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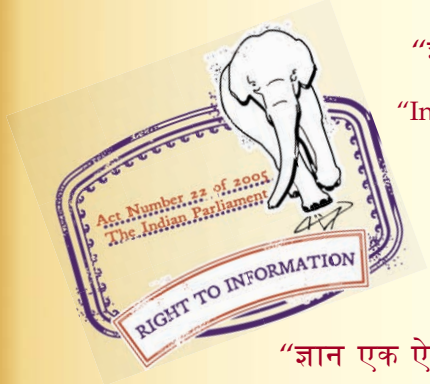
IS 10106-2-6 (1990): Packaging code, Part 2: Packaging materials, Section 6: Flexible leminates [TED 24: Transport Packages]



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"Knowledge is such a treasure which cannot be stolen"

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Indian Standard

(Reaffirmed 2006)

PACKAGING CODE

PART 2 PACKAGING MATERIALS

Section 6 Flexible Laminates

भारतीय मानक

पैकेजबन्दी संहिता

भाग 2 पैकजबन्दी सामग्रियां

अनुभाग 6 नम्य परतें

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

June 1990

Price Group 1

FOREWORD

This Indian Standard (Part 2 Sec 6) was adopted by the Bureau of Indian Standards on 9 January 1990, after the draft finalized by the Packaging Codes Sectional Committee had been approved by the Light Mechanical Engineering Division Council.

This Packaging Code is being issued in the following parts, which have one or more sections:

Part 1 Product packaging,
Part 2 Packaging materials,
Part 3 Ancillary materials,
Part 4 Packaging,
Part 5 Packaging operations,
Part 6 Storage and transportation, and
Part 7 Packaging machinery.

This section of Packaging Code (Part 2/Sec 6) deals with flexible laminates.

Attempt has been made to include, in this section of the Code, the general guidance on selection of some of the material that are used in laminate manufacture and the methods which may be used for combining such materials. For properties and other details of specific materials used to form laminates, reference may be made to the related Indian Standards, wherever available.

In the preparation of this Standard, considerable assistance has been derived from BS 1133 : Section 21 : 1976 'Packaging code. Section 21 Regenerated cellulose film, plastics films, aluminium foil and flexible laminates', issued by the British Standards Institution (BSI).

Indian Standard

PACKAGING CODE

PART 2 PACKAGING MATERIALS

Section 6 Flexible Laminates

1 SCOPE

1.1 This standard (Part 2/Sec 6) gives a general description and guidelines for selection of the materials that are used in the manufacture of laminates and also lists typical applications in packaging for some of those in widest use.

2 REFERENCES

2.1 The following Indian Standard is a necessary adjunct to this standard:

IS No.	*Title*
7019 : 1982	Glossary of terms in plastics and flexible packaging excluding paper (*first revision*)

3 TERMINOLOGY

3.1 For the purpose of this Code, the definitions given in IS 7019 : 1982 shall apply.

4 LAMINATES

4.1 General

Laminate is a composite material obtained by combining the complete surfaces of two or more webs. It may not always be possible to draw a distinction between a laminate and a coated material. Most laminates were originally designed to provide increased strength or rigidity, but the widening demands of modern packaging, coupled with the extensions of the range of available films, have led to the development of functional laminates with properties not possessed by any single material and generally made specifically for a particular application.

4.2 Materials

Any two or more materials can be combined to form a laminate and a large number of different laminates is therefore possible. In actual practice the range is limited mainly to the combination of materials having different and complimentary properties. The properties of the separate webs are usually combined in the final laminate and may be supplemented by those of the laminating agent. Certain properties, for example, flexibility, moistureproofness, may be adversely affected by the process of laminating.

