

Subject: Garment Machinery and Equipment

Unit 1: Pre-production machinery

Quadrant 1 – E-Text

Learning Objectives

The learning objectives of this unit are:

- Describe the working of automated spreading machinery used in garment manufacturing with theoretical knowledge of the functions of each parts.
- Describe the working of commonly used cutting machines in garment manufacturing along with the functions of each parts
- Practice cutting of woven fabrics using commonly used cutting machines in garment manufacturing
- Study specialized cutting machines used in garment and non-garment sectors.
- Review the theory behind fusing process.
- Identify parts of a fusing machine.
- Identify different types of fusing machines and relate to their use with respect to garment parts and types.

1.1 Automated Spreading Machine

There are three stages garment manufacturing.

Pre-production, Production and Post-production.

The pre-production stage comprises of Spreading, Cutting and Finishing.

In the production stage, the main activity is sewing.

In the post-production stages, important activities include finishing and packing.

The spreading process forms a lay by placing one or more number of fabric plies on top on one another for a required length.

The length of the lay and the number of plies to be laid for a particular lay will be pre-determined as per the cutting plan. It specifies the specifications of each lay type and the number

of times the same specification lay has to be cut with different coloured fabric plies to achieve the number of garments required in each colour and size.

Spreading Equipment consists of spreading surfaces, that is, tables, spreading machines, pins, weight, bars and fabric control devices as well as fabric cutting devices. Spreading surfaces will depend on the type of fabric, spreading equipment, cutting method and also the firm's quality standards. Spreading requires a flat smooth surface. For this purpose, normally a table is used.

If the table is being used for cutting as well, (in most of the cases it is being used) than it should be leveled. The table must be constructed sturdily, to bear the weight of a spread. The width and length of the table will vary with width of the fabric and production demands. Most often, the space available determines the dimensions of the table. Spreading surfaces need to be 10" wider than fabric width to allow the cutting knife to rest on the table.

Spreading tables may have tracks or rails placed along one or both sides or just few inches off the floor for the spreader to move up and down the length of the table. Spreading tables are usually covered with laminated or cork board to provide a low level of friction. Special spreading tables may also have vacuum points which are used to compress the lay.

Lay can be compressed up to 75%. This prevents movement of slippery fabric and prevents shifting of fabric during cutting. Air floatation tables allow easy movement of lay when activated.

Spreading tables may also be connected to a conveyor that carries the fabric to the cutting table.

A majority of the commercially available spreading tables come as modules. This allows a factory to configure the length as required. A special type of table is used for spreading checked and striped fabrics, which is called as pintable.

Pintables



Pintables consist of pins beneath the spreading table. The spreading operator can raise the pins at the points where they are required. While laying the fabric the spreading operator pins the fabric down. This allows the fabric to be spread without given any extra allowance for block cutting. The lay can be cut as per the patterns if the marker is done as per check matching. Spreading machines are of various types. Stationary, portable or fixed and traveling machines – manual, semi-automatic and automatic.

Stationary spreading remains in one position i.e. at the end of the table, while traveling machines move along the length of the table. Manual speeds are the same as operators speed. They basically consist of a frame or carriage, wheels traveling on the tracks, fabric support, and guide rolls to aid correct unrolling of fabric.

Manually Operated Spreaders

Manually operated spreaders can be as simple as a roll bar mounted on four wheels that is pushed along the table by an operator. In manual spreaders, the spreading speed can be

controlled by the operator who moves the machine. The cloth is pulled carefully from the fabric roll by hand, and is cut to the appropriate length.

Mechanical devices can be provided to facilitate the unrolling and cutting operations, but the proper alignment of the fabric edges is the responsibility of the human operator. It is suitable for short lays and for frequent changes in fabrics and colours. It is often used in small businesses.

Spreading Carriage

The cloth is unwound, and spread semi automatically, using a manually – driven carriage. The carriage is moved back and forth over the laying up table. A built-in mechanism takes care of aligning the fabric edges and smoothing the plies. This system is favored when long and broad and / or if the fabric is presented in large batches for relatively large orders. This method is very efficient and suitable for small business.

