FOOD PACKAGING MACHINERIES

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PACKAGING MECHENARY

- Packaging machines are a type of machines are used to package the products or components include filling, sealing, strapping, wrapping, labeling, coding etc.

CHOICE OF PACKAGING MECHENARY/ CONSIDERATION

- A choice of packaging machinery requires consideration of
  - technical capabilities,
  - labor requirements,
  - worker safety,
  - maintainability,
  - serviceability,
  - reliability,
  - ability to integrate into the packaging line,
  - capital cost,
  - floor space,
  - flexibility (change-over, materials, etc.),
  - energy usage,
  - quality of outgoing packages,
  - qualifications (for food, pharmaceuticals, etc.),
  - throughput,
  - efficiency,
  - productivity, and
  - ergonomics, at a minimum.

The food industry is aware of current public concerns related to packaging which includes:

- Packaging litter and the volume of packaging waste in municipal waste.
- Cost of disposal and recovery of discarded packaging in municipal waste.
- Pollution associated with methods of disposal, i.e. landfill and incineration.
- Ease of opening.
- Perception of over-packaging due to apparently excessive ullage (free space) resulting from product settlement.
- Legibility of labels.
- Integrity of information on labels.
- Contamination of food due to the packaging itself.
- Accidents involving packaging.

Framework for a packaging strategy

- Technical requirements of the product and its packaging to ensure pack functionality and product protection/preservation throughout the pack's shelf life during distribution and storage until its consumption.
- Customer's valued packaging and product characteristics, for example, aesthetic, flavor, convenience, functional and environmental performance.
- Marketing requirements for packaging and product innovation to establish a distinct (product/service) brand proposition; protect brand integrity and satisfy anticipated demand at an acceptable profit in accordance with marketing strategy.
- Supply chain considerations such as compatibility with existing pack range and/or manufacturing system.
- Legislation and its operational/financial impacts, for example, regulations regarding food hygiene, labeling, weights and measures, food contact materials, due diligence etc.
- Environmental requirements or pressures and their impacts, for example, light-weighting to reduce impact of taxes or levies on amount of packaging used.

TYPES OF PACKAGING MACHINES

Packaging machines complete packing process step by step.

- There are several types of packaging machines available such as
  - sealing machines, (paddle/ hand sealer)
  - filling machines, (for liquid……)
  - strapping machines,
  - wrapping machines,
  - coding machines and
  - labeling machines.

THE PACKAGING MACHINES ARE AVAILABLE IN DIFFERENT VERITIES:

- Cartooning packing machine
  Cleaning packing machine Cup
  filling & sealing machines
  Closing packing machine
- Coding and Marking packing machine

Conveyors packing machine

- Pouch filling machines
- Filling packing machine
- Food Processing packing machine
- Vacuum packing machines
- Form Fill Seal packing machine
- Handling packing machine
- Inspection packing machine
- Packing tube machines
- Labeling packing machine
- Palletizing & Depalletizing packing machine Bottle packing machines
- Wrapping packing machine Strapping machine Labeling machine
- Cleaning machinery

Multifunction machine Wrapping machine

- Pure Pack packing machines
- Drying machinery Container machinery Sterilization machinery

1.VACUUM PACKAGING MACHINE

- Vacuum packaging is a method of packaging that **removes air from the package** prior to sealing.
- This method involves (manually or automatically) placing items in a plastic film package, removing air from inside, and sealing the package.
- A vacuum packaging machine consists of vacuum pumps, motors, vacuum chamber, sealing section, Plexiglas plate covers, air bag, and the electromagnetic valve.

EQUIPMENT USE IN VACUUM PACKAGING:

- **External vacuum sealers** - external vacuum sealers involve a bag being attached to the vacuum-sealing machine externally. The machine will remove the air and seal the bag, which is all done outside the machine.

- **Single chamber vacuum machines** - single chamber sealers require the entire product to be placed within the machine. The lid is closed and air is removed. Then, there is a heat seal inside the chamber that will seal the bag. After sealing the bag the chamber is refilled with air by the automatic opening of a vent to the outside. The lid is then opened and the product removed.

