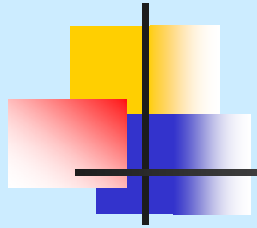


INDIAN INSTITUTE OF PACKAGING



Structure – Properties of Packed Materials and Material Selection

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Flexible Packaging on

19th- 20th September 2003





KEY REQUIREMENTS

- 1 LOW COST**
- 2 EASY DISPOSABILITY**
- 3 LOW TRANSPORT COST**
- 4 GOOD PRINTABILITY**



KEY REQUIREMENTS

- 5 INTRODUCTION OF NEW CONCEPTS IN PACKAGING DESIGN / TECHNIQUES**
- 6 NEWER END USES HAVE CREATED NEED FOR NEWER MATERIALS, GRADES**
- 7 PACKAGING AS SALESMAN**



KEY REQUIREMENTS

**8 AGGRESSIVE MARKETING –
SHORT SHELF LIFE**

9 CONSUMER PREFERENCE

EASY DECORATION

CONVENIENCE

DISPOSABILITY

Performance Requirements of Flexible Packaging

- 1 Protect Dry, Moisture Sensitive Products from moisture loss / ingress.
- 2 Protect product susceptible to oxidation from the atmospheric oxygen
 - contain the CO_2 , or N_2 or both
 - use replaced atmosphere oxygen gas flush packages.



Performance Requirements of Flexible Packaging

- 
- 3 Prevent loss or flavouring component from a packaged product.**
 - 4 Protect products from the expected shelf life.**
 - 5 Provide protection from pilferage.**
 - 6 Project brand image for increased sales.**





MONO LAYER PLASTIC FILMS

**POLYOLEFINS – LDPE, HDPE, HMHDPE,
PP, LLDPE**

POLYESTER

POLYAMIDES

NYLON - 6

VINYLS

- PVC / PVDC

POLYCARBONATE

STYRENES

EVA

CELLOPHANE





LAMINATES

A flexible packaging laminate is a combination of 2 or more layers of different material the finished laminate has derived from the individual layers.

POLYSTYRENE

Hard, Brittle, High Tensile Strength, Low Soft, Pour, Clear – Transparent use.

Modification : HIPS, ABS Looses clarity, Fups Trays.





NYLON (PA)

**FAIR WVTR, GOOD GAS/ ODOUR
PERMEABILITY VERY TOUGH**

USES : OIL PACK, VAC. PACKS

PET (Poly Ethylene Terephthalate)

HIGH STRENGTH, SOFT POINT

USUALLY ORIENTED

VERY CLEAR

USE : LAMINATION





BARRIER FILMS

PVDC

EVOH

METALISING :

PET

BOPP

PAPER



LAMINATED MULTILAYER FILMS

Area of Usage

Snack Food : Wafers, Extruded Food, Biscuits, Breakfast Cereals Chocolates Etc.

Conv. Food : Heat and Eat Foods, Noodles (inst), Inst. Mixed for Idlis Gulab Jamun Etc.

Dairy Food : Refil Packs for Dairy Whitener.

Others : Tea, Coffee, Pan Masala Malted Foods, Etc. Instant Coffee.



BASE MATERIAL FOR LAMINATES

- LDPE
- LLDPE
- HDPE
- HMHDPE
- EVA
- CPP
- BOPP
- OPET
- PA6

HEAT SEALANT LAYERS

- LDPE
- LLDPE
- PP
- HEAT SEALABLE BOPP
- EVA
- PRIMACOR. EAA
- PVDC
- SURLYN
- METALLOCENE PE

Typical Lamination Structures

Sr. No.	Product	Materials
1	Roasted/ Salted Cashews	i) 12μPET / 50μ LDPE ii) 12μ MET.PET / 50μ LDPE iii) 12μ PET/9μ AL.FOIL / 50μ LDPE LD Could be LD-HD or LLDPE or LLD-HD
2	Jams/Jellies Preserves	i. MET.BOPP / LD ii. PET / AL.FOIL / LD

Typical Lamination Structures

Sr. No.	Product	Materials
3	Frozen Meat & Block Frozen Shrimps	LDPE
4	IFQ Shrimps	i. PET / LDPE ii. LD-TIE-NYLON-TIE-LD or LLD
5	Instant Coffee	i. 10 μ PET / 12 μ MET.PET / POLY

Typical Lamination Structures

Sr. No.	Product	Materials
6	Instant Food Mixes (Idli, Dosa, GulabJamun)	i. MET.PET / POLY ii. BOPP / POLY iii. PET / POLY
7	Extruded Foods	i. BOPP / LDPE ii. PET / LDPE
8	Breakfast Cereals	10-12 μ / 9-12 μ AL.FOIL /LDPE

Typical Lamination Structures

Sr. No.	Product	Materials
9	Spice Powders	<ul style="list-style-type: none"> i. 12μ PET /37.5μ LD-HD ii. 12μ MET.PET/37/5μ LD-HD iii. 12μ PET / 50μ PP iv. 12μ MET.PET / 50μ PP v. 10μPET/1μAL.FOIL/37.5 LDPE vi. 25μ BOPP / 50μ PP
10	Milk	LD – LLDPE (70 Micron)