Automatic Spreaders

These machines are therefore ideal for increasing productivity and quality.

These machines may include various features, such as a motor to drive the carriage, a platform on which the operator rides, a ply cutting device, automatic catchers, ply counters an alignment shifter (edge guides), a turn table and a direct drive on the fabric support and tension devices.



Tension mechanisms ensure that the art of spreading, is synchronized with the rate of fabric that is unrolled. The alignment shifters actuated by photo – electric mechanisms sense any deviation from the required alignment. In this case, they shift the roll to the correct position. Width indicators alert the operator on any width variations in the fabric. End catchers hold the fabric at the end of the lay, an overfeed device which feeds extra fabric when a fold is made. Ply cutting devices cut the fabric across the width at the end of a lay. It usually consists of a rotary knife blade mounted on rails.

Turntables

Turntables permit face one way spreading on every trip. The turntable rotates 180 degrees at the end of spread. During dead heading, the machine may travel at higher speed. A very highly automated spreader may be pre-set to a selected number of plies. A sound indicator alerts the user when it has reached the selected number or has come to the end of a piece of fabric.

Some machines are equipped with automatic sensing of previously marked flaws and damages. As the machine comes across a flaw, the sensor will halt the spreader, the ply cutter will cut

across the ply, and the spreader will reverse direction to the nearest splice mark on the marker plan and then continue its run.

1.2 Common Cutting Machines

Cutting is the process of separating a spread into garment parts that are precise in size and shape of the pattern pieces on a marker. It may involve transferring marks and notches from the marker to the garment parts to assist operators during sewing. The spread can also be cut into sections or blocks which are then given precision cut. Cutting may also involve preparing sections of piece goods for special operations such as screen printing especially in case of T-shirts with chest print.

Cutting can either be manual or automated. Cutting depends on the skill of the operator. These equipment's can be portable or stationary. Portable knives are moved through the spread while the stationery cutters require the operator to position and control fabric blocks in through the blade. There are two types of portable cutting knives, mainly the vertical reciprocating straight knife and round knife.

Straight Knife

The Straight knife consists of a base plate with rollers for ease of the movement, an upright carrying the straight blade, the power system consisting of the motor and switch, the cutting blade which can have various edges, operating handle, sharpening device and the blade guard. These machines are also available with a blade cooling system.

The vertical knives have an up and down cutting action. Blades vary in length from 6 to 14". Blade length and the adjustable height of the blade guard are factors determining the spread height that can be cut. This feature must be considered in choosing a straight knife machine. The blade guard not only acts as a safety device for the operator, but also holds the top plies of the fabric, thus preventing them from lifting up during cutting.

Metal mesh gloves are also available as a safety device for the cutting operators. The cutting blade is available in various edges such as straight, serrated and wavy edged. The most commonly used is the straight knife. Wavy edges help to reduce heat generation and are used for cutting plastics and vinyls, whereas, saw edge type is used to cut canvas.

The straight knife is also available in varying speeds allowing the same machine to be used for natural or thermoplastic fabrics.



This machine is most commonly used in the industry today because of its adaptability and flexibility to various kinds of fabrics and spread heights. Due to the shape of the cutting knife it is a good choice for accurately cutting sharp corners and angles. However, it has its limitations too. It does not give very accurate cuttings along the curves due to the blade shape. The broader the width of the blade, the less accurate the cut along the curves will be. As the machine enters the spread, the base plate lifts up the plies of fabric causing a slight distortion. To overcome this, edges of the base plate are sloped and the front is curved.

The base plate is the foundation that supports and helps balance the cutting machine and maintains the position of the blade at 90 degrees. During cutting, it is very important that the

machine is not tilted as the cutting would not be proper. The straight knife machine can make only lateral cuts into the spread and cannot be used to cut areas from the center of garment parts.

A slasher can be used for this. It cuts into the spread from the above, that is, vertically, without making a cut across the fabric. The operator power is affected by the weight of the machine, handle height, sharpness of the blade, and the stroke. Stroke is the vertical distance traveled by the blade during its reciprocation.