- **Double vacuum chamber machines -** they are simply a pair of chambers with two seal bars to seal the pouch. The air is pulled from the entire chamber during the vacuum process, the bag is sealed and then the air is let back in the chamber.

- **Automatic belt vacuum chamber machines -** automatic belt chamber sealers require the entire product to be placed in a plastic bag or pouch within the machine. The product travels on the conveyor belt, it is automatically positioned in the machine on the seal bar, the lid is closed and air is removed.

ADVANTAGES

- **Reduces spoilage:** Sealed foods last 3-5 times longer compared to conventional storage methods. as a result, foods maintain their texture and appearance longer.
- Store food using vacuum sealed foods is in the freezer. Freezer burn is eliminated, because foods no longer become dehydrated from contact with cold, dry air.
- **Money Savings:** One of the best aspects of this storage method is that it is extremely economical.
- **Space Savings:** Vacuum sealing conserves space for food storage.
- Packing to protect against handling for hygiene during transport and presentation.
- Efficiency
- Freshness
- Safety

DISADVANTAGES

- Proper Gas Levels and Oxygen Levels Must be Known to Increase Shelf Life, this External Gases Can Increase Cost.

- Some foods contain anaerobic bacteria, which can grow without the presence of air. Within a vacuum sealed pouch, with reduced oxygen, these bacteria will grow and may pose a risk to your health.

- Loss of Preservation Once the Package has been Opened

Form Fill and Seal Machines

- Form Fill Seal (FFS) machines are packaging machines that form, fill and seal a package on the same machine.
- The main types are
  1. vertical form fill seal (VFFS) and
  2. 2.horizontal form fill seal machines (HFFS)
- Most FFS systems use flexible film to form the primary package, such as a bag or pouch.
- But gable-top and aseptic cartons are also created in a form-fill- seal operation.
- And most blister packs are produced with a thermoform/fill/seal machine, a close cousin.

Types of Form Fill and Seal Machines

- Vertical Form Fill and Seal Machine
- Horizontal Form Fill and Seal Machine (Flow Wrapping)
- Filling Machine
- Semi-Automatic Filling and Sealing Machine

QUESTION

VERTICAL FORM FILL AND SEAL MACHINE

VFFS machines offer businesses a fast and efficient way of packaging their products.

- A roll of plastic film is fed through the machine's long, hollow conical tube, where the outer edges of are sealed together to form a bag.
- Then, a horizontal sealing bar clamps across the bottom edge of the plastic, sealing those pieces together.
- This bag is the lowered onto a weighing table, where the product is filled into the bag, and when the target weight of the bag is reached, the filling stops and the horizontal sealing bar seals the top of the bag, and that bag is cut away from the rest of the roll, ready to advance onward in the packaging line.
- During the sealing process, the bag may be filled with air from an inert gas supply. This helps protect the product from crushing—take, for instance, a bag of potato chips—and drives out oxygen, which can prevent or slow the growth of bacteria.
- Various products like salt, tea, sugar, spices, snack foods, wafers, detergent, and candies are placed into formed pouches and then sealed.