Typical Lamination Structures

Sr. No.	Product	Materials
11	Snack Foods	<ul style="list-style-type: none">i. 12μ PET / 50μ CPPii. 12μ PET / 37.5μ PEiii. 20μ PET / 37.5μ PEiv. 12μ MET.PET / 37.5μ LDPEv. 12μPET/9μM.FOIL/37.5 LDPE
12	Flour	<ul style="list-style-type: none">i. PET / POLYii. LDPE



Typical Lamination Structures

Sr. No.	Product	Materials
13	Cheese	<ul style="list-style-type: none"><li data-bbox="680 514 1831 763">i. Nylon Based Co-Extruded Film Layer Film for Vacuum Packaging.<li data-bbox="680 799 1391 863">ii. MET.PET/ POLY<li data-bbox="680 906 1226 971">iii. PET / POLY
14	Edible Oil	<ul style="list-style-type: none"><li data-bbox="680 1042 1207 1106">i. HD-LD-HD<li data-bbox="680 1149 1767 1213">ii. LLD-TIE-NYLON-TIE-LLD<li data-bbox="680 1256 1265 1320">iii. PET/LD-HD

Typical Lamination Structures

Sr. No.	Product	Materials
15	Pickles	<ul style="list-style-type: none"><li data-bbox="676 506 1854 664">i. 15 μ PET/15 μ AL.FOIL / 55 μ PE<li data-bbox="676 706 1854 863">ii. 15 μ PET/12 μ MET.PET/ 55 μ PE<li data-bbox="676 906 1622 1063">iii. 12 μ PET/EVOH based structure





New Developments in Packaging

CONTROLLED ATMOSPHERE (CAP)

INTENTIONAL ALTERATION OF THE NATURAL GASEOUS ENVIRONMENT AND MAINTENANCE OF THAT ATMOSPHERE. AT A SPECIFIED CONDITION THROUGHOUT THE DISTRIBUTION CYCLE REGARDLESS OF THE TEMPERATURE OR OTHER ENVIRONMENTAL VARIATIONS.





New Developments in Packaging

MODIFIED ATMOSPHERE (MAP)

IT IS THE INITIAL ALTERATION OF THE GASEOUS ENVIRONMENT IN THE IMMEDIATE VICINITY OF THE PRODUCT PERMITTING THE PACKAGED PRODUCT INTERACTION TO NATURALLY VARY THEIR IMMEDIATE GASEOUS ENVIRONMENT MOST FOOD PRODUCT UNDER CAP/MAP TECHNOLOGY ARE

NATURALLY RESPIRING OR CONTAIN MICRO ORGANISMS WHICH RESPIRE. AS THE RESPIRATION CONTINUES, THE O₂ PRESENT IN THE ATMOSPHERE IS CONSUMED AND CO₂ A WATER VAPOUR ARE RELEASED THEREBY ALTERING THE ENVIRONMENT.





New Developments in Packaging

VACUUM PACKAGING

REMOVAL OF ALL THE AIR WITHIN THE PACKAGE WITHOUT DELIBERATE. REPLACEMENT WITH OTHER GAS. IN THIS SYSTEM A PRESSURE DIFFERENCE EXISTS BETWEEN THE PACKAGE EXTERIOR AND INTERIOR AND THE PRESSURE DIFFERENCE MAY CAUSE COLLAPSE OF THE PACKAGE.

THE VACUUM PACKAGE RESPIRING FOODS LIKE FRESH RED MEAT CONTINUE TO RESPIRE. THE SMALL AMOUNT OF O₂ PRESENT IN THE PACK IS CONSUMED PRODUCING CO₂ AND WATER VAPOUR THUS GIVING A MODIFIED ATMOSPHERE.





New Developments in Packaging

GAS FLUSH PACKAGING

PHYSICAL DISPLACEMENT OF AIR IN A PACKAGE BY A NEW GASEOUS COMPONENT PREFERABLY INERT GAS LIKE N₂ OR CO₂. MAIN OBJECTIVE IS TO REMOVE O₂ WHICH IS A POWERFUL SPOILAGE FACTOR.





APPLICATION OF NEW PACKAGING

1. SOFT BAKERY PRODUCTS (4-5 DAYS)

- a) STALING b) LOSS OF MOISTURE**

2. RETAIL RED MEAT (8-10 DAYS)

- a) OXIDATION b) RANCIDITY**
- c) MICROBES**

3. FRUITS (10-14 DAYS)

- a) RIPENING b) DELAYED RIPENING**
- c) DISCOLOURATION d) FERMENTATION**



APPLICATION OF NEW PACKAGING

4. VEGETABLES (1-2 WEEKS)

- a) MICROBIAL SPOILAGE**
- b) LOSS PF FIRMNESS**
- c) FLAVOUR**

5. POULTRY (10-12 DAYS)

- a) ODOUR**
- b) MICROBES**

6. PRE COOKED FOOD

- a) CHANGE / LOSS OF FLAVOUR**
- b) DEHYDRATION / HYDRATION**
- c) MICROBIAL ATTACK.**



PACKAGING MATERIAL

LAMINATES BASED ON

- **ALUMINIUM FOIL**
- **NYLON BASED**
- **POLYESTER**
- **PVDC COATED**
- **POLYESTER
(METALLISED / NON METALLISED)**