

LECTURE 6

6.0 FLEXIBLE PACKAGING MATERIAL

These generally fall into two broad categories

1. Paper and 2. Films

6.1 PAPER – Consist of bonds, tissues, litho, krafts, glassiness parchment and greaseproof.

PAPER TYPE	MATERIAL	WTS/3000ft ²	USES AND FINISHES
(i) Bonds	Uncoated sheets made of bleached chemical pulp	20-70 lbs/3000 ft ²	Wide variety of finishes for printing. May have high degrees of wet strength etc.
(ii) Tissues	Light wt paper made of semi-fully bleached chem. pulp	8-20 lbs/3000 ft ²	Wide variety of strength and porosity. They may be glazed etc. use as wraps
(iii) Litho	Coated on one or both side	29-60 lbs	Used in publication advertising Excellent printing properties used in beer labels

(iv) Krafts	Very strong paper, made in bleached or unbleached form	25-80 lbs	Wide variety of strength available they are porolls and roughly finished. They are sheap. Used in making cannister labels
(v) Glassines	Super calendered chemical pulp sheet	15-45 lbs	Have high resistance to air and grease. Very strong, have smooth surface and glossy. Used for candy wraps
(vi) Parchment	Bleached chemical pulp stipped in H_2SO_4	15-27 lbs	Good grace resistance, good wet strength used for butter and magarine wraps
(vii) Greese Proof			Very much like parchment paper.

6.2 FILM

Definition: Thin flexible plastic sheeting having a thickness of 0.0100 inch or less. They are flexible as a result of manufacturing processes.

6.3 PLASTIC FILMS

(i) Cellophane

Originated as a brand name for a regenerated cellulose film. Transparent, somewhat elastic heat-resistant, water and oil insoluble film.

Produced by precipitating viscose solution with ammonium salts. When dry, cellophane film is relatively GAS TIGHT, when wet it loses much of its imperviousness to gas. Its lowest rated property is lack of flexibility. It therefore breaks easily when used with dry products. Cellophane is often used with other plastic films in laminates.

Cellophane to cellophane is not heat sealable but it easily accepts heat sealable coating.

Cellophane should be used immediately after exposure to high PV or immediately after exposure to low temperature.

(ii) CELLULOSE ACETATES

Closely resembles cellophane as far as most properties go except in two respects

1. Gas Transfer
2. Water Transfer

Cellulose acetate is better in water transfer resistance than in GAS TRANSFER resistance.

Because of its permeability to GAS it is suited for packaging certain fresh products such as fruits and vegetables.

It is not used for meat because its transmission rate of water is high and shrinkage and surface drying of fresh meat will result.

Cellulose acetate is derived from cellulose treated with acetic acid anhydride. The cellulose triacetate is partially hydrolyzed. Additives include plasticizers, antiblocking agents U.V absorbers. Used where stiffness, gloss and dimensional stability are required. Cellulose acetate is sealed commercially with solvent adhesives. It have a wide use in laminates. Used extensively with polyethylene.

(iii) Polystyrene: A polymer of styrene. Its tensile properties are good as a film only at temperature above 176⁰F.

It has attracted considerable attention in recent times because of its remarkable resistance to RADIATION include CHANGE. It is three times as resistant to radiation as polyethylene.

(iv) Polyethylene: the largest volume single film produced. Its primary selling point is its high functional properties as well as low cost.

In 1960 consumption of polyethylene in U.S.A was 280 million pounds.

In 1970 U.K. consumption 315,000 tons.

It is a polymer of ethylene and it obatned by two processes.

(a) High Pressure polyethylene

Or

Low density film

Manufactured at temperature 302-392⁰F pressure of 1200 atmospheres traces of O₂ present

(b) Low Pressure or high Density Film

Temperature 140-320⁰F, Pressure 40 atmosphere with Alkylmetal catalysts.

Low density polyethylene is lower cost of the two.

Has moderate tensile strength and clarity. It is a good moisture barrier and poor O₂ barrier. Not affected by mineral oils. Easily fused for closure. Density ranges are 0.926-0.940 medium 0.910-0.926 low.

High density film offers better moisture protection and increased heat stability. Density ranges are 0.941-0.965 polythene bonds with cellophane to make good laminates. Printability is a problem it will not take printing ink, but by crafting polyacrylamide, a hydrophilic polymer on polyethylene, a polyethylene hybrid is produced whose surface will take ink. Extensive use of polyethylene is made in the retail market.

(v) Polyamides - Nylons

Various grades are available

Nylon 6 – Ease in handling and good abrasion resistance

Nylon 11 and Nylon 12: Superior barriers to O₂ and water and have low heat seal temperature.

Nylon 66: Very high melting temperature, difficult to seal.

(vi) Polyvinylchloride: Used for dairy, meat, confectionery and beverage packaging as well as laminate component.