POTATO
CHIPS

VERTICAL FORM FILL AND SEAL MACHINE

https://www.youtube.com/watch?v=ITQg46v1hq0

https://www.youtube.com/watch?v=lEg2TMN4ff0

VERTICAL FORM FILL AND SEAL MACHINE

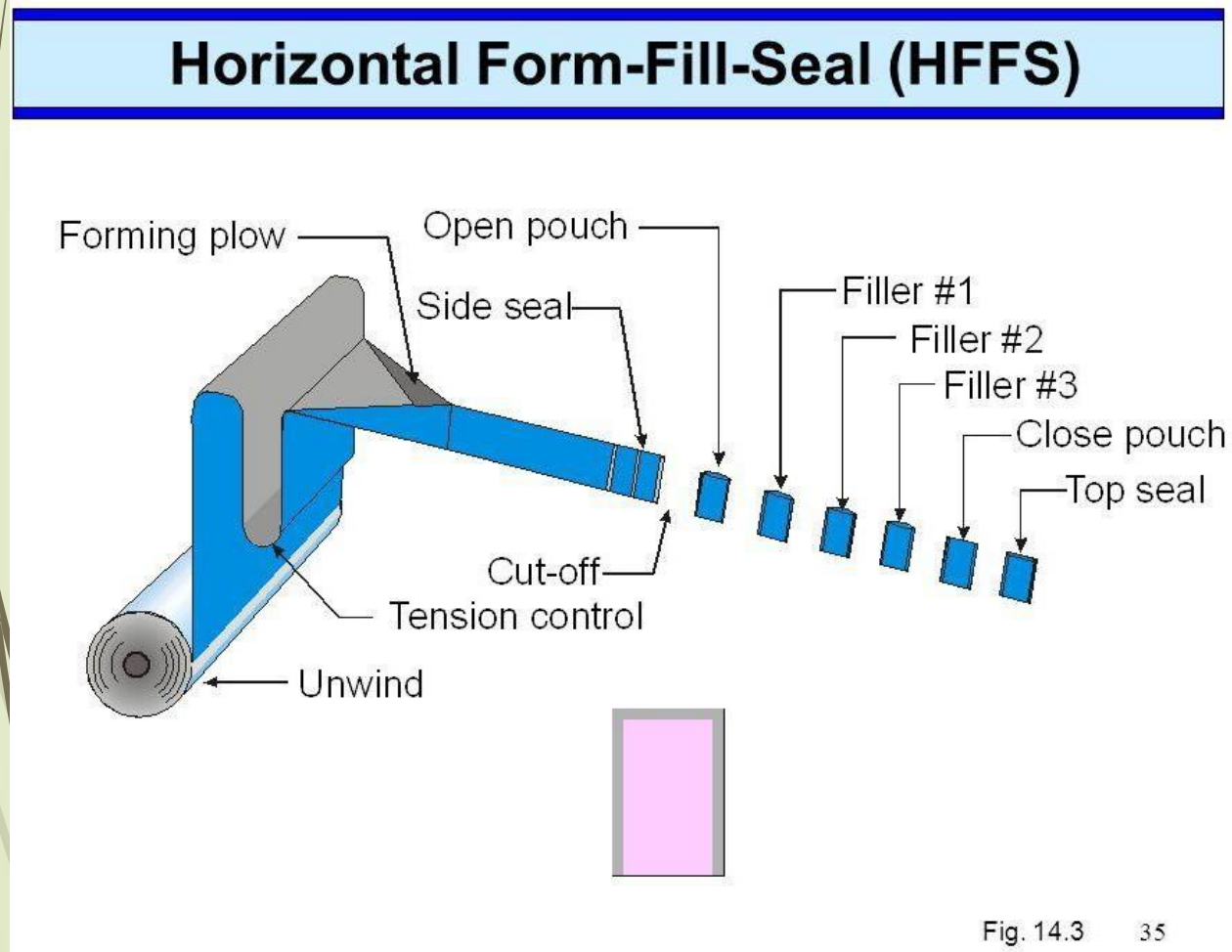
Advantages

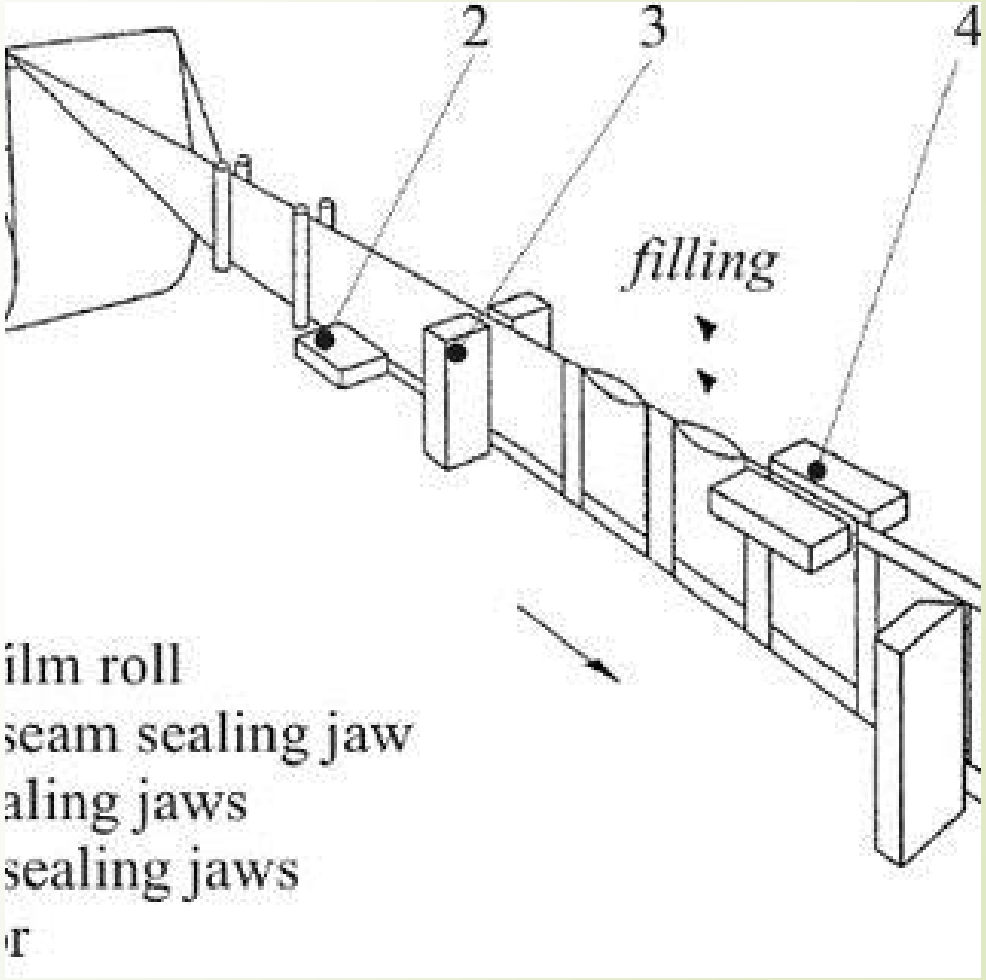
- Completely automated forming, filing & bag sealing process from start to finish.
- Speeds up the bagging process & in turn output.
- It increase overall sealing & bagging precision.
- Delivers high quality packaging products at low cost. Fast, durable & reliable packaging.
- Significant packaging cost reduction due to ease of use & highly efficient machinery.
- Require less labors.

Dis-advantages

- Only produce a pillow style pouch and it has a seam (where the lay-flat roll-stock is joined and sealed) running the length of the bag.
- Trained person required.

