spread on the table and all the fabric layers are cut together. Depending on the fabric thickness number of plies in a lay is decided. Normally the height of the lay is kept according to the cutting machine blade height. Sometimes fabrics are relaxed for over night.

Marker making:

For manual marker making, cutter uses the paper patterns for marking and use chalk to mark outlines of the patterns. After marking the outlines on the lay, patterns are removed, and the cutter follows the outline to cut the garment parts.

Component numbering on the marker:

Normally, in a marker more than one garment are cut and garment may be of different sizes. To avoid mixing of different garment sizes during bundling and sorting, the size is marked on the top layer after manual marking. For automatic cutting or paper printed marker, this marking is not required, as all patterns are already come with style and size marking.

Lay Cutting:

After marker making, the lay is cut by using a cutting machine. For a single ply and a small number of plies, hand scissors are used.

Ply numbering: Ply numbering is done to all the garment components. This process is included to avoid color variation and mixing of sizes in the garment components of a same garment. In single piece production system bundle numbering is not required. A hand machine is

used for numbering the cut plies.

Sorting and bundling:

Cut components are sorted by size, color, and bundle size. Then bundling is done and stored in the cutting room. A ticket (bundle tag) is attached to the bundle to identify the component and style details.

Dispatch cuttings to stitching section:

Cut bundles are sent to stitching section as per the need of sewing floor and loaded to the line. Some factories prefer to send the whole lay to stitching section and bundling of the layer are done on the production line.

Quality checking in cutting section:

In the cutting section, quality of the cut components like notches, pattern shape, components measurement, and major fabric defects (hole in fabric, cut mark etc.) are checked. Parts measurement is taken from top, middle and bottom plies and compared with the actual patterns, and shapes etc.

Read the book Garment Manufacturing Processes, Practices, and Technology to learn and explore the garment manufacturing processes followed by garment manufacturers and exporters.

Garment Printing and Embroidery

Printing and embroidery processes are value added but an optional process. Printing on the garment is done at either fabric stage or after cutting of garment components. There are different ways of printing in garments. Mostly used printing method is screen printing, heat transfer printing.

For small-scale set up, this is not necessary to set up facility for printing and embroidery process. If required,

printing and embroidery process are outsourced.

For small printing works like heat transfer logo printing, factories can install heat transfer printer inside the factory and print logo and care instruction.



Garment Stitching



After fabric cutting and printing process (optional process), cut components are sent to the sewing department. Sewing operators stitch and assemble garment components one by one and make the complete garment.

At the time of sewing, garments are checked by quality checkers. Stitched garments are dispatched to finishing section or washing department if washing is required.

The garment stitching process involved following sub-processes.

- Part preparation
- Marking on panels
- Folding and steam pressing
- Stitching/assembling
- Quality checking

In the sewing section, operators are also provided various sewing supplies like stitching threads, sewing machine needle, trims, operation specific guides and attachments.

Parts preparation: Before assembling the garment, individual garment parts are prepared in the preparatory section. For an example, in shirt manufacturing, shirt collars, sleeve cuffs and sleeves are prepared in the preparatory section and later loaded in the shirt assembling section. Preparatory section is introduced in the line to improve line balancing. Be noted preparatory section is not required for products like t-shirt, boxer, leggings.

Marking part: In a garment, some part requires marking to attach one garment component to another precisely. Marking is normally done by using chalk or magic pencil by using a template or laser ray. Like in formal shirt for buttonholing and button attachment, front plackets are marked manually to define the correct location of the button positioning. The marking process helps operator deciding where the job needs to be done accurately.

Parts folding and pressing: Depending on the requirement an operator may need to fold the component and press it by means of a template. Like, chest pocket is folded and pressed prior to attaching the pocket on the chest.

Assembly section: The garment components are assembled by the operators step by step in a sequence of product construction. To sew

garments different types of sewing machines are used.

Quality inspection on the floor: On the sewing floor, stitching quality is checked by the quality checkers. Normally, the semi-stitched garments are checked to detect the stitching faults. The checker suggests a solution to the operator who is responsible for making the defects. Inline quality inspection, roaming inspection, and end-of line quality checking are followed in the sewing floor.

Production line set-up: The stitching floor utilizes the maximum manpower in a garment production units including sewing machine operators, helpers, pressman, alteration tailor, feeder, data collection, work-study officer, quality checker and line supervisors. In mass garment production, the production line layout and line setting is done prior to loading every new product (style). Industrial engineers prepare the operations bulletin and line layout. In the operation bulletin, they estimate manpower requirement and machine requirement to produce the target quantity.

