

PLASTICS FOR FOOD PACKAGING: NATIONAL AND INTERNATIONAL STANDARDS

Before proceeding to acquaint ourselves with application of standards in the field of food packaging, it would be useful for us to recapitulate the definitions of the two words, namely “standards” and “standardisation”.

A ‘standard’ is a result of a particular standardisation effect, approved by the recognised authority. It may take the form of a document containing a set of conditions to be fulfilled, a fundamental unit or physical constituent or an object for physical comparison.

Standardisation is the process of formulating and applying the rules for an orderly approach to a specific activity - for the benefit of all - with the co-operation of all concerned and in particular for the promotion of optimum overall economy, taking due account of functional conditions and safety requirements. Standardisation is based on the consolidated results of science, technology and experience. It determines not only the basis for the present but also for future development and it should keep pace with advances.

The development of packaging, as science and technology, has witnessed a phenomenal growth in the recent years. Traditional materials like metal, wood and jute are being replaced by light weight plastics, fibreboard boxes and containers made of laminated and coated materials. In order to successfully and safely market food products as well as enter the export market, the package must conform to the prevailing specifications, trends and preferences of the target markets.

In the context of all these factors, application of standards and standardisation for food packaging needs, can play a vital role in putting the food packaging industry on a sound footing for developing domestic and international markets.

There are several aspects of standards. These may include:

- Specifications of products and materials
- Codes of practices
- Standard test methods
- Standard terminologies, symbols, colour schemes, nomenclature, notations etc.
- Standard sampling procedures
- Inspection methods
- Criteria for conformity

There are different levels of standards, which may be listed as:

- An Individual Standard
- A Company Standard

- An Association Standard
- A National Standard
- An International Standard

The level is determined by the specific interests involved in creating and using the standard in day-to-day operations.

There are various benefits to standardisation. To mention a few briefly; the following are listed:

- To the Producer — Rationalisation of manufacturing processes, improved control of processes/materials, high rate of production, reduction of inventories, ultimate increase in sales and hence profits.
- To the Consumer — Assurance of quality of food and services purchased, better value for money spent.
- To the Trade — Minimisation of delays, workable basis for acceptance or rejection of goods, opening of larger markets, reduction in cost of handling transactions.
- To the Technologist — Increased knowledge of properties, possibilities of application of materials, accepted methods of tests and procedures, guidance for formulation of R & D programmes.

National Standards on Food Packaging

The technical committees of the Bureau of Indian Standards (BIS) formulate the National Standards. The primary objective of this organisation is to prepare and promulgate National Standards.

Selection and use of the right packaging material, and the role it plays in preservation and protection of perishable and non-perishable foodstuffs has become very important in today's scenario. In the transportation and distribution of these products, safe handling and economic factors also play a vital role. In order to provide safe and hygienic food product to the consumers, handling of the raw materials and finished products and the selection and use of a safe and clean packaging material are of utmost importance. For perishables such as meat, fish, fruits and vegetables, which are stored and transported under refrigeration or in frozen conditions, proper maintenance of a cool or cold chain is imperative.

The BIS has brought out an Indian Standard on Code of Practice – IS 10106 (Part 1 / sec 1): 1990, where part 1 deals with Product Packaging and section 1 with Foodstuffs and Perishables. This code has laid down guidelines for packaging of various foodstuffs in such a way so as to protect them from deterioration.

For returnable containers it has further explained the procedures to keep the containers clean for re-use. Packaging of foodstuffs and perishables commonly used by the masses are

covered, and are classified into the following categories in their decreasing order of perishability:

- Milk and milk products
- Fruits and vegetables
- Meat, fish and poultry
- Bakery and confectionery products
- Protein rich food
- Edible starch and starch based products
- Oils and fats
- Foodgrains and food grain products
- Sugar and honey
- Stimulant food
- Alcoholic drinks and carbonated beverages
- Spices and condiments

The code has recommended various types of packaging materials for the above product groups, which are listed in Appendix Table 1 (at the end of the article).

This standard has other parts and sections, which are also to be followed along with the part 1 and sec 1 i.e.

- IS : 10106 (Part 2, sec 6) – 1990
Packaging Code : Packaging materials : Flexible laminates, and
- IS : 10106 (Part 4, sec 3) – 1984
Packaging Code : Packages : Plastics

Plastics for Food Packaging

Use of plastics for food packaging applications is increasing both in quantum as well as in variety. Plastics are available in various forms such as monofilms, co-extruded films, laminates, sachets, jars, bottles, jerry cans, trays, cups and containers of all shapes and sizes. Realising the versatility of plastic packaging which has prompted its wide usage in food packaging in the country, it was considered expedient by the BIS to formulate standard on this subject – IS: 10171-1982, Guide on Suitability of Plastics for Food Packaging.

This standard is expected to provide general guidance to the food packer in selecting the specific thermoplastic material or its combination to design an acceptable food packaging system. The standard, however, does not provide guidance on the actual design of the food packaging system or cover the shelf-life requirements for various food products. The standard also states that the plastics used shall be of food grade material and should be safe for food contact and conform to the relevant Indian Standards and used in conjunction with the following series of standards on food contact plastics of which it forms a part.

Indian Standards for Food Contact and Safety

IS: 9833-1981: List of pigments and colourants for use of plastics in contact with foodstuffs, pharmaceuticals and drinking water.

IS: 9845-1998: Method of analysis for the determination of specific and/or overall migration of constituents of plastics materials and articles intended to come into contact with food stuffs.

IS: 10141-1982: Positive list of constituents of polyethylene for its safe use in contact with foodstuffs, pharmaceuticals and drinking water.

IS: 10142-1982: Specification for styrene polymers for its safe use in contact with foodstuffs, pharmaceuticals and drinking water.

IS: 10146-1982: Polyethylene for its safe use in contact with foodstuffs and drinking water.

IS: 10148-1982: Positive list of constituents of polyvinyl chloride and its copolymers for safe contact with foodstuffs, pharmaceuticals and drinking water.

IS: 10149-1982: Positive list of constituents of styrene polymers in contact with foodstuffs, pharmaceuticals and drinking water.

IS: 10151-1982: Poly vinyl chloride (PVC) and its co-polymers for its safe use in contact with foodstuffs, pharmaceuticals and drinking water.

IS: 10910-1984: Positive list of constituents of Polypropylene and its copolymers for its safe use in contact with foodstuffs, pharmaceuticals and drinking water.

IS: 11434-1985: Ionomer resins for its safe use in contact with foodstuff, pharmaceuticals and drinking water.

IS: 11435-1985: Positive list of constituents of ionomer resins in contact with foodstuffs, pharmaceuticals and drinking water.

IS: 11704-1986: Ethylene acrylic acid (EAA) copolymers for their safe use in contact with foodstuffs, pharmaceuticals and drinking water.

IS: 11705-1986: Positive list of Ethylene acrylic acid (EAA) copolymers in contact with foodstuffs, pharmaceuticals and drinking water.

IS: 12229-1987: Positive list of constituents of polyalkylene terephthalates (PET & PBT) for their safe use in contact with foodstuffs, pharmaceuticals and drinking water.

IS: 12247-1988: Nylon-6 polymer for its safe use in contact with foodstuffs, pharmaceuticals and drinking water.