Horizontal Form Fill and Seal Machine

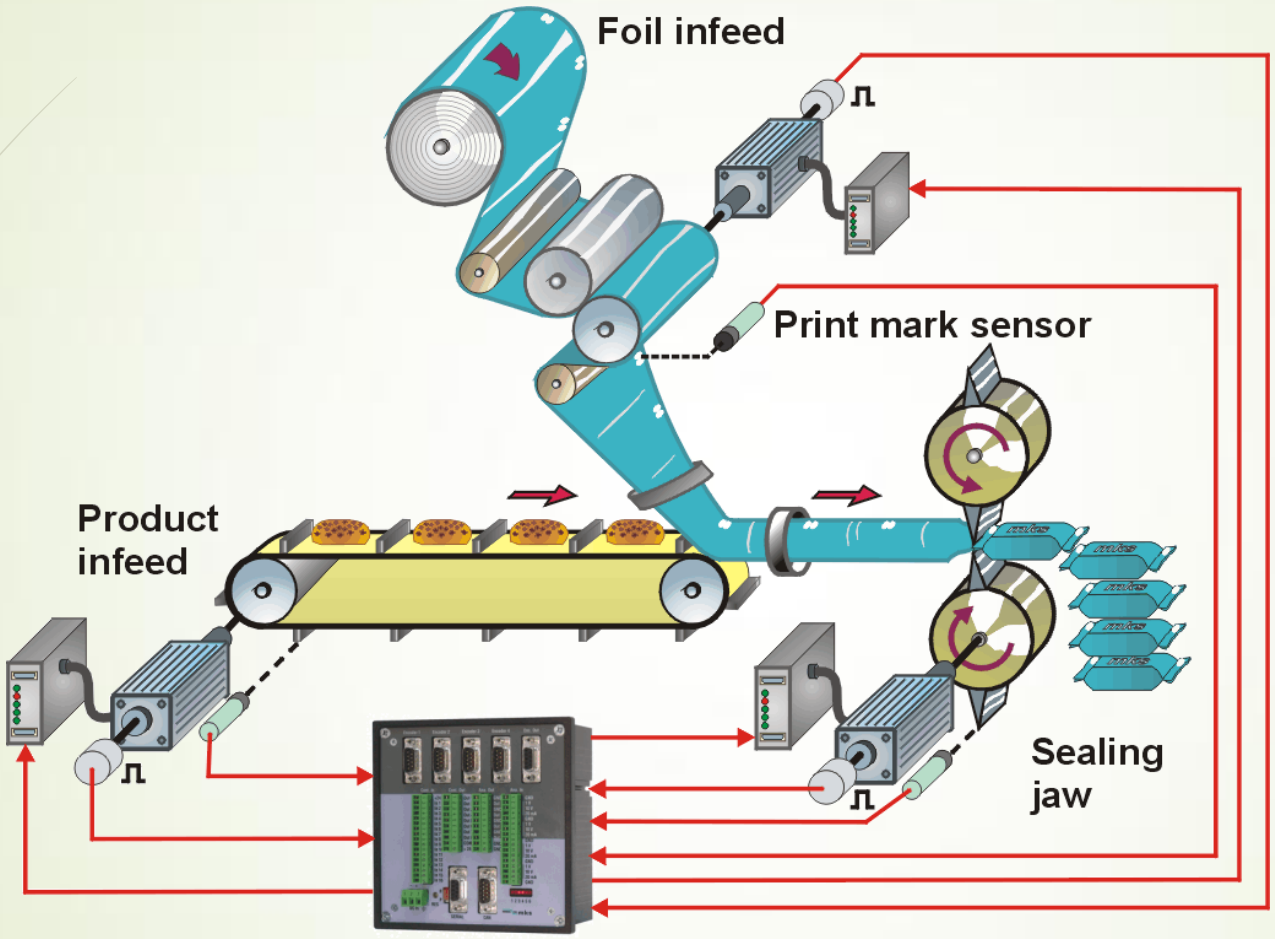




Horizontal Form Fill and Seal Machine

- Any type of pouch (three sides, four sides, center seal, stand up, zipper etc) can be sealed.
- Pouch moves in horizontal position.
- Continuous type sealing process for more production.
- Conveyor speed 5 to 12 meters per min.
- Teflon belts are used for sealing.

Home Work



Tubular Bag Type Packing Machine

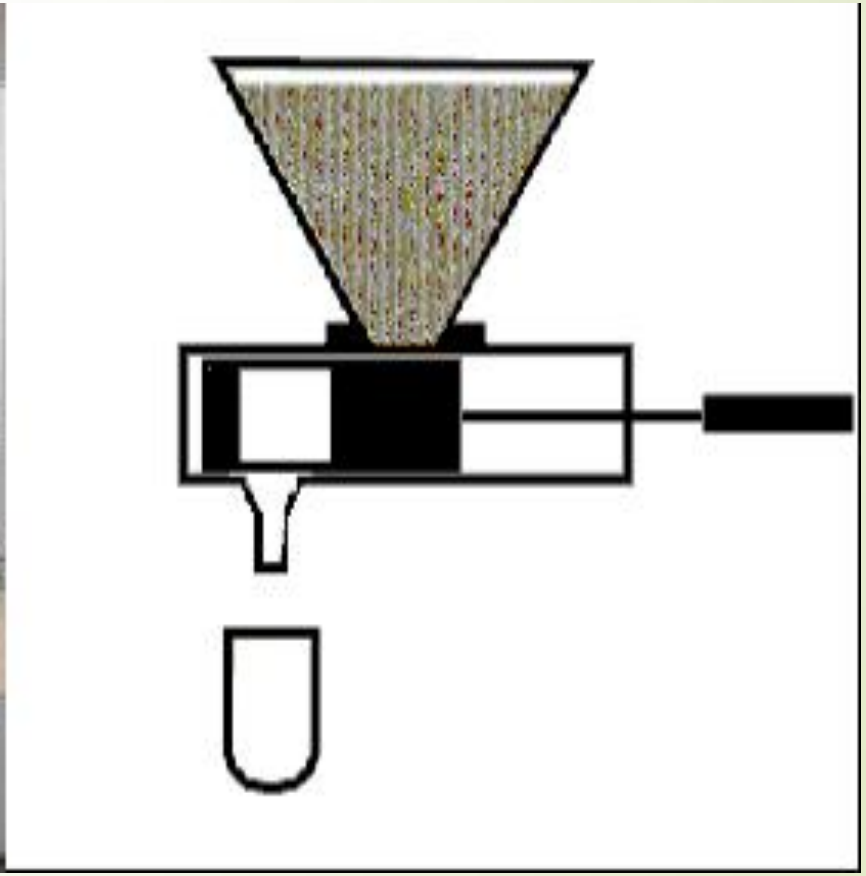
https://www.youtube.com/watch?v=ImTKsvS_ciY