The Supporting Arm

A further advancement to the straight knife machine is the use of a supporting arm that supports the machine from above. Therefore, the heavy base plate can be replaced by a small, flat base plate which reduces distortion of plies, narrower blade therefore, enabling cutting along sharper curves. Further, there are lesser chances of tilting of the blade during cutting.

Rotary or Round Knife

The Rotary or Round knife is a portable cutting machine. It consists of a round blade, a motor above it and a handle to direct the machine. The knife rotates in the anticlockwise direction. It cuts the fabric with one way thrust, as compared to the up and down motion of the straight knife. The cutting capacity or spread height depends on the blade diameter, motor power and speed.



Cutting Pitch

Cutting pitch is the angle at which the cutting device contacts the spread. It determines the uniformity in size of the pieces from top to bottom in a spread. Uniformity can be obtained only if the cutting pitch is maintained at 90 degree and the knife accurately guided through the lay. In case of the straight knife machine, the edge of the knife is perpendicular to the base plate, the cutting pitch is 90°.

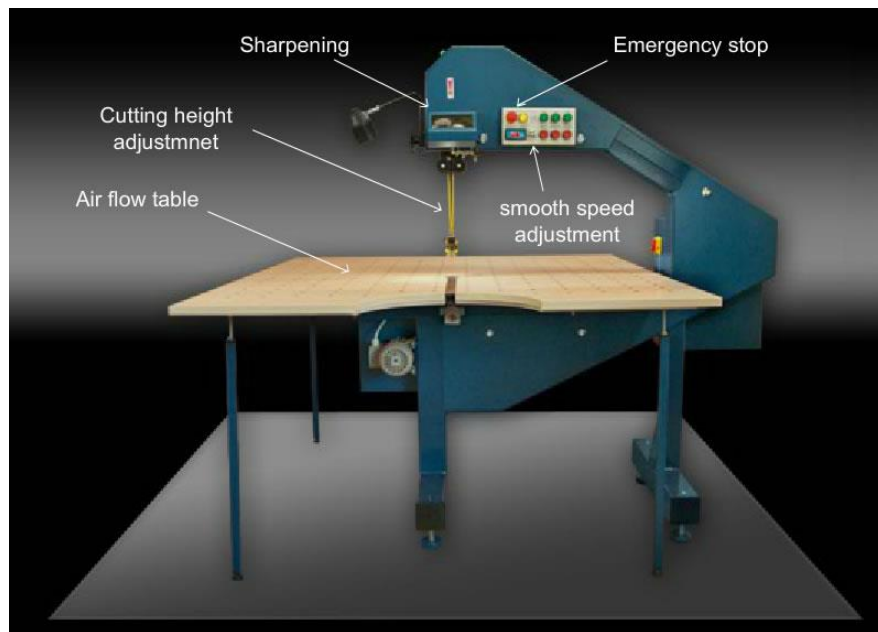
In cases of rotary blade, cutting pitch is less than 90 degree. The greater the diameter of the knife, the lesser is the cutting pitch and therefore, the top ply will cut sooner than the bottom ply. If the machine is moved forward at the same time, it will result in uneven cutting. In order to get a uniform cutting through the entire spread, that is, vertically, the machine must be kept stationary and the cutter must raise the bottom plies. However, this does not ensure a uniform cut. This is the biggest limitation of the rotary knife.

When the rotary knife cuts a spread whose height is greater than the blade then the middle plies will get cut first, top plies next followed with the bottom plies. This is the greatest limitation with the rotary knife.

Stationary Cutters

Stationary cutters have blades or cutting devices that are fixed to the machine and the operator manipulates the spread to cut it. There are two types Band Knife and Die cutters.

Band Knife Machine



Band Knife machines have blades that rotate through a slot on the cutting table while cutting. The operator guides the fabric through either a push or pulling action towards the knife. One edge of the blade is sharpened and the blade is narrower than the straight knife which is the greatest advantage of this machine. It gives accurate cuts for small parts such as, collar, cuffs, and pockets as the turning of the block on a narrower blade disrupts the plies less than the wider blade of a straight knife machine.