IS: 12248-1988: Positive list of constituents of Nylon-6 polymer for its safe use in contact with foodstuffs, pharmaceuticals and drinking water.

IS: 12252-1987: Polyalkylene terephthalates (PET & PBT) for their safe use in contact with foodstuffs, pharmaceuticals and drinking water.

IS: 13449-1992: Positive list of constituents of ethylene vinyl acetate (EVA) copolymers in contact with foodstuffs, pharmaceuticals and drinking water.

IS: 13576-1992: EMA for its safe use in contact with foodstuffs, pharmaceuticals and drinking water.

IS: 13601-1993: Ethylene vinyl acetate (EVA) co-polymers for its safe use in contact with foodstuffs, pharmaceuticals and drinking water.

IS: 14972-2001: Positive list of constituents of polycarbonate in contact with foodstuffs, pharmaceuticals and drinking water.

The above standards cover requirements of basic resin, additives, monomers, pigments and colourants, overall migration and storage and control.

IS: 10171-1982 also provides a table, Appendix Table-2 at the end of the article, of specific food products, guidance on type of thermoplastics, nature of packaging, possible substitutes, combinations of thermoplastics and variations to provide general guidance on the food contact thermoplastics.

Standards for Test Methods

BIS also specifies some **standards for test methods** of checking food containers and plastic materials. These are listed below.

Standards for Test Methods

IS: 2798-1964: Method of tests for polyethylene containers

IS: 8543-1979 (Part 1, Sec. 2): Methods of testing plastics: characterization of polymer structure and size : determination of density of solid plastics

IS: 8543-1977 (Part 2, Sec. 1): Methods of testing plastics: testing of materials before moulding: determination of density of moulding

IS: 8343-1977 (Part 2, Sec. 2): Methods of testing plastics : testing of materials before moulding: determination of apparent density of moulding materials that cannot be poured from a funnel

IS: 8543-1977 (Part 2, Sec. 3): Methods of testing plastics: testing of materials before moulding: determination of bulk factor of moulding materials

IS: 8543-1978 (Part 3, Sec. 1): Methods of testing plastics: preparation of test specimens: compression moulded test specimens

IS: 8543-1978 (Part 3, Sec. 2): Methods of testing plastics: preparation of test specimens: injection moulded test specimens

IS: 8543-1984 (Part 4, Sec. 1): Methods of testing plastics: short term mechanical properties: determination of tensile properties

Other BIS Standards

Other BIS standards listed below are on milk and dairy products (code of practice); edible oils and vanaspati packaging; drinking water; feeding bottles, liquor packaging; flour packaging; food grains and sugar packaging; glossary of terms and other miscellaneous plastic food related subjects.

Other BIS Standards

IS: 1613-1960: Milk bottle crates

IS: 2508-1984: Low Density Polyethylene films

IS: 2828-1964: Glossary of terms used in the plastic industry

IS: 7019-1982: Glossary of terms used in plastics and flexible packaging, excluding paper

IS: 7408-1984 (Part 1): Blow moulded polyolefin containers – over 5 litres capacity

IS: 7408-1984 (Part 2): Blow moulded polyolefin containers – over 5 up to 30 litres capacity

IS : 7408-1988 (Part 3): Blow moulded polyolefin containers – closed head containers over 30 litres, up to and including 200 litres capacity

IS: 7688-1976 (Part 3): Code of practice for labeling of pre-packed foods: nutritional labeling

IS: 8356-1993: Titanium dioxide for food grade

IS: 9907-1981: HDPE crates for milk bottles

IS: 10177-1982: Ice cream cups and lids

IS: 10840-1986: Blow moulded HDPE containers for vanaspati

IS: 10974-1984 (Part 1): Code for hygienic conditions for production, transport, storage, and distribution of indigenous milk products – khoa and khoa based sweets

IS: 10974-1984 (Part 2): Code for hygienic conditions for production, transport, storage, and distribution of indigenous milk products – dahi

IS: 10974-1984 (Part 3): Code for hygienic conditions for production, transport, storage, and distribution of indigenous milk products – chhana and chhana based sweets

IS: 10974-1984 (Part 4): Code for hygienic conditions for production, transport, storage, and distribution of indigenous milk products – kulfi

IS: 10974-1984 (Part 5): Code for hygienic conditions for production, transport, storage, and distribution of indigenous milk products – fermented products – shrikhand

IS: 11352-1994: Flexible pack for packing of vanspati in 100g, 200g, 500g, 1kg and 5 kg packs

IS: 11584-1986: High density polyethylene (HDPE) crates for milk sachets

IS: 11805-1989: Polyethylene (PE) pouches for packaging liquid milk

IS: 11824-1986: Packaging – paper coated woven sacks for packaging skimmed milk powder

IS: 12100-1987: HDPE woven sacks for packing flour

IS: 12265-1987: Flexible packs for packing edible oils

IS: 12626-1989: Laminated jute bags for packing milk powder

IS: 12724-1989: Flexible packaging materials for packaging of refined edible oils

IS: 1283-1989: Poly vinyl chloride (PVC) bottles for edible oils

IS: 12887-1989: Polyethylene terephthalate (PET) bottle for edible oils

IS: 14129-1994: Flexible packaging materials for the packing of vanaspati in 10 kg and 15 kg packs

IS: 14537-1998: PET bottles for packaging of alcoholic liquors

IS: 14543-1998: Packaged drinking water (other than natural mineral water)

IS: 14625-1999: Plastic Feeding bottle

IS: 14887-2001: Textile-HDPE/PP woven sacks for packing 50/25 kg food grains

IS: 14968-2001: Textile-HDPE/PP woven sacks for packing 50/25 kg sugar

Standards and Specifications of Plastic Recycling

The Indian plastic industry has helped formulate standards and **specifications for plastics recycling** in the country. There are two BIS standards introducing the **coding system recycling practices** and standards for the manufacture & usage of recycled plastics. (Figure 1)

- **Recycled Plastics for Manufacturing of Products Designation IS: 14535**

Scope:

1. This standard is intended to be used for the identification of the recycled plastic material on the basis of its basic properties and applications.
2. This standard applies to recycled plastics material ready for normal use without any further modifications.
3. Though some modification and test methods have been provided in the standard, any specific modification and the relevant test method, which may be necessary in some specific applications, shall have to be agreed between the purchaser and the supplier.

4. Though this designation system is only indicative of a broad classification of the recycled material, the absolute value of the low results may be provided which shall be agreed to, between the purchaser and the supplier.

- **Guidelines for Recycling of Plastics**

This standard prescribes guidelines to the manufacturers of plastic products with regard to the marking to be used on the finished product in order to facilitate identification of the basic raw material. It will also help in identifying whether the material used on the end product is recycle or a blend of virgin and recycle.