https://www.youtube.com/watch?v=0rZGBewBmQo

Cup Fillers (Also known as Pocket Fillers)

- Cup fillers are also volumetric fillers that work in a different way than an auger filler.
- The Cup filling & sealing machines are available in 2 varieties that are semi-automatic and automatic.
- The Cup filling machines are intended for filling liquids like milk and juice and can also fill semi liquid products like jam, mayonnaise, spreads, syrup, creams and some similar products.
- Cup fillers work well with any free flowing product such as nuts, granules, and course powders .
- Cup fillers are also the machine of choice for canning operations of peas, corn, beans and many other similar products.
- A hopper sits above the top of the cup and gravity feeds product in.
- Wipers remove excess product so that the cup is leveled. When the cup reaches the discharge chute it falls out of the bottom of the cup and into the container or bag.
- Cup fillers can be made for very high production rates compared to auger and net weight fillers.
- These machines are accurate, reliable and provide continuous operation without stopping.

Cup Fillers (Also known as Pocket Fillers)



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- **Advantages of Cup Fillers**

 Can run virtually any free flowing product (not recommended for fine powders).

 Fast - Capable of speeds into the hundreds of fills per minute.

 Simple design - very little downtime for mechanical problems.

 Relatively inexpensive to other filling systems.

- **Disadvantage of Cup Fillers**

 Very limited fill range without change parts (less than 2:1).

 Cannot run products that are not very free flowing.

 Does not run irregular shapes or densities.

PACKING TUBE MACHINE

- These machines are useful for filling and sealing plastic Tubes.
- The packing tube machines use for the semi liquid products with special heating and sealing jaws.
- These machines are intended for filling products like food products, cosmetic products and pharmaceutical business.
- The packing tube machines include liability and more advantages.