4.2.1 The materials most widely used in laminates together with the chief properties they impart to the laminate are listed below:

Material	*Properties*
Paper	Strength; rigidity; opacity; printability.
Aluminium foil	Negligible permeability to water vapour, gases and odours; greaseproofness, opacity brilliant appearance; dead folding characteristics.
Cellulose film (coated)	Machinability and strength, transparency, gloss and resistance to oils and greases; very low permeability to water vapour, gases and odours, which property can, however, be varied according to the type of coating used; heat-sealability; printability. Grades coated on one side only facilitate adhesion to other plies.
Polyethylene	Durability; heat-sealability; low permeability to water vapour; good chemical resistance; good low temperature performance.
Ethylene copolymers and ionomers	Improved toughness and improved heat-sealing characteristics; generally higher permeability to gases and water vapour when compared with low density polyethylene.
Polypropylene and copolymers of propylene	Very low permeability to water vapour; resistance of heat-seals to steam sterilization; mechanical strength at low temperature varies according to chemical composition of the copolymer.
Oriented polypropylene	Transparency and gloss; good water vapour and gas barrier (coated films); good mechanical strength; not heat-sealable unless coated; relatively poor dimensional properties at elevated temperatures.
Polyester film	Transparency and gloss; durability; coated film has good barrier properties to gases and water vapour. Thermoformable grades available.
Nylon 6	Durability; high water vapour permeability; gas permeability depends on moisture content of film; good resistance to heat; printability; thermoformable.
Rigid PVC	Transparency and gloss, thermoformability; mechanical strength and rigidity ; good chemical resistance.

4 3 Types of Laminate

The laminates can be made by one or more of the methods given below.

4.3.1 *Adhesive Lamination*

The webs are bonded at the contacting surfaces by means of a suitable adhesive which may be an aqueous, lacquer or hot-melt type. The adhesive is applied to one web which is subsequently brought into contact with the second web between nip rollers.

With hot-melt adhesives, which are usually based on wax, the two webs are brought into contact before the adhesive sets.

The lamination of two non-porous webs with an aqueous or lacquer adhesive requires that the adhesives should be dried on one web before combining it to the second web, the adhesive being reactivated, if necessary, by heat between heated nip rollers.

Aqueous adhesives, for example, starch, dextrin, gums casein and sodium silicate, are normally used where at least one web is porous, the moisture being dried off through the porous web by heating the laminate.

4.3.2 *Extrusion Coating*

An extruded thermoplastic layer is applied directly, while still in the molten state, to a substrate web. A laminate of this type has properties that may differ slightly from laminates made, for example, by adhesive lamination.

4.3.3 *Extrusion Lamination*

Laminates can be made by using molten thermoplastics polymer, for example, polyethylene, as an adhesive. The polymer is extruded between the two webs prior to entry into the laminating nip. Again, the properties of extrusion laminates may differ slightly from laminates made by other means.

4.3.4 *Coextrusion*

Laminates containing two or more different thermoplastic plies may be made by coextruding the different plies from the same die.

4.3.5 *Thermal Lamination*

Laminates can be made by bonding two separate plies by heat and pressure at heated nip rollers, where each of the two separate plies is either a thermoplastic material or a heat-sealable coated material; alternatively, one of the plies may be paper.

4.4 Typical Laminates and Applications

It is not practicable to refer specifically to all the many different laminate types available for packaging. Typical applications in packaging for some of the laminates in widest use are given in Table 1.

Table 1 Typical Laminates and Applications

(*Clause* 4.4)

Description of Laminate	Application
Aluminium foil — paper	Biscuits; sweets; ice-cream; margarine; butter, soap; cigarettes
Cellulose film — cellulose film	Biscuits; sweets; nuts; crisps and other snack foods
Cellulose film — polyethylene	Vacuum packs for bacon, luncheon meats, etc; ground coffee; shampoos; hardware items
Nylon 6 — polyethylene	Vacuum packs and formed vacuum packs for cheese, bacon products, subprimal packs for fresh meat
Polyester — polyethylene	Ground coffee; boil-in-packs for precooked deep frozen convenience foods
Oriented polypropylene (coated) — polyethylene	Vacuum packs for bacon, luncheon meats, etc
Oriented polypropylene (uncoated) — polyethylene	Hardware items; sweets
Paper — aluminium foil — polyethylene	Dehydrated foods (soups, potatoes, etc)
Paper — polyethylene	Dry foods and sauce mixes, chemicals, frozen foods
Cellulose film — aluminium foil-polyethylene	Dehydrated foods (soups, potatoes, etc) and dehydrated fruit juices
Rigid PVC — vinylidene chloride copolymer	Pharmaceuticals (for example, push-through pill packs)

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