Learn more about industrial engineer in the apparel manufacturing from my blog
<https://www.onlineclothingstudy.com>

Garment Washing



In garment manufacturing, washing is an optional process. For some type of products (e.g., sweaters and denim made items) washing is must. But washing is not necessary for many garment items like, shirts, t-shirts and ladies' dresses.

Washing is done to remove dirt and dust from the garments. Washing process involves additional cost, so this process is done only if buyer asks for washing of their orders.

More than just cleaning of garments, washing is also done to give washed look to the finished garment with different types of finishes.

For garment washing industrial garment washing machines are used. Factories can set-up washing department if they see washing requirement is for their orders.

Dry cleaning is required for some types of items like high-fashion items and suits. For denim items, dry process is another process involved before finishing.

Garment Finishing Process



All the stitched garments are finished prior to sending a shipment to customers. Finishing means removing all creases and wrinkle from the garment, cleaning dusts and loose threads and repairing defective pieces.

In this section, a brief list of garment finishing processes are explained.

Thread trimming:

In case garments contain uncut threads – left by stitching operator during stitching, threads are cut at this stage. Uncut threads can be trimmed by manual trimmer or a thread trimming machine.

Removing ply numbering stickers and loose threads:

I have mentioned above that in cutting department, all the garment components are labeled by numbering stickers. Those stickers are removed manually by a team of workers.

Initial garment checking:

This checkpoint is placed prior to ironing the garments. Visual inspection and measurement checking is done in the initial checking. Finishing checkers check for loose and uncut threads, ply numbering stickers, garment construction,

garment labeling, workmanship and measurement after washing/non-wash.

Finishing room quality checkers check for stitching defects in seams, fabric defects in the garment and any other kind of defects those need to be repaired. So, at this stage checkers segregate the defective garments and defective garment are sent to the repair section.

All stitching defects are sent to a repair tailor. Defects like stains and hard stains, defective garments are given to stain removers. In the finishing thread trimming and removing of stickers are done by the checkers also.

Garment pressing (ironing):

The garment pieces are pressed by an iron. Normally steam press is used for processing cotton garments. In this process, creases and wrinkles in unfinished garments are removed, and give a fresh look to the apparel products.

Different types of pressing equipment are available for garment pressing. Depending on the product and production volume, the right pressing equipment is used.

Final garment checking:

The pressed garments are rechecked for measurement and visual inspection. Shade variation, correct labeling of size and content labels are check in this stage.

Any defective garment detected at this stage is sent back for repairing

Further reading: Learn about *the finishing machines, tools and equipment.*

Garment Folding and Packing

In this stage garment folding, tagging, and packing is done manually. The packing process is normally performed in the finishing section.

Garment folding: The finished garments are folded in a specific dimension. Folding can be done by using a template too. The price tags, hang hags and any other kind of tags are attached to garment after folding. The garment folding types varied depending on the garment item and buyer's requirement. Sometimes the whole garment is packed in a hanger without folding.

Packing: The folded garment is packed into a polybag to keep it fresh till it reaches to a retail store or to a showroom. Different types of packaging accessories are used to keep the garment in a desired shape. Some products are packed into paperboard cartons directly without packing it into a polybag.

Carton packing: For the transport of the finished garment are packed into bigger cartons.

Internal Audit: The packed garments are then audited for quality assurance of the outgoing finished products. This



Image source: img.etimg.com

process is followed for internal quality audit and to ensure that no defective garments are packed into the cartons.

Finished and ready product: Finally, the garments are ready for the shipment and ready for the end consumers. As per the ex-factory schedule and shipping plan, garment factories dispatch the finished item for shipping.

The garment manufacturing process ends at this point. You read the complete steps from fabric to finished product. Now you know how garments are made in factories.

Daily Production Reporting

The work does not get completed unless you prepare the daily production report and do the reporting of all activities. The same is true in garment manufacturing business. Each department head prepares their daily production reports and submit the report to their seniors.

There are few key reports, all factories prepare without fail. It is the daily production report. Status of inventory. Employee attendance and daily expenses.