https://www.youtube.com/watch?v=5bi3nzlEOtw

https://www.youtube.com/watch?v=EdY0TL8T8v4

POUCH FILLING MACHINE

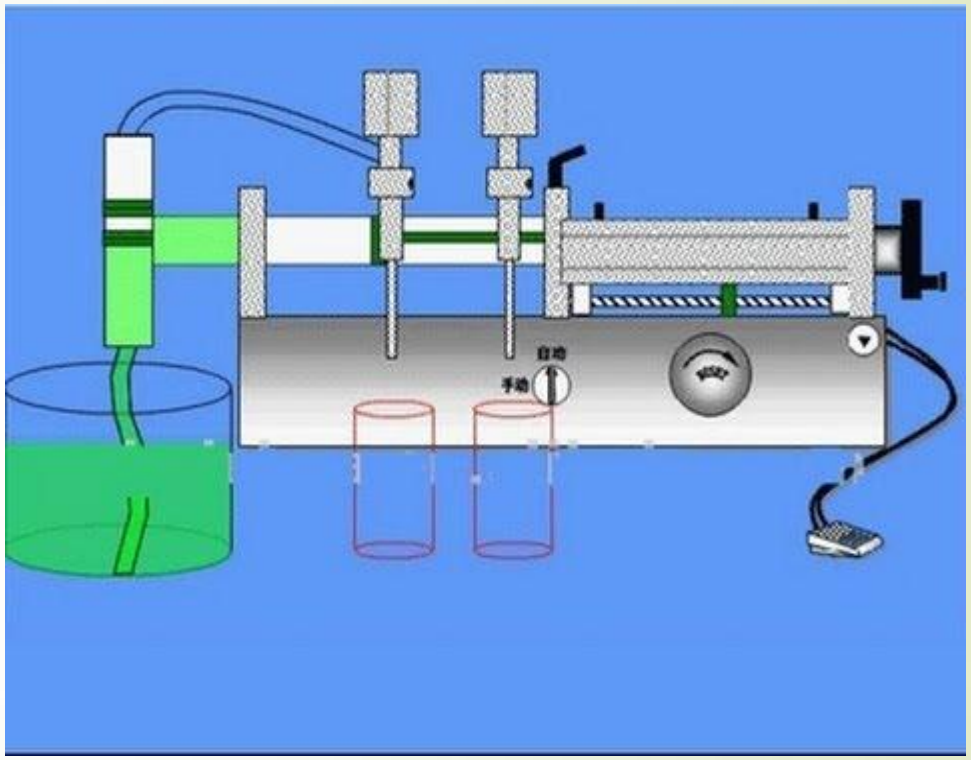
- These machines are intended for filling products like Yogurts, Cream, Juice and more others.
- The operator can easily access pouch filling machines because these provide operation and maintenance guidance to the operator.
- Thus, packing roll is insert in the machine after that it take pouch shape, fill the elements and lastly sealed by sealing device.

https://www.youtube.com/watch?v=sDRjLHHkUH8

AUTOMATIC WATER BOTTLING MACHINE

- The machines are mainly used in the mineral and pure water filling operations.
- The three functions of bottle rinsing, filling and capping are composed in one body of the machine.
- The whole process is automatic.
- The bottle is transferred through air conveyor at first, then to rinser. The machine start to rinse through the bottle nip clamping and turning over 180 degree. The bottle turn over to origin after rinsing.
- Then the machine start to fill through the middle gear wheel 1. After finish the filling, the machine start to cap through the middle gear wheel II. At the same time, the caps are fed to the bottom of bottle through cap feeding.
- The machine is also used in filling juices, mineral water and purified water in bottles made of polyester and plastics. The machine can also be used in hot filling if being installed with temperature controlling device.
- The handle of the machine can be freely and conveniently turned to adjust the machine to fill various types of bottles. The filling operation is faster and more stable.

