

'Packaging for the Logistics'



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Packaging- the terminology

- ✿ **Packaging** is the technology of enclosing or protecting products for distribution, storage, sale and use. Packaging also refers to the process of design, evaluation and production of packages. Packaging can be described as a coordinated system of preparing goods for transport, warehousing, logistics, sale and end use. Packaging contains, protects, preserves, transports, informs, and sells.
- ✿ Packaging is done by private firms as well as government bodies too.
- ✿ Governments of UK (cow-milk) and Government of Australia (Sheep-Wool) etc.
- ✿ Indian companies like Uflex, ITC, Aquench etc.





The Characteristics

⊕ Physical Characteristics

- ▣ Density of bulk materials
- ▣ Content in the material
- ▣ Ability to withstand exposure to other elements
- ▣ Respiration of the material
- ▣ Handling procedure of the material

⊕ Chemical Characteristics

- ▣ Compatibility of the products
- ▣ Products requiring chemicals for its delivery

⊕ Characteristics must be made known to consumers

- ▣ Handling way of the material
- ▣ SOP of the material



The Characteristics

✚ Hazardous Cargo

- ✚ Explosives and inflammable liquids/gases
- ✚ Compressed gases
- ✚ Oxidizers
- ✚ Poisons
- ✚ Radioactive materials

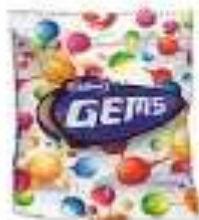
✚ Environmental Protection

- ✚ Reduce packing materials used
- ✚ Use packaging materials that are more environmentally friendly with recycled content
- ✚ Use reusable containers
- ✚ Retain or support services that collect used packaging and recycle it



Primary Packaging

- ✿ Packaging which forms a sales unit for the user or final consumer
- ✿ It is also called sales packaging
- ✿ This can be a single form of pack like a can of drink or a few layers of packaging material in a box of chocolate
- ✿ Primary packaging is the packaging format in direct contact with the food or the containment
- ✿ It is conceived so as to constitute, for the end-user or the consumer at the POS, a complete integral package
- ✿ For eatables, as it always remains in direct contact with the commodity, its hygiene and edibility safety requirements are maintained throughout its life span
- ✿ It is also the packaging that the consumer will retain the longest
- ✿ It normally has the most information in terms of contents, branding, 'Best Before Date', instructions for use, etc.





Secondary packaging

- ✿ Secondary or grouped packaging is that which is used to collate primary units for ease of handling in the selling environment
- ✿ Typically this packaging can be cardboard boxes or trays, or shrink-wrapped plastic packs containing a number of primary units
- ✿ The layer after primary packaging is in indirect contact with the food but may still have product safety impact
- ✿ Secondary packaging plays a vital role in the marketing strategy surrounding the product
- ✿ It keeps the primary packaging in its original condition during storage and logistics
- ✿ The dimensions of the secondary packages are kept in accordance with its contents to fulfill space utilization
- ✿ Its materials are chosen so as to keep its contents in its necessary temperature and condition(s)





Tertiary packaging

- ✿ It is used to group secondary packaging together to aid handling and transportation and prevent damage to the products
- ✿ Examples: Pallets, shrink wrap, straps etc.
- ✿ It facilitate the safe handling and transport of a number of sellable units or grouped packaging
- ✿ The packaging prevents physical damage due to incorrect handling or transport
- ✿ Transport packaging does not include road, rail, ship or air containers. It concerns, for example, pallets or (heavy) wooden crates
- ✿ Economically, the tertiary packaging should be done so as to accommodate the secondary packages totally and should be able to be transported from places
- ✿ Carries information about the product e.g. fragility etc.





Packaging in Logistics

- ✦ Packaging should be done in the way so that:
 - ✦ movement of goods between incoming transport, storage, processes and outgoing transport should be flexible and easy
 - ✦ should not hamper the constituent material throughout the path along the logistics

- ✦ The right packaging ensures the constituent product is:
 - ✦ in the right condition
 - ✦ at the right place
 - ✦ in the right position
 - ✦ in the right sequence
 - ✦ for the right cost
 - ✦ by using the right methods.

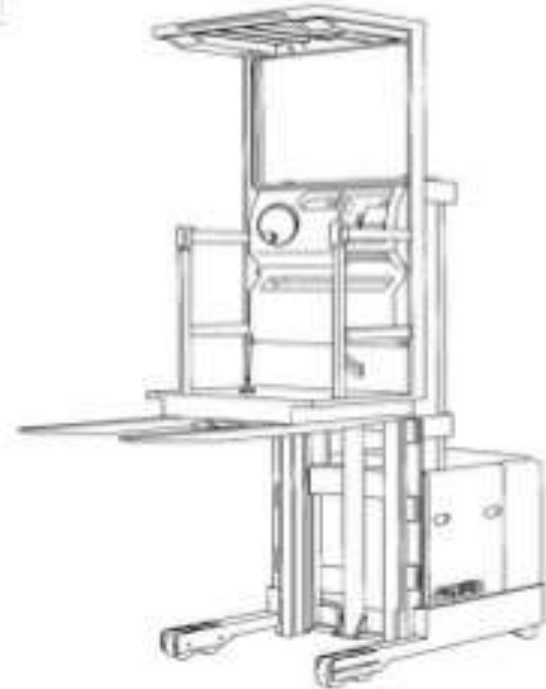


Materials Handling

- Material Handling should be done to find the methods, the routes, the layouts and the right components to minimize hand

- Six main responsibilities for material handling:

- ▣ packaging - unitizing
- ▣ internal transport
- ▣ storage
- ▣ retrieval
- ▣ identification
- ▣ communication.



- The design of a material handling system depends upon the type and the characteristics of the materials to be handled.



Material Handling System Components

☀ Material handling equipment:

- ❏ **Containers and unitizing equipment:** Containers are to facilitate the movement and storage of loose items and unitizers are equipment for a formation of a unit load such as containers, such as cartons, boxes, and bags, carriers or support, such as pallets, skids, and plywood, stretch wrap, shrink wrap
- ❏ **Material transport equipment:** To move material from one location to another (e.g., between workplaces, between a loading dock and a storage area, etc.) within a facility or at a site by Conveyors, Industrial trucks, Cranes
- ❏ **Storage and retrieval equipment:** The equipment used for stacking and reclaiming packages e.g. pallet-trucks, push-back racks
- ❏ **Automatic identification and Communication equipment:** For Automatic identification and recognition (Bar coding, Optical character recognition), for Automatic paperless communication such as Radio frequency data terminal, Voice headset, Light and computer aids, Smart card



Packaging

✿ Package testing:

- ✻ **Vibration:** Vibrations and other relevant tests are done before finalizing the packaging material
- ✻ **Dropping:** From certain heights, such packages are dropped to check the fragility of the package
- ✻ **Horizontal impacts:** Horizontally the package is attacked by several forces
- ✻ **Compression:** To reduce time-taken and space, shrink wraps are generally used to wrap up the packaging
- ✻ **Overexposure to extreme temperatures or moisture:** As and when needed (cold chain for pharmaceuticals), temperature is controlled inside the package
- ✻ **Rough handling:** Along each point in Logistics, severe and rigorous handling of the package is done. It ensures the durability of the package



Improper Packaging

Most important points during packaging before shipment:

- ✚ Characteristics of the Constituent material
- ✚ Volume of the package
- ✚ Dimensions of the constituent material and the package
- ✚ Safety of the constituent product with the package



Source: www.eleconindia.com/packaging/wagon-tippler



Objectives of packaging

Physical protection

- ✿ The objects enclosed in the package may require protection from:
- ✿ Mechanical shock; Vibration; Electrostatic discharge; Compression, Temperature etc.

Barrier protection

- ✿ A barrier from oxygen, water vapour, dust, etc., is often required.
- ✿ Some packages contain desiccants or oxygen absorbers to help extend shelf life . Modified or controlled atmospheres are also maintained in some packages.
- ✿ Keeping the contents clean, fresh, sterile and safe for the intended shelf life is a primary function.
- ✿ A barrier is also implemented in cases where segregation of two materials, prior to end use is required, as in case of special paints, glues, medical fluids etc.
- ✿ At consumer end, the packaging barrier is broken or measured amounts of material removed for mixing and subsequent end use.



Objectives of packaging

• Containment or Agglomeration

1. Small objects are typically grouped together in one package for reasons of efficiency.
2. Example: a single box of 1000 pencils requires less physical handling than 1000 single pencils.
3. Liquids, powders and granular materials need containment
4. Agglomeration helps the manufacturer and/or retailer sell more in a single hand

• Information transmission

1. Packages and labels communicate how to use, transport, recycle, or dispose of the package or product
2. With pharmaceuticals, food, medical, and chemical products, some types of information are required by governments.
3. Some packages and labels also are used for track and trace purposes.
4. Most items include their serial and lot numbers on the packaging
5. And in the case of food products, medicine, and some chemicals, the packaging often contains an expiry/best-before date
6. Packages may indicate their material with a symbol.



Objectives of packaging

✿ **Marketing**

1. The packaging and labels can be used by marketers to encourage potential buyers to purchase the product
2. Package graphic design and physical design have been important and constantly evolving phenomenon for several decades
3. Marketing communications and graphic design are applied to the surface of the package and (in many cases) the point of sale display
4. Most packaging is designed to reflect the brand's message and identity

✿ **Security**

1. Packages can be made with improved tamper resistance to deter tampering
2. It also can have tamper-evident features to help indicate tampering.
3. Packages can be engineered to help reduce the risks of package pilferage or the theft and resale of products
4. Some package constructions are more resistant to pilferage and some have pilferage indicating seals.





Objectives of packaging

✚ Security

5. Packages Counterfeit consumer goods, unauthorized sales (diversion), material substitution and tampering can all be prevented with these anti-counterfeiting technologies
6. Holographic materials are used for the authenticity of the materials
7. Packages may include authentication seals and use security printing to help indicate that the package and contents are not counterfeit
8. Packages also can include anti-theft devices, such as dye-packs, RFID tags, or electronic article surveillancetags that can be activated or detected by devices at exit points and require specialized tools to deactivate
9. Packaging is also considered a means of loss prevention and authentication





*A Handheld Laser
Scanner Scanning Labels
on a Pallet Load of
Product Sitting in a
Warehouse Rack*



Packaging

- ✿ For the logistics, a package system requires 3 types of information to design viz.:
 - ☒ Severity of the distribution environment
 - ☒ Fragility of the product
 - ☒ Performance characteristics of various cushion materials

- ✿ For an uniform and smooth logistics, labeling of the packaging is important. It consists of:
 - ☒ Retroflective labels
 - ☒ Batch numbers
 - ☒ Weight
 - ☒ Specific contents
 - ☒ Instructions for use
 - ☒ Information to allow passage through customs
 - ☒ Compliance labeling
 - ☒ One- or two-dimensional bar codes
 - ☒ Smart labels or RFID labels



ULINE SPECIAL HANDLING LABELS

SHIPPING

ADDITIONAL PARTS INSIDE S-2162 3 x 9"	PARTIAL CASE S-2164 3 x 9"	CAUTION SHARP OBJECTS INSIDE S-2283 3 x 9"	READY TO SHIP S-2219 3 x 9"
BOX _ OF _ S-2224 3 x 9"	SKID _ OF _ S-4158 3 x 9"	CUSTOMER PICK UP S-2202 3 x 9"	CAUTION HEAVY S-2216 3 x 9"
REPACK S-2299 3 x 9"	SAMPLE S-2301 3 x 9"	EXPEDITE S-2300 3 x 9"	NO FORKLIFT S-4150 3 x 9"

RECEIVING

OPEN THIS END S-2141 3 x 9"	ADULT SIGNATURE REQUIRED S-7384 3 x 9"	OPEN THIS SIDE ONLY S-7385 3 x 9"	UNLOAD OTHER SIDE S-7386 3 x 9"
SIGNATURE REQUIRED S-6159 3 x 9"	INSPECT FOR DAMAGE BEFORE ACCEPTING S-7387 3 x 9"	DOCK TO STOCK SHIPMENT S-7388 3 x 9"	OPEN FIRST S-7389 3 x 9"