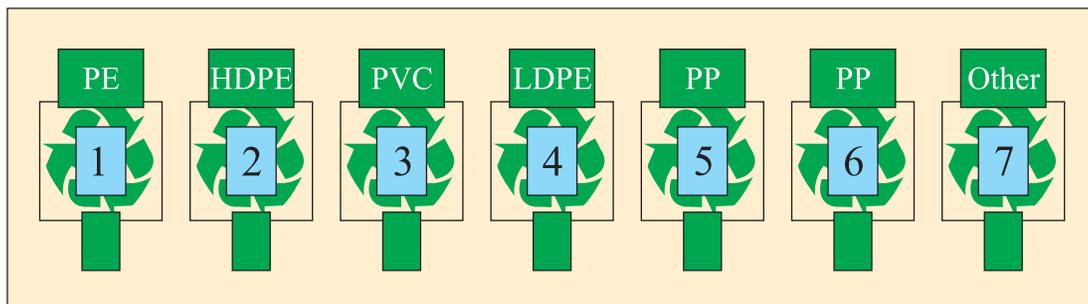
Terminology:

1. End Products: Products made out of virgin, recycled/reprocessed plastics. Typical suggested end products along with use of appropriate types of plastic waste / scrap are given. A process by which plastic waste is collected, segregated, processed and returned for use.
2. Classification of Recycling: Plastics recycling technologies have been historically divided into four general types – primary, secondary, tertiary and quaternary. (Figure 1)

IS: 14534/14535-1998 Introducing Coding System / recycling practices Packaging guidelines of MOEF

MOEF notification “Recycled Plastic Manufacturers & Usage rule 1999”

Figure 1: Regulatory and Statutory Norms



International Standards

The International Organisation for Standardisation (ISO) is a worldwide federation of national standards bodies from 140 countries, working in partnership with international organisations, governments, industry, business and consumer representatives. The mission of ISO is to promote the development of standardisation and related activities in the world with a view to facilitate the international exchange of goods and services, and to develop co-operation in the spheres of intellectual, scientific, technological and economic activity. ISO's work results in international agreements, which are published as International Standards.

The various packaging and related aspects where standards at international level have been covered by ISO are:

- Standards for Packaging
- Pallet Size Standards
- Standardisation of ISO Freight Containers
- Standardisation of Air Mode Containers, Pallets and Nets.

Standards for Packaging

Guide 41 – 1984 Standards for Packaging

Consumer requirements published by the ISO / TC 122 Packaging Committee, lays down the requirements in order of priority which should be taken into consideration when drafting a standard relating to packaging.

ISO Guide 41 – 1984 (E) Standards for Packaging – Consumer Requirements is reproduced below.

Introduction

Packaging is a product of consumer interest, the cost of which is borne indirectly by the consumer. Standardisation of packaging should therefore address itself to such factors as safety, health, fitness for purpose, comfort and reliability, as well as such general needs as protection of the environment and energy conservation.

When drafting a standard relating to packaging, the requirements set out below in order of priority should be taken into consideration.

1. Human and Environmental Safety

1.1 In storage

1.1.1 The packaging material should not be potentially harmful due to:

- a) emission of substances which may endanger human or other forms of life;
- b) contamination of the contents by the packaging, including those specific cases where the combination of packaging material and contents may cause problems.

1.1.2 The contents, where potentially harmful, should not leak through the packaging due to:

- a) lack of a seal
- b) deterioration of the packaging caused by the outside influences, such as light or foreseeable mechanical forces
- c) deterioration of the packaging caused by the contents

1.1.3 Where the contents are potentially harmful, the packaging should be clearly labeled with relevant warnings and instructions for storage and disposal.

1.1.4 Where time affects the safety of the product, the packaging should be clearly labeled to that effect, for instance, by way of a phrase such as “Do not use after (date).”

1.2 In Use

1.2.1 Where contents are potentially harmful:

- a) the packaging should not be misleading and should be clearly distinguishable, in colour and shape or by any other means, if necessary, from food or beverage packaging;
- b) the packaging should be clearly labeled with relevant warnings and instructions for use
- c) relevant warnings and instructions for use, such as “Keep out of Children’s reach” should be repeated on any inner packaging.

1.2.2 Where contents or packaging are potentially harmful on opening, or on removal of contents:

- a) opening instructions should be given clearly and at the appropriate place
- b) opening means should be suited to the contents, packaging and potential users. In some cases, two or more groups of users may have different, possibly conflicting, requirements with respect to opening means. For example, packaging of pharmaceuticals which may come within reach of children should have child resistant closures, while the same closure should be easy for a handicapped person to open (possibly with the help of an auxiliary device)
- c) closing devices should be designed in such a way that they cannot fall inside the container
- d) the packaging should facilitate the safe removal of the contents

1.2.3 Where contents may become harmful if the packaging is left open;

- a) clear closing instructions should be given, for example “Materials with noxious fumes”.
- b) closing devices should be suited to the contents, packaging and potential users.

1.3 In Disposal

1.3.1 Wherever possible, the packaging and remainder of the contents should be capable of safe disposal by normal means, with no short or long term danger to human beings or the environment. Biodegradable materials are preferred.

1.3.2 Clear instructions on disposal of packaging and/or contents should be given whenever normal means of disposal are inappropriate.

1.3.3 Recycling processes, if any, should not cause harm in the short or long term to human beings or the environment.

2. Fitness for Purpose

2.1 Protection

The packaging should protect the contents in such a way that neither their performance nor their reliability is affected by:

- a) outside mechanical forces such as impact or vibration;
- b) contamination by undesirable substances, for example water or air;
- c) climatic conditions, for example heat or cold.

2.2 Handling

The packaging design should facilitate:

- a) transportation and storage of the product both at the distribution level and at home
- b) opening and remaining opened of the packaging when needed
- c) closing and remaining closed of the packaging when needed
- d) removal of the contents from the packaging
- e) complete emptying of the packaging

2.3 Physical Dimensions

2.3.1 Neither the size nor the shape of the packaging should mislead the consumer as to the amount of its contents. Where settling may occur, this information should be clearly stated on the outside of the packaging.

2.3.2 The number of packaging sizes should be kept to a minimum for each line of product. Each size should be a simple multiple of the previous size (e.g. 25g, 50g, 100g, 200g)

2.3.3 The packaging sizes should be suited to the end-use and to the average rate of consumption of the product.

3. Conservation of Resources and Economy

3.1 Conservation of Resources

The packaging should, as far as possible, be designed with a view to conserve resources. In particular:

- a) the material should be in common supply
- b) the manufacturing method should be low in energy consumption
- c) the packaging should be reusable, which implies that it should be easy to clean
- d) the packaging material used should be reclaimable

3.2 Economy

3.2.1 Direct cost to the consumer

The cost of packaging should add as little as possible to the price of the product. Care should be taken in the design of the packaging to minimise shipping and storage costs. Excessive packaging should be avoided and where not in conflict with other requirements, the least expensive materials should be chosen for packaging.

3.2.2 Cost to the Community

When determining costs, those relating to the disposal of the packaging should also be taken into consideration.

ISO/IC 122 – Packaging Committee has also laid down standards on the transport packages covering their dimensions for unitisation as palletised load, which can fit into freight containers. The module of unit load sizes – covered in:

- ISO 3676 – 1983 Packaging – Unit Load Sizes - Dimensions
- ISO 3394 – 1984 Dimensions of Rigid Rectangular Packages
- ISO 6780 – 1988 General purpose Flat Pallets for through transit of goods – Principal dimensions.

For assessment of the transport package to withstand transport hazards by road, rail, sea and air a series of testing standards for transport packages have been developed by this committee.