AUTOMATIC WATER BOTTLING MACHINE



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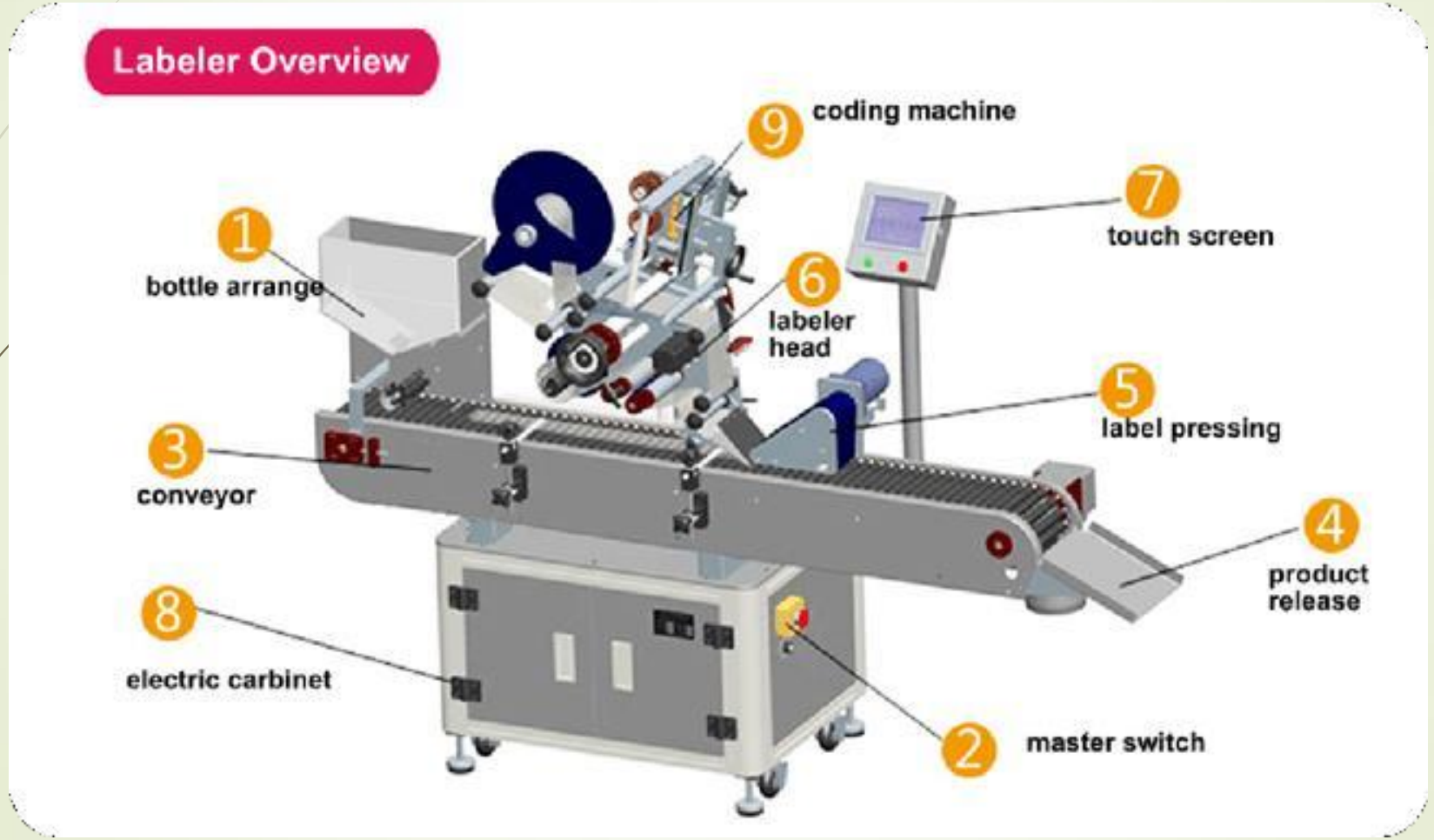
Labeling Machines

Labeling Machines



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Labeling Machines

- Labelling Machines apply labels and decoration onto all types of packaging containers, display, point-of-sale and transit packs.

- For ease of explanation we group labelers in several categories including:
- Semi-Automatic Labeling Machines,
- Label Applicators,
- Automatic Labeling Systems,
- Full Body Sleeve Labelers,
- Print and Apply Labeling.

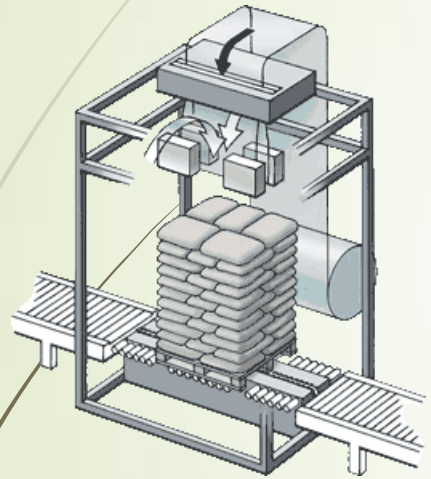
LABELING MACHINES

- **Advantages of labeling**
- Labeling, just like the rest of the packaging processes, is very important for the product.
- 1) A label has the ability to attract a consumer,
- 2) Provides information on the product
- 3) Allows consumers to differentiate and identify with the product.
- 4) Labels are also used to provide protection against tampering (tamper evident) to ensure the product reaches the consumer without interference and unopened.
- 5)Shrink sleeve labels are also used on products which do not have surfaces suitable for a conventional label.
- 6)A growing market is security labeling to counter fraud and theft, and give brand protection and authentication.

AUTOMATIC WRAPPING MACHINE

- Wrapping Machines wrap a flexible packaging material, (*e.g. paper, aluminium, plastic film*), around a product or group of products.

AUTOMATIC WRAPPING MACHINE



HAND SEALER

Paddle Sealer

QUESTION: