

Different packaging materials



Different packaging materials

- Metals
- Glass
- Wood
- Plastics

Metals

Four types of metals

- Steel, aluminum, tin and chromium
- Tin plate (a composite of tin and steel), electrolytic chromium-coated steel and aluminum .

METALS

- Formation of metal packages
 - Three piece can
 - Two piece can
 - Foil pouches
 - Metallised films

Characteristics of metal packages

Advantages

- Thermal stability
- Mechanical strength and rigidity
- Ease of processing on high-speed lines
- Recyclability
- Excellent barrier properties
- Consumer acceptance
- High heat conductivity, corrosion resistance, capacity for being rolled thinner – **Aluminum**
- Introduction of pop-top or easy-open ends

Characteristics of metal packages

Disadvantages

- Weight of the cans
- High cost
- Corrosion
- Reactivity with foods (tin will react with acids in foods)

Foils

- Made from aluminum
- Thin rolled sheet of aluminum (4.3 to 150 μm)
- Good compatibility
- Resistant to most fats, petroleum greases, organic solvents and mild acidic products
- Unaffected by heat and moisture
- Strength and ductility increases at lower temperatures
- Opacity protects products from light exposure
- Alloying strengthens aluminum – Fe, Cu, Mg, Mn, Cr, Ni, Zn and titanium (@ <4%)
- Multilayer films

Metallised films

- **Thin layer of aluminum vapors depositing onto a plastic film in a high vacuum chamber**
- **Less expensive than aluminum foil**
- **Barrier to moisture, gases, oils and light**
- **Oriented polypropylene (OPP) - widely used**
- **Metallized PET and nylon – available**
- **Used in laminate structures**
- **Snack foods and coffee**

GLASS - Types of glass

- Soda-lime glass – most widely used
- Contains mostly silica sand (73%), limestone (12%), soda ash (13%) and aluminum oxide (1.5%), with small amounts of magnesia, ferric oxide and sulfur trioxide
- Melted together in a gas-fired melting furnace until fusion occurs and cooled to a rigid state without crystallization
- Cullet, broken or recycled glass, also added as an ingredient
- Coloring additives added to control the penetration of specific light wavelengths
- Iron or sulfur (amber glass), chrome oxides (emerald glass) and cobalt oxides (blue glass)

Formation of glass

- Blow and blow process (narrow-neck bottles)
- Press and blow process (wide mouth jars)
- A gob (lump) of molten glass is transferred from a furnace to a blank mold (or parison mold)
- A plunger in the base of the mold is used to form the furnish (the threaded part that will receive the closure) and the neck ring of the package

Formation of glass

- **Blow and blow process** - air is blown through the finish to expand the glass into the mold and form the parison
- **Press and blow process** - a metal plunger rather than air pushes the gob into the mold
- Completed parison resembles a test tube with a threaded top
- Transfer to an annealing oven or lehr to cool the glass to minimize internal stresses and possible cracking

Characteristics of glass packages

Advantages

- Chemical inertness
- Non-permeability
- Strength
- Resistance to high internal pressure
- Optical properties
- Surface smoothness

Characteristics of glass packages

Disadvantages

- Fragility
- Brittleness
- Heavy weight
- Safety concerns

WOOD

Four groups

- **Groups I and II – soft**
- **Groups III and IV – hard**
- **Group I – softer woods, pine, spruce and chestnut**
- **Group II - heavier woods, Douglas fir and Southern yellow pine.**
 - **Nail holding power**
 - **Greater strength**
 - **Greater shock resisting capacity.**