When using this machine, space has to be left around the garment parts during planning the marker. For small parts, a template can be used as a guide.

Another advantage over the straight knife is that the blade is the straight knife tends to wear out faster at its lower end, which is more in contact with the fabric, unless the spread is high enough. On the other hand, in the band knife, the blade wears evenly due to its action cycle. The cutting knife is called as endless knife or loop knife. The machine resembles a sawmill cutter. Band Knife machines are also available with air flotation tables to facilitate easy movement of the block.

End Cutters



End cutters are special type of round knife machines. A small diameter round knife is placed on a rail or track with a pushing arm. This ensures an accurate straight cut. End cutters are used to cut the end of the fabric after each spread while spreading.

Die Cutters

Die cutters are used for cutting when each and every piece is required to cut in exactly the same shape. Dies are pre-shaped, metallic outlines with a cutting edge.



The cutting action is vertical. The accuracy and consistency of die cutting can be affected by inaccurate placement of dies. Dies are in the shape of pattern periphery. Dies are very useful in case of high production volumes of similar styles. Generally, small parts like collars and cuffs are cut. The downward force is generated by hydraulic systems to press the dies through the fabric lay. Slitting die machines have blades that are used to cut intricate slashes used in pockets for example in welt pockets.

Notchers

Garment parts require notches in order to align them accurately during sewing and assembly. Operator controlled cutters can be used for this purpose; however, accuracy depends on the skill of the operator.



It is also necessary that the lay must be absolutely vertical, otherwise some pieces will be marked too deep while other may not be marked at all. Special notching machines such as, straight notchers and vee notchers are available for this purpose. Hot notchers have a heating element which fuses the fibers adjacent to the notch in order to prevent fraying and disappearance of the notch. It is a good choice with natural and knit fabrics, however it cannot be used for thermoplastic fibers. It may also be available with adjustable heat control.

Drills

When markings have to be made inside garment parts, for example, marking position of pockets, appliqués, darts etc., drills are used. This machine consists of a motor that rotates the needle, a base plate and a long needle. The needle penetrates completely at the specified point creating a hole or just shifting yarns.

Certain drill machines are also equipped with a hollow needle that carry marking fluid that leaves a mark on the fabric plies. It is important that the marks remain till the particular sewing operation. Drills are problematic to use on loosely wove thick textured fabrics. Marking can also be done using thread markers which carry the thread through the entire spread and then

individual threads are cut. It may also be done manually, on every ply using a template, but it is time consuming.

1.3 Specialised Cutting Machines

Auto Cutter

Auto cutters are also known as computer controlled cutting machine (CNC cutters). Presently, they are the fastest and most precise means of cutting fabric lays for garment production. The cutting table of a computer-controlled cutter is made of nylon bristles. The nylon bristles are flexible. The lay is transported from the spreading table to the cutting table with the help of air flotation. Since, the cutting table area of an auto cutter is relatively short, the cutting table generally touches the spreading table to form a continuous area. Thus, the lay is fed in parts for cutting by auto cutter.

This flexible nylon bristle cutting bed, allows the cutting knife to penetrate deeper and move freely. Also, the bristles allow air passage through them to create a vacuum. The vacuum thus created, helps reduce the height of the lay by compacting it and holds the fabric in place. The carriage supports the cutting head. It is fixed on to parallel rails that are at the side of the cutting table. The to and fro movement of the carriage is achieved by two synchronized motors. The cutting head can move on the carriage with the help of a third motor. This arrangement, gives the capability to position the knife exactly.

The cutting head contains a knife, motor and automatic sharpener. The motor rotates the knife and positions it along the line of cut of curves. The sharpener sharpens the blade periodically.

The knife can be lifted and plunged again to enable it tackle sharp curves and create V shaped notches. A motorized drill is also available to put drill marks when required.

Control Cabinet

This cabinet has the computer and other electrical components that are required to operate the cutter, carriage and the vacuum motor.