The Quality Standard ISO 9000:2000

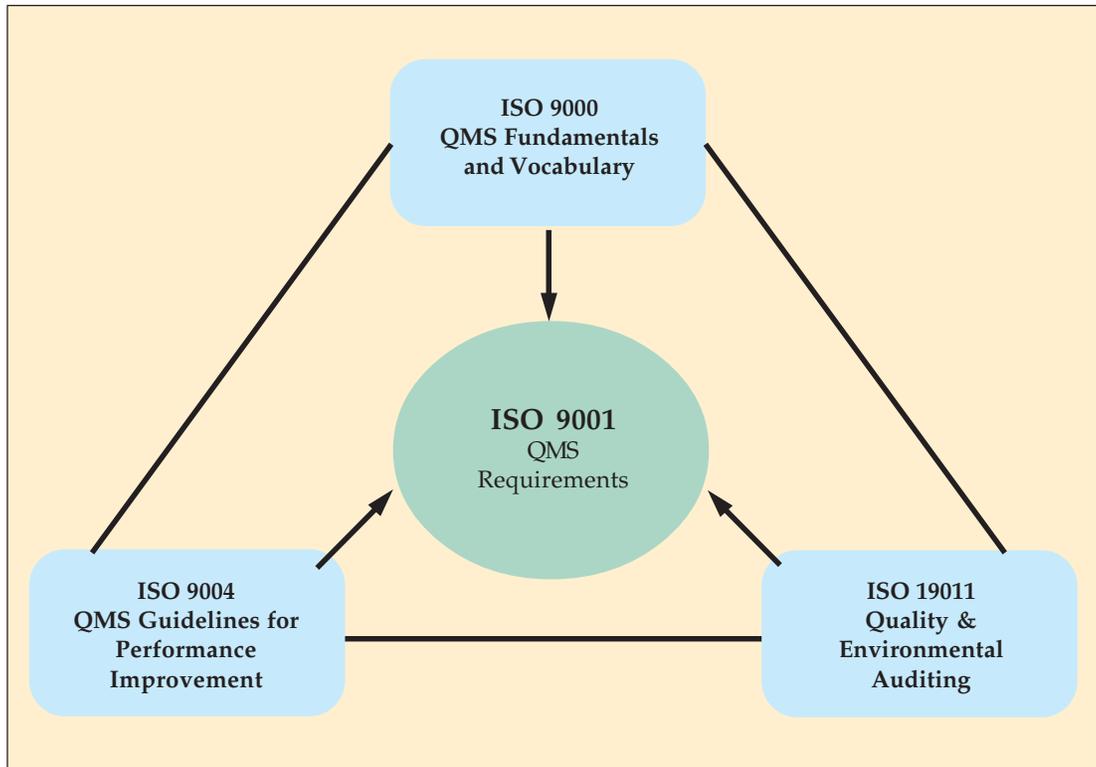
One of the most far reaching developments in the quality arena affecting world trade has been the evolution of ISO 9000 series of standards on quality management systems. It has brought in a new era of the concept of quality at the global level. ISO 9000 provides an overall improved competitiveness as it ensures control, consistency, assurance of high standards and most importantly improved quality. ISO 9000 is an internationally recognised bench mark for measuring quality in the context of trade. The worldwide growth of Quality Management System (QMS) has been phenomenal, and in a short span of time, the ISO 9000 series of standards are being applied increasingly by majority of nations.

Based on the experiences gained worldwide - over 12 years or so, the ISO committee of Quality Management Systems decided to launch the ISO 9000 : 2000 series of standards. The ISO 9000 standards serve as a basis for ensuring consistent quality of goods and services.

These standards have necessitated organisations to reorient, to address process centred approach to meet customer requirements, gauge their satisfaction and place the system on a continual improvement mode.

The ISO 9000 Standards have four basic modules (Figure 2), one core module ISO 9001 and three supporting modules ISO 9000, ISO 9004 and ISO 19011.

Figure 2: ISO 9000 : 2000 Module



ISO 9000 : 2000: Quality Management System – Fundamentals and Vocabulary

This standard has two parts:

- **Part A:** Fundamentals for Quality Management Systems encompassing the following :
 - Quality Management System Approach
 - Process Approach
 - Distinguishing features of System and Product Requirements
 - Value of Documentation
 - Evaluation of QMS
 - Instituting Continual Improvement.
- **Part B:** Concepts, Terms and Definition.

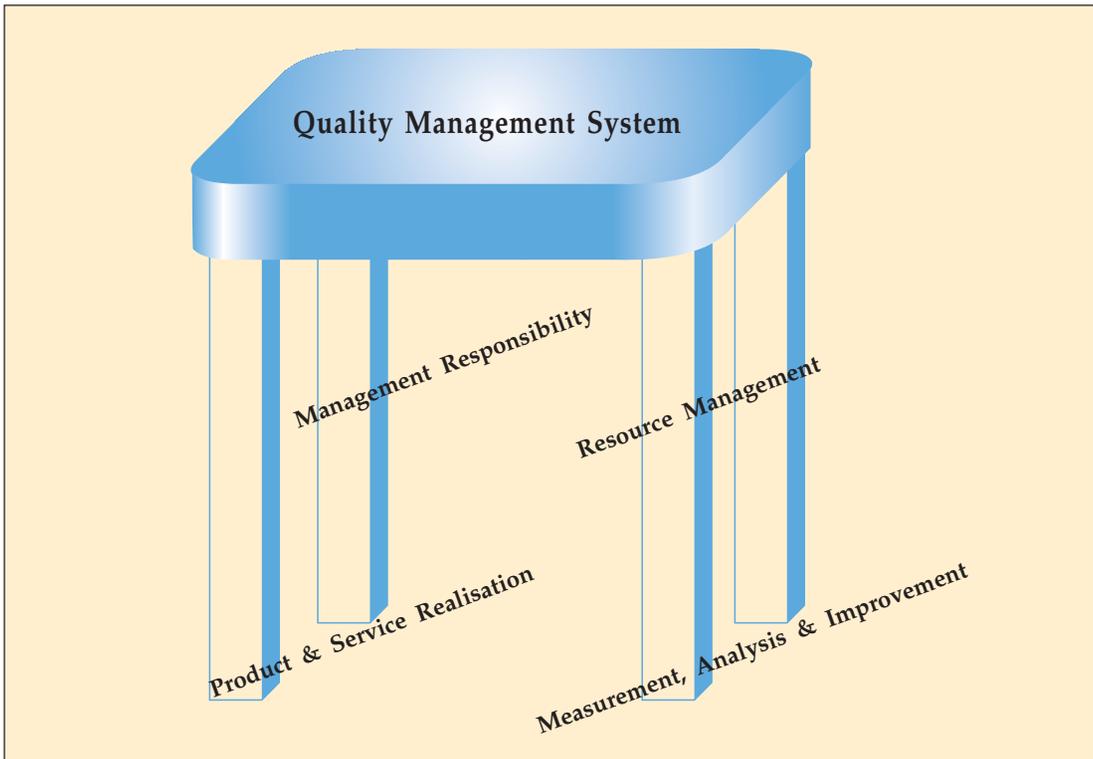
This part has included a new approach to quality and system related definitions making it friendly in use under different linguistic conditions.