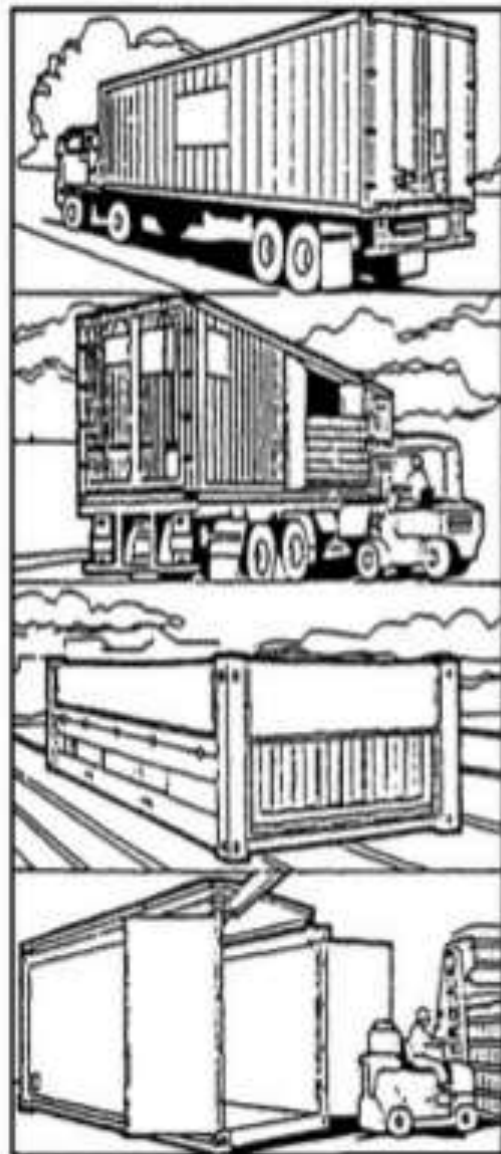
MIXED

MIXED PALLET S-1391 3 x 9"	MIXED CARTON S-2271 3 x 9"	MIXED PARTS S-2261 3 x 9"	MIXED PALLET PLEASE BREAK DOWN SKID S-4072 3 x 9"
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*Examples of
Shipping Labels*



Package loading for logistics



End loading
fully enclosed

Ventilated

Side loading,
fully enclosed

Refrigerated

Open top

Liquid bulk

Open top
hard top

Flat bulk

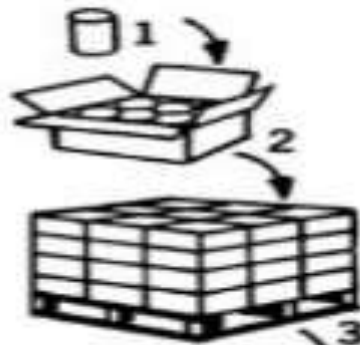


✶ An intermodal container holds the unit load

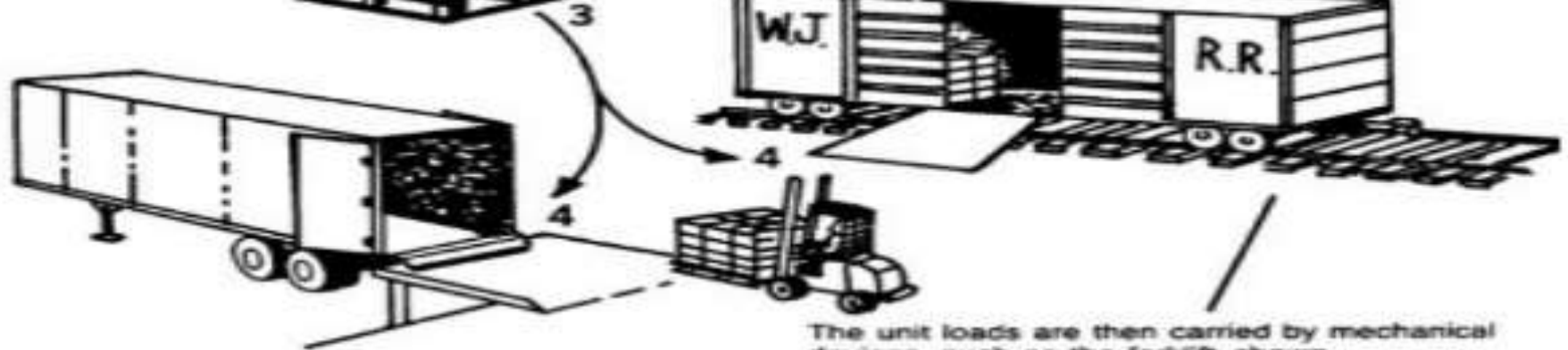
- ✶ Interchangeable among rail, truck, and water carriers
- ✶ Air carriers usually use irregular shaped containers made to fit fuselage



The Building-Blocks Concept of Packaging



Shown here are consumer products (1), packed in individual cartons (2), which are loaded on to a pallet. This pallet load (3) is also referred to as a unit load. The process to this point is called *unitization*.



The unit loads are then carried by mechanical devices, such as the forklift shown here, and loaded aboard a trailer (4), railcar (4), or oceangoing container. Carriers give discounts when handling several identical vehicle or container loads at the time, because they can be grouped for handling (5).