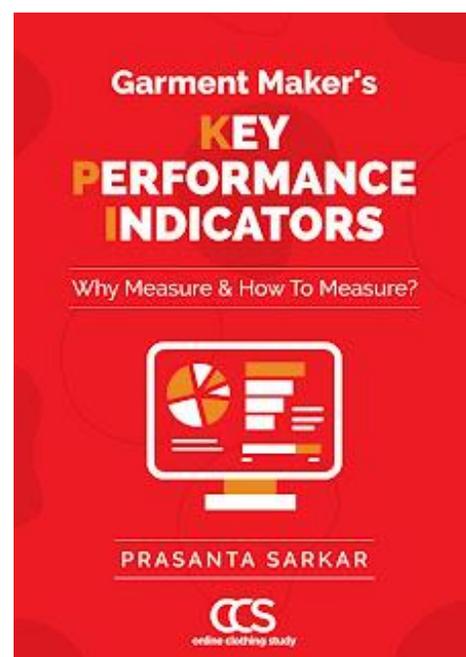
In the production area, industrial engineering team make couple of production related reports. In monthly interval they used to prepare KPI reports. Another good thing with the help of real-time production tracking system and IoT-based sewing machine, factories can get real-time KPI data.

The finishing and packing team prepare the packing list. Their packing list is important for tallying packed quantity. Invoicing to the buyer is done based on the packed and shipped quantity. The shipping team prepares all the necessary documents for export orders and documentation needed for goods transportation.

After the shipment of an order, each department prepare order completion report. Fabric store prepares the fabric reconciliation report and trims reports. Cutting team, production team and finishing and packing team, prepare reports of the all the leftover fabrics and (surplus) garments after shipment.

The quality department, prepare quality analysis report for each orders and document it.

If you are interested to learn more about garment production and quality KPIs and want to know how to prepare the KPI analysis report, read my book **"Garment maker's KPI: Why measure & how to measure."**



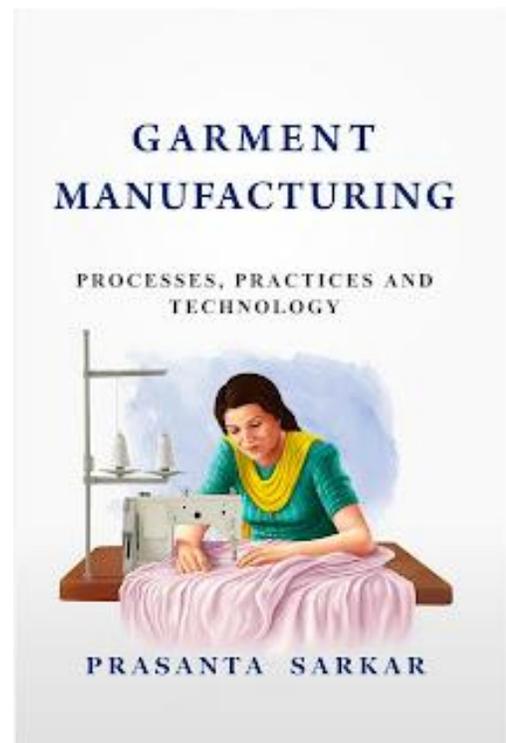
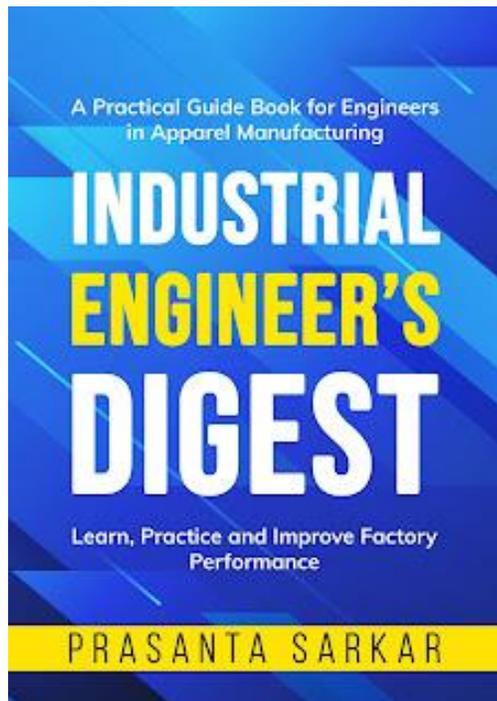
What is next?

Garment manufacturing is a profitable business. One can start small-scale garment manufacturing business with 10-15 sewing machines. If you like to explore more on garment manufacturing processes and want to know how the RMG industry works and make such huge volume of apparel items, read my blog [Online Clothing Study \(OCS\)](#).

It is an open source of huge reading materials including articles, how-to guides, free downloads, formats, templates and free-eBooks. I have also written some books for the newcomers and industry professionals

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