The lay is laid in the spreading table with a paper sheet in the bottom. This helps to transfer the lay from the spreading table to the cutting table, without distorting the ply. Once the lay is kept, a polyethylene sheet is spread over the lay. The operator starts the vacuum pump and the air is sucked out of the lay and gets compacted.

Most of the auto cutters can handle height of 7.5 CM of compacted fabric. The cutting marker is fed through a floppy or a disc to the cutter. The cutting operator chooses a starting point / reference point at the corner of the spread by positioning the origin light. The cutting head receives instructions from the computer continuously, and positions the knife and drives it through the fabric accordingly.

Laser Cutting Machine

This machine produces a laser beam which can be focused into a very small spot. This high energy density, when pointed on a fabric, produces a rapid increase in localized temperature.



This acts as a cutting action of fabric by burning, melting and vaporization. A laser beam, unlike conventional blades, does not get blunted with use, but has the limitation of depth of focus, as it loses energy, after cutting the first ply. Because of this, the laser cutting machine is best suited for cutting single plies.

The machine has a stationary gas laser, and a cutting head carrying a system of mirrors that reflect the laser beam to the cutting line. The residue, which gets developed due the cutting action, needs to be cleared immediately by suction. The linear speed of cutting is very high with upto 40 m/min compared to the auto cutter. But the auto cutter cuts bulkier lays, compared to the single plies. Due to this, laser cutting is only done where accuracy is needed. Its general applications lie in cutting of appliqués, home furnishings, labels and sails. The main limitation is - Thermoplastic fabrics cannot be cut using laser as the edges may fuse together.

Water Jet Cutting

Water when applied through a small nozzle under high velocity can act as a knife. The high-pressure jet tears textile fibers on impact. Like lasers, water also loses energy after cutting the first ply, and its cutting ability is reduced.



The bottom plies will be cut wider and rougher. Due to this, water jet cutting is also applied for single ply cutting. The water used is caught and drained away. Filtered and de-ionised water should only be used for this kind of cutting. Generally, this method is used to cut leather.

Plasma Cutter

A high velocity jet of high temperature ionized gas (mainly argon) is focused at the fabric and acts like a laser cutter. This cutting is suitable for aluminium and stainless steels.

Ultrasonic Cutting

Blades are vibrated using ultrasonic frequencies in the 20KHz range. The ultrasonic vibrations induce a very small movement of the cutting blade. This removes the need of a nylon bristle top of the cutting table.

1.4 Fusing Machines

Fusing and interlining is needed for the manufacturer to:

- Maintain consistent quality as against hand operations.
- Save time and labour.
- Enable easy handling of small components.
- Reduce differential shrinkage between top cloth and interlining to controllable levels.
- Stitch, pucker and distort sewn products.
- Create garments with a cleaner and fresher appearance.
- Increase durability of garments.
- Modify slightly by the interlining the handle of cloth.

- Retain the garments original shape after repeated dry cleaning and washing.
- Reduce crease recovery time.

Interlinings

Interlinings are additional pieces of fabric applied to particular garment sections, that may require further support.

However, interlinings can also serve many other purposes, including to:

- 1) Stabilize garment sections.
- 2) Reinforce sections which may be weakened by subsequent operations.
- 3) Maintain the shape of parts such as collars and lapels.
- 4) Prevent seam impressions.
- 5) Stiffen the garment or fabric.
- 6) Strengthen the garment or fabric.
- 7) Mask the transparency of fabric with sheer characteristics.
- 8) Provide additional warmth, for example, quilting.

Categories of Interlinings

Interlinings can be categorized as:

- 1) Woven
- 2) Non-Woven (Bonded)
- 3) Knitted

All these types can be obtained in either fusible or non-fusible form. Interlining consists of the base fabric or substrate onto which the thermoplastic resin is coated, sprayed or printed. Base Cloth can be produced by variety of woven, knitted and non-woven materials.

Woven

The main advantage of woven is that they can be cut on exactly the same grain as the pieces to which they will be applied. This is considered by many, well worth the extra cost incurred by lay wastage. Canvases of linen, wool and hair are often used for a softly tailored finish as they reshape in pressing.

Non-woven

Some of these can be cut multi-directionally and are therefore, very economical. They are also very resilient, have good crease recovery and excellent shape retention. For these reasons, they have replaced, to some extent, the traditional canvases particularly in ladies wear, but also in some menswear. The main advantage of non-woven is their low resistance to abrasion.

Knitted

Knitted interlinings were developed specifically for use with knitted fabrics, so that the fabric's stretch characteristics can be maintained as well as controlled. However, their drapability has made them an attractive alternative to woven and non-wovens on some outerwear garments.

Resins

There are several types of resins. The choice of resin is restricted by limits imposed by the outer fabric, fusing equipment to be used, end use requirements and the precise behaviour of resins in response to heat.

Requirements of Resins

These are the requirements of resins.

a) Upper Limit Fusing Temperature:

Should not be higher than 175 degree C, so that it does not cause damage to the top fabric or its colour.

b) Lower Limit Fusing Temperature:

Lower limit temperature is suitable, because too low temperature may lead to inadequate bonding to withstand handling of fused garments. Lower limit of 110 degree C. Leather and suede may require lower temperature.

c) Thermoplasticity: of resin must be such that change of temperature combined with correct pressure is efficient for resin to penetrate the top cloth and form an efficient bond. It should not cause strike through effect.

Strike Through Effect:

The adhesive seeps through to the right side of the fabric, causing sticky patches which collect dust etc., (thru the top cloth).

Strike Back Effect:

The adhesive seeps through the back of the interlining (thru the base cloth).

d) Cleanability:

Should withstand washing and or dry cleaning throughout the life of garment.

e) Handle: Give the desired handle.

f) Colour: In normal end uses, must be white or transparent unless there are specific colour requirements. Should have low dye retention properties.

g) Safety: Must be harmless in processing and end use.

Different types of resins are Polyethylene, polypropylene, polyamides, polyesters, polyvinyl chloride (PVC), plasticized polyvinyl acetate (PVA). Resins can be applied through different methods such as, Scatter Coating, Dry Dot Printing, Paste Coating, Preformed, Extrusion Laminating, Hot Melt Coating and Emulsion coating.

Scatter Coating

In Scatter Coating, scattering heads are used to provide an even scatter under automatic control. After scattering, the resin enters an oven, softens and is pressed against the base cloth. This is then cooled. This is the cheapest method. It does not give uniform or not as flexible as printed coatings.

Dry Dot Printing

In Dry Dot Printing, powdered resins fill engraved holes on a roller. Base cloth passes over a heated roller and then against the engraved roller. Powdered resin adheres to the cloth in form of dots. Oven heating ensures permanent adhesion. Patterns of dots can vary from 3 to 12 per cm.

Generally, light weight fabrics require interlinings with smaller dots in higher concentration, while heavy weight fabrics require larger dot in lower concentration to allow good penetration.

Paste Coating

In paste coating, fine resin powders are blended with water and other agents to form a smooth paste and are printed onto base cloth. Heat removes the water and dots cool into a solid resin. This gives precise shaped dots and is used on interlinings in shirt collars.

Preformed

In the preformed method, a preformed net is laminated to a base cloth to form precise dot patterns when using heat and pressure. It is widely used for top collars of shirt.

Extrusion Laminating

In the Extrusion laminating method, thin films of molten polyethylene are laminated directly from an extruder onto an interlining base fabric. This gives a stiff product.

Hot Melt Coating

Hot melt coating produces continuous plasticized polyvinyl coatings on interlinings for leather goods.

Emulsion Coating

In emulsion coating, the Base cloth is dipped into the emulsion, excess resin is squeezed out by passing base cloth through rollers and drying in oven produces double sided coating.

1.5 Selection of Fusible

A) Characteristics of top cloth:

Will it withstand fusing conditions?

Durability of fused products?

Does top cloth have open structure that will allow strike through?

Does the top cloth have a pattern or surface that could be damaged with pressure during fusing.

B) Selection of woven, knitted or non-woven fusible:

Different parts of garment may require different types of fusible.

Woven Interlinings can be used where strength, stability and good draping qualities are required.

The disadvantage is that it is costly.

Knitted Interlinings: The base cloths provide elasticity. They have a natural handle which provides good resiliency. They are used in women's light clothing such as blouses, dresses made with crepe, georgette and polyester fiber yarns. Since knitting is also faster, they are cheaper.

Nonwoven: Are cheaper, largely used for industrial purposes.

C) Selection as per resin type and coating method:

Depending on whether garment is washed, or dry cleaned, interlining should be compatible.

D) Type and quality of fusing equipment:

Whether equipment uses steam heat or dry heat, steam heat used during fusing process should be at temperature higher than the heat used for steam pressing to avoid delamination.

Dry heat done at the right temperature will not affect the laminated fabric during further steam pressing.

It may cause a temporary change in colour of top cloth which returns later.

E) Cost:

The cost must be evaluated and balanced against factors such as:

- Desired performance of fusible.

- Compatibility to equipment.
- Technical services provided by supplier.

1.6 Methods of Fusing

There are five methods of fusing. They are:

Single fusing, Reverse fusing, Sandwich fusing, Double fusing, and Top fusing.

Single Fusing

In single fusing, the fusible is on top of the cloth.

Reverse Fusing

In Reverse fusing, the fusible is below and the Top Cloth is on top.

Sandwich Fusing

In Sandwich fusing, two components are fused in one operation.

Double Fusing

In Double fusing, two fusible e.g.:- fusing the front and chest piece fusible to the fore part of jacket or coat.

Top Fusing

In top fusing, Fusible components positioned on top cloth and heat applied directly to top cloth.

Components of Fusing

The main components of fusing are:

Temperature, Time, Pressure, and Cooling.

Temperature

The temperature should be high enough to change dry thermoplastic resin into partially molten state in order to flow. Too low temperature gives poor flow and adhesion. Too high temperature gives strike back or strike through.

HEAT SHOCK: When entering fusing zone then subjected to high temperature. Sudden change harms contains fabric such as viscose. May make the fabric brittle and may even change texture.

GLUE LINE TEMPERATURE: Minimum threshold range required for melting the glue.
Temperature existing at the interface of outer fabric and interlining.

Time

Equipment should give enough time to allow temperature and pressure to induce melting of the resin.

Pressure

Ensures controlled and even penetration of the resin.

Cooling

Cooling:

Ensures a consolidated bond or the fused assemblies. Enforced cooling ensures higher levels of productivity than if fused assemblies are left to cool unnaturally. Optimum results can be achieved by accurate and continual control of the four processing components. The properly fused fabric part with fusible will look as displayed. When the temperature, pressure or time is lower than required, the cross section will look as displayed. When the temperature, pressure or time is higher than required, the cross section will look as displayed.

Fusing Equipment

Fusing process can be executed by these machine categories:

- Specialized fusing presses
- Hand irons
- Steam presses

Specialized Fusing Presses

Under specialized fusing presses we have:

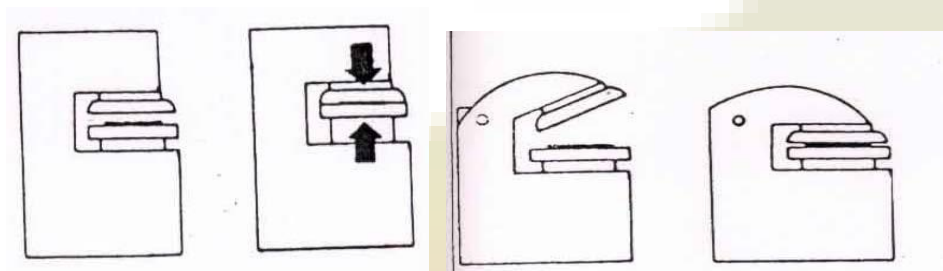
- Flatbed fusing press
- Continuous fusing press
- High frequency fusing press

Flatbed Fusing Press

A flatbed fusing press is a static method whereby, the assembly is fed or positioned onto the bottom plate and the head or the top plate is closed over it. It consists of two horizontal metal platens. The top platen is unpadding, but the bottom one has resilient cover of silicone rubber. Heat provided by electric elements, can be on top or on both platens. Pressure is applied mechanically or hydraulically.



Categories of Flatbed Fusing Machines



Flatbed fusing machines are further categorized as:

Vertical Action Closer, and Vertical action machine is considered more preferable due to its ability to put uniform pressure throughout.

Advantages of Flatbed Fusing

The Flatbed fusing machine:

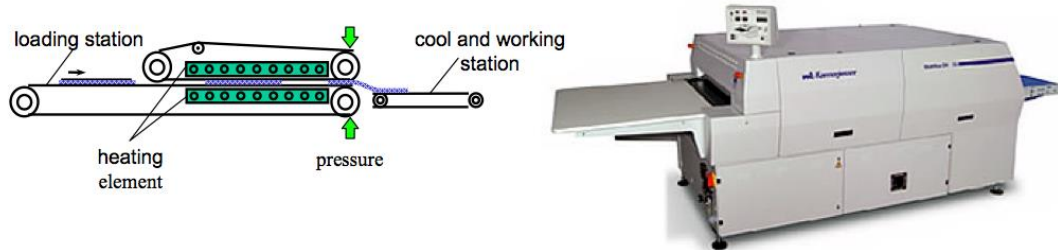
Is a simple version, less complex and easy to operate.

Is small in size and its relatively low cost allows it to be used by small clothing manufacturers.

Reduces fabric shrinkage, since the fabric is held under pressure throughout the fusing cycle.

Continuous Fusing Machines

This type of machine has an endless conveyor system for transporting the assemblies successfully through the heating, pressure and cooling stages. In this system, the garment is passed through a heat source simultaneously, or subsequently applying pressure.



Heating Mechanism

The heating systems generally used for continuous fusing presses are:

Heating Plates – These consist of two heating surfaces, positioned apart, with one above the conveyor belt and one below the conveyor belt. Both have separate temperature control profile.

Cylinder Heating - The cylinder consists of two parts, the inner cylinder, a stationary assembly in which the heating element are mounted and the outer cylinder, which rotates around the inner cylinder.

This principle ensures that the heat generated by the inner core is evenly distributed all over the cylinder mantle.

Pressure Mechanism

Pressure is applied continuously and evenly, throughout the entire process once fed into the machine, but that pressure is just sufficient to only hold the fabric and fusing together and to prevent slipping. Actual pressure is applied at the outlet point, where drums put heavy pressure on just heated fusible piece.

Time Mechanism

Fusing time depends on the speed on the conveyor belt, the faster the belt runs, the shorter the time. All machines have a belt speed controller which can be adjusted to give various dwell times in the heated zone.

High Frequency Fusion Press

High Frequency Fusion press is used for multiple layers of fabric and interlining. The alternating waves from a high frequency generator are absorbed by material, which generate friction heat between the molecules and thus distribute resin uniformly.

- Maximum height of fabric: 70mm

- Example : for 30 kw unit,
- Operating time is 1-3 minutes
- Load is 5-20 kg.



1.7 Hand Iron

Hand irons are used only for interlinings that can be fused at relatively low temperatures, low temperature and short times. It can be useful only for positioning a fusible temporarily before it is pressed by a steaming press.

1.8 Steaming Press

Steam applied from the head of a press is used to achieve high temperature, which melts the fusing glue.

The press head applies pressure and the lower part of the press of buck helps in cooling, once the fusing action has taken place. Major application of this machine is in fusible shoulder pads in men's jackets.

1.9 Conclusion

To summarize, in this unit, you have learnt about spreading surfaces and spreading machines. You have also been given an overview of common cutting machines such as the Straight knife cutting machine, the round knife cutting machine, the band knife cutting machine, the end cutter, Notcher, Driller and reviewed the practice of cutting a lay using common cutting machines.