ISO 9001 : 2000: Quality Management System Requirements

IS 9001:2000, is the certification model for use by all types and sizes of organisations both in industrial and service sectors. It is built of four pillars of Quality Management System (Figure 3):

- Management Responsibility
- Resource Management
- Product and Service Realisation
- Measurement, Analysis and Improvement

Figure 3: Four Pillars of Quality Management Systems ISO 9001 : 2000



ISO 9004 : 2000: Quality Management System – Guidelines for Performance Improvement

This standard includes:

- Principles of Quality Management Systems which encompasses eight principles to facilitate achievement of quality objectives. The eight principles are – customer focused organisations, leadership, involvement of people, process approach, systems approach to management, continual improvement, factual approach to decision making and mutually beneficial supplier relationships.

- **Managing Systems and Processes**
The process model reflects integration of management responsibility, resource management, product and / or service realisation, measurement analysis and improvement.
- **Evaluation of the Organisation's Progression in Performance Improvement.**

The standard has included a self-assessment model to provide fact based guidance to organisations regarding where resources can best be utilised. This helps in identifying priorities and action plans for improvements.

ISO 19011 : 2000: Guidelines on Quality and Environmental Auditing

The ISO 9000 and ISO 14000 series of international standards include mandatory requirement for audit as a key management tool for achieving the objective set by the organisation. There is a harmonisation effort at the international level to bring the present quality system auditing standards into one international standard ISO: 19011:2000. This standard clarifies audit terms and provides procedures for the conduct of quality and environmental system audits and managing audit programmes. This also provides guidelines on qualification criteria and competence of auditors to ensure that audits are carried out effectively and consistently.

WTO and the Food Sector

It is now widely accepted that the international norms for all aspects of food production and marketing would be governed by the WTO Regulations. The Indian food companies therefore have to gear up to meet the challenges lying ahead.

The World Trade Organisation (WTO) came into existence from 1st January 1995. **The WTO agreement on Agriculture (AOA)** stresses on the liberalisation of trade so as to have distortion free markets.

Under the WTO regime, the two agreements that enable the enforcement of quality and safety are:

- Agreement on Sanitary and Phytosanitary Measures (SPS)
- Agreement on Technical Barrier to Trade (TBT)

The Sanitary and Phytosanitary Agreement (SPS)

The SPS agreement fundamentally affirms that importing countries can impose measures necessary to protect the life and death of their animals and plants, on the basis of sound and scientific evidence and judgement, using appropriate risk analysis methods. The SPS agreement:

- Places a heavy emphasis on "transparency" in the development and application of sanitary and phytosanitary trade measures
- Requires these measures to be applied in a non-discriminatory manner
- Places emphasis on equivalence

- Emphasises the use of risk analysis to determine measures to provide the appropriate level of protection in the least restrictive manner to international trade
- Strongly encourages “harmonisation” between countries based on adoption of standards developed by bodies setting international standards
- Requires countries to participate in the work of organisations setting international standards
- Emphasises the need for assistance to developed and less developed countries, and
- Provides for dispute settlement procedures

The SPS agreement requires that, with regard to food safety measures, WTO members base their national measures on sound scientific evidence and judgement, taking into account international standards, guidelines and other recommendations adopted by the **Codex Alimentarius Commission**, where they exist. The SPS Agreement establishes a WTO Committee on SPS measures to provide a regular forum for Consultations and to monitor the process of international harmonization and the use of international standards, guidelines and recommendations.

Technical Barriers to Trade (TBT)

The agreement on Technical Barriers to Trade (TBT) had been in existence as plurilateral agreement since the Tokyo Round. It was revised and converted into a multilateral agreement through the Uruguay Round. It covers all technical requirements and standards (applied to all commodities) such as labeling, that are not covered by the SPS Agreement. The SPS agreement covers those aspects related to health i.e. food additives, pesticide residues, residues of veterinary drugs, codes and guidelines of hygienic practices etc. Aspects such as labeling are covered by the TBT Agreement. For example, in the case of a carbonated beverage sold in a plastic bottle, the bottling method, contaminants, packaging material coming in contact with the drink, and additives are covered by SPS, while product description, labeling and package specifications are covered by the TBT agreement.

The Codex Alimentarius

A worldwide recognition of the importance of international trade, the need for facilitation of such trade while at the same time ensuring the quality and safety of food for the world consumer, led in 1962 to the establishment of the joint **FAO/WHO Food Standards Programme** and of the **Codex Alimentarius Commission (CAC)**.

The Food and Agriculture Organisation (FAO) and the World Health Organisation (WHO) support the Codex Alimentarius Commission.

Its work is serviced by a Secretariat located in FAO Headquarters in Rome, the joint FAO/WHO Food Standards Programme, Membership of the Commission is open to member governments or Associate Members of FAO and/or WHO.

The CAC is responsible for the development of the Codex Alimentarius, which is Latin for “food code.” The Codex Alimentarius is a collection of internationally adopted food standards, maximum residue limits for pesticides, residues of veterinary drugs, and codes of practice.

The codex aims at global protection of consumer's health and economic interests, and ensuring of fair practices in the trade in food. The Codex Alimentarius includes provisions related to the basic composition, hygiene and nutritional quality of raw, semi-processed and packaged foods, provisions for food additives, residues of pesticides and veterinary drugs, industrial chemicals or naturally occurring contaminants, labeling and presentation and methods of analysis and sampling. The principal role of CAC is to develop harmonised international food standards by the WTO as the bench mark for international trade in food.

Hazard Analysis Critical Control Points (HACCP)

In 1993, CAC recommended the commercial application of HACCP in food processing plants. Moreover, the SPS measures under the auspices of WTO endorsed the recommendation of CAC. In the post-WTO regime, there were instances where foreign buyers refused to accept Indian processed food products, for Indian firms had not adopted the HACCP system. However, since then, the implementation of HACCP in Indian firms has been on the rise. The Central Government has also announced a subsidy scheme for HACCP implementation.

HACCP is a food safety management system based on logical, scientific approach to control safety problems in food processing in a timely manner. By using HACCP, control is transferred from end product testing (i.e. testing for failure) to the design and manufacturing of food (i.e. preventing failures). HACCP is product specific and plant specific, and therefore, a unique plan has to be chalked out for each product and/or process. In principle, HACCP can be applied throughout the food chain, starting from the primary producer to final consumer. HACCP comprises of three aspects:

- Good Manufacturing Practices (GMP)
- Preliminary Steps, and
- The Seven Principles

The first is a pre-requisite for implementation of HACCP. Before HACCP is implemented, it is a pre-requisite that the food manufacturing plant follows GMPs. For example, hygienically clean shop floors and premises are extremely essential for food production.

The preliminary steps involve forming a HACCP team, which would include representatives right from the top management to the shop floor worker, chalking out flow chart of production process and related activities.

The seven principles of HACCP are as follows:

- Conduct hazard analysis
- Identify critical control points (CCP)
- Set critical limits for each CCP
- Establish corrective action
- Establish record keeping procedure
- Verification and validation of the system

Codex and Food Packaging

Food packaging has not received much attention with the CAC. Its most prominent coverage is in relation to labeling, the Codex General Standard for the Labeling of Prepackaged Food (Codex Alimentarius Section 4 of Volume 1 A). This general standard has its guiding principle that, prepackaged food should not be described or presented on any label in a manner that is false, misleading or deceptive or is likely to create an erroneous impression regarding its character in any respect. A further guiding principle that prepackaged food should not be described or presented on any label by words, pictorial or other devices, which refer to or are suggestive of any other product with which the food might be confused, or in such a manner as to lead the purchaser or consumer to suppose that the food is connected with such other product.

This general standard covers mandatory labeling requirements such as naming of food, listing of ingredients, the format of net contents and drained weights, identification of manufacturer, packer, distributor, importer, exporter or vendor, inclusion of country of origin and the special identification of food that has been irradiated.

At its session in 1995, the CAC adopted a Code of Practice for the Packaging and Transport of Fresh Fruits and Vegetables. The provisions in this Code, consistent with the approach of the Uruguay Round Agreement and principles of equivalence, set out standards to be achieved rather than prescribing detailed requirements. As an example, it requires that packaging must withstand rough handling during loading and unloading, compression from the overhead weight of other containers, impact and vibration during transportation, and high humidity during pre-cooling, transport and storage.

The issue of packaging is also covered in the Codex Alimentarius' Recommended International Code of Practice – General Principles of Food Hygiene (Codex Alimentarius Section 1 of Volume 1B). In this also, the treatment of the subject is general, requiring that all food packaging material be appropriate for the product to be packed and for the expected conditions of storage. It further specifies that packaging should not transmit to the food product substances beyond the limits acceptable to the official agency having jurisdiction.

Finally, the Codex Alimentarius also contains guideline levels for vinyl chloride monomer (0.01 mg/kg) and acrylonitrile (0.02 mg/kg) in food, with slightly higher levels permitted in packaging material (Codex Alimentarius Section 6,4 of Volume 1 A).

Conclusion

Food safety is a growing concern among consumers. Standards and specifications for food packaging have played a vital role in putting the food packaging industry on a sound footing in globalised markets.

Plastics have been the ideal material for food packaging. As the technologies have grown, plastics have readily outperformed the traditional materials in food packaging in all aspects meeting stringent requirements. They have always kept pace with the growing customer needs and meet International standards and specifications.

APPENDIX TABLE 1
Packaging Materials For Food Products

Sr. No.	Food Product	Packaging Materials
I PACKAGING OF MILK PRODUCTS		
1	Flavoured milk a) Pasteurized flavoured milk b) Sterilized flavoured milk	<ul style="list-style-type: none"> • Glass bottles • LDPE lined cartons • Aseptic cartons • Glass bottles • Sanitary cans • Poly-paper or Poly-laminated paper packs in tetrahedron, pyramid or other forms
2	Sterilized milk	<ul style="list-style-type: none"> • Glass bottles • Sanitary cans • Poly-paper or poly-laminated paper packs in tetrahedron, pyramid or other forms
3	Condensed milk sterilized cream	<ul style="list-style-type: none"> • Hermetically sealed containers • LDPE lined cartons • Aseptic cartons
4	Fermented milk products and dahi	<ul style="list-style-type: none"> • Glass bottles or any other suitable containers and capped.
5	Channa, khoa, cheese, chakka and shrikhand	<ul style="list-style-type: none"> • Bi-axially oriented nylon film (BONF) /EVA BONF / IONOMER BOPP / EVA • Metal cans coated with a suitable lacquer.
6	Partly skimmed sour milk powder, sweet-cream, buttermilk powder and casein	<ul style="list-style-type: none"> • Kraft paper • Gunny bags with plastic liners

Sr. No.	Food Product	Packaging Materials
7	Burfi	<ul style="list-style-type: none"> • Paper-board container • Barrier laminates like BOPP/LDPE • Tinsplate containers having inner lining of parchment paper • Board carton lined on the inside with fat and moisture proof parchment paper
8	<p>Ice – cream</p> <p>a) Dried Ice – Cream Mix</p>	<p>Returnable containers (not for retail sale)</p> <ul style="list-style-type: none"> • Mild steel tinned • Aluminium or stainless steel <p>Non-returnable Containers</p> <ul style="list-style-type: none"> • Paper-board • Metallic foil • Paper board containers shall be made water-resistant by coating or impregnation with wax or resin. • Sterilized and wrapped spoons shall be supplied with small non-returnable containers. • Hermetically sealed and clean tinsplate containers
9	Canned rasgulla	<ul style="list-style-type: none"> • Open top sterilized sanitary cans • Polystyrene tubs
10	Milk powder, malted milk and skim milk foods, vegetable protein infant food with milk, infant milk foods and processed cereal weaning foods	<ul style="list-style-type: none"> • Hermetically sealed and clean tinsplate containers • Bag in box having inner layers made of PET / LDPE, BONEF/ LDPE

Sr. No.	Food Product	Packaging Materials
II PACKAGING OF SUGAR AND HONEY		
1	Sugar a) Vaccum Pan Sugar, Refined Sugar, Raw Sugar, white sugar and Sugar Used in food Preservation Industry b) Cube Sugar c) Icing Sugar	<ul style="list-style-type: none"> • Polyethylene coated hessian hags • Polyethylene coated raffia bags • A-twill jute bags • Wrapped together in butter paper or kraft paper and packed in cartons. • LDPE coated poster paper. • Hermetically sealed tin containers • Polyethylene bags packed in cartons • LDPE coated poster pouches.
2	Honey	<ul style="list-style-type: none"> • Wide mouth glass containers • Acid-resistant lacquered tin containers
III PACKAGING OF EDIBLE STARCHES AND STARCH PRODUCTS		
1	Flours and Starches (Maize, Tapioca Arrowroot)	<ul style="list-style-type: none"> • LDPE coated jute bags • LDPE coated raffia bags • A-twill jute bags
2	Makhana Products	<ul style="list-style-type: none"> • Suitable moisture proof containers
3	Tapioca Chips and Sago	<ul style="list-style-type: none"> • A-twill jute bags or LDPE coated jute bags • LDPE coated raffia bags
4	Custard Powder	<ul style="list-style-type: none"> • Flexible pouches made from PET/LDPE, poster paper/LDPE, glassine etc.
5	Liquid Glucose	<ul style="list-style-type: none"> • Drums, lined with PET/LDPE bags or lacquered • Lined steel drums or those made of tin-plate

Sr. No.	Food Product	Packaging Materials
6	Dextrose Monohydrate	<ul style="list-style-type: none"> • High density polyethylene(HDPE) bags • Hessian or textile bags - paper, polyethylene or cotton lined • Multi-walled paper bags • Lined corrugated fibre-board containers • Solid fibre-board containers • Lever lid tinsplate containers
7	Edible Spray Dried Potato Flour	<ul style="list-style-type: none"> • Tin containers • HDPE or metallised polyester containers or bags • Pouches made from flexible laminates, such as, BOPP/LDPE
IV PACKAGING OF FOODGRAINS AND FOODGRAIN PRODUCTS		
1	Cereal Grains a) Pearl Barley	<ul style="list-style-type: none"> • LDPE coated jute bags • Raffia bags • Double jute bags Inner one of which shall be new A-twill • Air-tight containers made of tinsplate • LDPE coated jute bags and raffia bags
2	Cereal Flours a) Barley Powder	<ul style="list-style-type: none"> • LDPE coated jute bags/LDPE coated raffia bags • B-twill jute bags • DW-flour bags • Polyethylene lined jute bags • Air-tight tinsplate containers or any other suitable air-tight containers • LDPE coated paper bags and pouches
3	Besan	<ul style="list-style-type: none"> • Paper • Cloth • Polyethylene or polyethylene laminated jute bags

Sr. No.	Food Product	Packaging Materials
4	Miscellaneous a) Malt Extract b) Barley Malt c) Corn Flakes d) Rolled Oats e) Macaroni, Spaghetti and Vermicelli	<ul style="list-style-type: none"> • Air-tight containers made of galvanized iron • Glass or any other suitable material • Bag-in-box system • Polyethylene lined gunny bags • Bag-in-box system • HDPE bags made of 300 gauge HDPE and properly sealed • LDPE lined cartons • Air-tight containers made of tinplate • LDPE lined cartons • Card board cartons with a lining of moisture-proof material or plastic film • Moisture-proof paper bags • Pouches made from PET/LDPE, BOPP/LDPE
5	Papad	<ul style="list-style-type: none"> • Pouches made from PET/LDPE and BOPP/LDPE
V PACKAGING OF BAKERY AND CONFECTIONERY PRODUCTS		
1	Bread	<ul style="list-style-type: none"> • In sliced form in LDPE coated poster paper or clean waxed paper • Grease-proof paper
2	Biscuits	<ul style="list-style-type: none"> • Containers made of tinplate • PCRC sheets • Card board paper • Cello / LDPE • BOPP / LDPE • PET / LDPE • Paper / LDPE • Foil / LDPE

Sr. No.	Food Product	Packaging Materials
3	Confectionery	<ul style="list-style-type: none"> • Cellulose film waxed paper or foil • Polyethylene • Cello / LDPE • BOPP / LDPE • PET / LDPE • Paper / LDPE • Foil / LDPE
4	Ice – cream Cones	<ul style="list-style-type: none"> • Containers made of card board paper or any other suitable material
5	Bread Rusks	Containers made of : <ul style="list-style-type: none"> • Tinsplate • Cardboard • Paper
6	Buns	<ul style="list-style-type: none"> • Suitable non-toxic wrapper
7	Bombay Halwa	<ul style="list-style-type: none"> • Hermetically sealed tinsplate containers suitably lacquered • Glassine / LDPE
8	Peanut Candy	<ul style="list-style-type: none"> • Cellulose film • Aluminium foil • Wax paper • Polyethylene or other flexible packaging materials
9	Desiccated Coconut	<ul style="list-style-type: none"> • LDPE bags of about 50µ thickness • Pouches made from PET/LDPE or BONF/LDPE
10	Baking Powder	<ul style="list-style-type: none"> • Air-tight containers • Flexible packaging materials, such as, PET/LDPE and BONF/LDPE
11	Cakes	<ul style="list-style-type: none"> • Waxed paper • Grease-proof polyethylene • Glassine/LDPE • Tins

Sr. No.	Food Product	Packaging Materials
12	Self-Raising Flour	<ul style="list-style-type: none"> • Jute bags • Paper bags with polyethylene lining • Polyethylene bags
VI PACKAGING OF PROTEIN-RICH FOODS		
1	Protein Rich Flours and Concentrates a) Edible Leaf Protein concentrates	<ul style="list-style-type: none"> • Polyethylene lined jute bags or paper bags • Clean tinsplate containers • Sealed metal containers • Double polyethylene lined paper bags • Multi-walled bags
2	Fish Protein Concentrates	<ul style="list-style-type: none"> • Grease-proof or sulphate paper • Cellulose paper or any other non-toxic packing materials which may be covered with moisture-proof laminate or coated paper • Air-tight Metallic containers
3	Roasted Groundnut (Peanut) Kernels	<ul style="list-style-type: none"> • Flexible food grade pouches • Sealed containers
4	Ready-to-Eat, Protein-Rich Extruded Foods	<ul style="list-style-type: none"> • Moisture-proof paper bags (multi layered, polyethylene lined) • Pouches made from BOPP/ LDPE, Glassine/LDPE • High density polyethylene woven bags having 300gauge LDPE liner for bulk • 250 gauge high density polyethylene bags

Sr. No.	Food Product	Packaging Materials
5	Protein Chewy Candy	<ul style="list-style-type: none"> • Cellulose film • Waxed paper • Foil • Polyethylene or other flexible packaging pouches • BOPP/LDPE • Glassine/LDPE
6	Sunflower Seed Grits	<ul style="list-style-type: none"> • Bag-in-box system
7	Re-constitutable Protein Beverage Food	<ul style="list-style-type: none"> • Tin-plate containers • Glass-bottles hermetically sealed • Bag-in-box system
8	Peanut Butter	<ul style="list-style-type: none"> • Wide-mouth glass jars • Polystyrene tubs
9	Vegetable Protein Based Yogurt (Vegetable Curds)	<ul style="list-style-type: none"> • Wide-mouth glass jars • Polystyrene tubs • Plastic or paper containers
10	Protein Fortified Bread	<ul style="list-style-type: none"> • LDPE coated poster paper • Waxed paper • Grease-proof paper
11	Protein-Rich Concentrated Nutrient Supplementary Foods and Food Supplements for Infants	<ul style="list-style-type: none"> • Moisture-proof, clean, dry and sound containers • Pouches made from sterilizable flexible laminates
12	High Protein Mixes for Use as Food Supplements	<ul style="list-style-type: none"> • Tinplate containers or cardboard paper containers • Pouches made from sterilizable flexible laminates
13	Protein Based Beverages	<ul style="list-style-type: none"> • Glass bottles • Lined cartons • Glass bottles or sanitary cans

Sr. No.	Food Product	Packaging Materials
14	Protein-rich Biscuits	<ul style="list-style-type: none"> • Tinplate containers made of PCRC sheets or cardboard paper containers • Grease-proof sulphite paper, cellulose film • Cello/LDPE • PET/LDPE • BOPP/LDPE
VII PACKAGING OF SPICES AND CONDIMENTS		
1	Whole Spices a) Black Pepper, Whole b) Cardamoms	<ul style="list-style-type: none"> • Jute, cloth, paper or polyethylene bags • LDPE coated jute bags • LDPE coated raffia bags • Double gunny bags • Jute bags with or without moisture-proof lining • LDPE coated raffia bags • Tinplate or wooden cases, lined with polyethylene or water-proof or kraft paper • Jute bags lined with polyethylene • LDPE coated raffia bags
2	Ground Spices	<ul style="list-style-type: none"> • Paper bags • Bags made of suitable barrier films / laminates, such as PET/LDPE, PET / EVA, BOPP/EVA
3	Miscellaneous a) Ginger, Whole b) Ginger, Ground	<ul style="list-style-type: none"> • Double or single jute bags with water-proof lining • LDPE coated raffia bags • Tin-plate or glass containers • Paper cartons properly lined with water-proof paper • Bags or pouches made from PET/EVA or BOPP/EVA

Sr. No.	Food Product	Packaging Materials
	c) Curry Powder	<ul style="list-style-type: none"> • Tin-plate or glass containers, paper cartons properly lined with water-proof paper • Bags or pouches made from PET/EVA or BOPP/EVA
	d) Chillies	<ul style="list-style-type: none"> • Jute bags • Pouches made from PET / EVA or BOPP / EVA • LDPE coated raffia bags
	e) Dehydrated Onion and Garlic	<ul style="list-style-type: none"> • Large bags made from PET/LDPE • BOPP/LDPE or in HDPE woven bags
	f) Saffron	<ul style="list-style-type: none"> • PET / LDPE or BOPP/LDPE
	g) Black Pepper and Ginger Oleoresin and Oleoresin Chillies	<ul style="list-style-type: none"> • Glass containers • Pure aluminium containers • Tin containers or containers of high density polyethylene (food grade) • Bag-in-box system
	h) Tamarind Concentrate and Tamarind Pulp	<ul style="list-style-type: none"> • Tin or glass containers • Pouches made from metallised polyester or laminate of metallized BOPP/ionomer • Metallized PET bags or BOPP ionomer bags • Closely woven bamboo baskets, lined with polyethylene or palmyra mat • Jute bags, lined with polyethylene • LDPE coated raffia bags • Wooden boxes lined with palmyra mats
	i) Dehydrated Green Pepper	<ul style="list-style-type: none"> • Tin or glass containers • Paper cartons lined with water-proof paper • Jute bags with or without moisture-proof lining • PET/LDPE bags

Sr. No.	Food Product	Packaging Materials
	j) Cloves	<ul style="list-style-type: none"> • Air-tight containers • PET/LDPE bags
VIII PACKAGING OF FRUITS AND VEGETABLES		
1	Raw Vegetables and Fruits a) Onion and Garlic b) Tomatoes c) Peas-in-Pods d) Chillies e) Guavas, Limes and Mandarines	<ul style="list-style-type: none"> • Loosely woven gunny bags • Wooden / plastic crates • Lined or unlined corrugated boxes • Loosely woven gunny bags • Net bags, bamboo baskets or palm leaf baskets • Wooden crates, lined or unlined corrugates boxes • Baskets or wooden boxes • Lined or unlined corrugated boxes • Loosely woven gunny bags • Baskets or corrugated boxes, lined or unlined • Gunny bags • Bamboo baskets • Corrugated boxes, lined or unlined • Wooden boxes, lined or unlined corrugated boxes • Individually wrapped either in tissue paper or any other suitable material
2	Canned Vegetables and Fruits	<ul style="list-style-type: none"> • Open top sanitary cans-Lacquered internally and hermetically sealed
3	Dehydrated Vegetables	<ul style="list-style-type: none"> • Containers made of tinplate • Laminated foil bags • Metallised BOPP/LDPE bags
4	Juices, Jams, Jellies and Marmalades	<ul style="list-style-type: none"> • Glass bottles or open top cans

Sr. No.	Food Product	Packaging Materials
5	<p>Miscellaneous</p> <p>a) Synthetics and Fruit Squashes</p> <p>b) Tomato Ketchup</p> <p>c) Pickles</p> <p>d) Mango Chutney</p> <p>e) Papain</p> <p>f) Walnuts</p> <p>g) Cashew Kernels</p>	<ul style="list-style-type: none"> • Glass containers • Containers made from suitable plastic materials, such as, PET • Glass containers, jars • Plastic containers made of PET • Glass container • Wooden barrels • Metal containers • Large pouches made from PET-PET/ ionomer • Suitable flexible packaging material as PET and food grade PVC • Wooden barrels • Glass containers • Pouches made from metallized PET/ionomer • Polyethylene bags • Metallized polyester/ionomer pouches • B-twill jute bags • LDPE coated jute raffia bags • Leak-proof containers • LDPE coated jute raffia bags
IX PACKAGING OF STIMULANT FOODS		
1	Tea	<ul style="list-style-type: none"> • Flexible packaging materials • Laminates, such as, LDPE, paper coated LDPE • PET / LDPE • BOPP / LDPE

Sr. No.	Food Product	Packaging Materials
2	Roasted and Ground Coffee	<ul style="list-style-type: none"> • Tin-plate • Glass • Plastic films or foil • Laminated pouches of paper/LDPE • PET/LDPE • BOPP/LDPE
3	Soluble Coffee Chicory and Soluble Coffee Powder	<ul style="list-style-type: none"> • Tin-plate or glass container • Flexible laminated pouches of paper/LDPE • PET/LDPE • BOPP/LDPE
4	Cocoa, Roasted chicory, Roasted Coffee Chicory Powder, Drinking Chocolate	<ul style="list-style-type: none"> • Suitably lined containers • Flexible laminated pouches of paper/LDPE, Foil/LDPE, PET/LDPE
5	Chocolates	<ul style="list-style-type: none"> • Tinplate • Plastic, grease-proof paper • Aluminium foil • Laminates made of paper/LDPE, BOPP / LDPE
6	Cocoa Butter	<ul style="list-style-type: none"> • Well closed containers • Polystyrene tubs
7	Cocoa Beans	<ul style="list-style-type: none"> • LDPE coated jute raffia bags
X PACKAGING OF ALCOHOLIC DRINKS AND CARBONATED BEVERAGES		
1	Carbonated Beverages	<ul style="list-style-type: none"> • Glass containers • Cans, plastic containers and dispensing units
2	Vodka, Gin, Country Spirit (Distilled), Table Wines, Brandies, Whiskies and Rums	<ul style="list-style-type: none"> • Glass liquor bottle • Glass bottles of any suitable capacity • PET bottle
3	Beer	<ul style="list-style-type: none"> • Glass bottles • PET bottles
4	Toddy	<ul style="list-style-type: none"> • PET and PVC bottles

Sr. No.	Food Product	Packaging Materials
XI PACKAGING OF MEAT, FISH AND POULTRY		
1	<p>Fish and Fisheries Products</p> <p>a) Fresh Products</p> <p> a₁) Pomfret and Threadfin</p> <p> a₂) Mackerel and Sardines</p> <p> a₃) Seerfish</p> <p>b) Frozen Products</p> <p> b₁) Prawns</p> <p> b₂) Frog legs and Lobster trils</p> <p> b₃) Pomfret, threadfin, mackerel, seerfish, sardines</p> <p> b₄) Cuttlefish and squid</p> <p>c) Canned Products</p>	<ul style="list-style-type: none"> • Containers, made of either plywood, Country wood or plastic • Polyethylene lined insulated boxes • Suitable containers of sufficient strength • Polyethylene lined insulated boxes • Polyethylene lined insulated boxes Polyethylene lined dealwood boxes • Polyethylene lined insulated LDPE coated cartons • LDPE bags • Plywood or dealwood cases • Cardboard cartons • Suitable containers which can withstand the stress and strain • The fillets of uniform sizes should be laid flat in the specific carton with a polyethylene lining • Fillets of uniform size shall be rolled loosely in torpedo shape and laid in layers in the selected carton which shall be covered by polyethylene sheet • The frozen fillets of cuttlefish or tubes of squid may be packed inside a polyethylene pouch of suitable size or wrapped with polyethylene film • Internally and uniformly lacquered cans

Sr. No.	Food Product	Packaging Materials
2	<p>Meat and Meat Products</p> <p>a) Meat (Fresh, Chilled)</p> <p> a₁) Packaging of meat including whole carcasses for local market</p> <p> a₂) Packaging of meat for distant markets</p> <p> a₃) Packing of whole frozen carcasses for distant market</p> <p>b) Meat Products</p> <p> b₁) Fresh sausages</p> <p> b₂) Cooked meat products</p> <p> b₃) Smoked ham or bacon</p> <p>c) Canned Meat Products</p> <p> c₁) Pork luncheon meat and pork sausages</p> <p> c₂) Ham, mutton and goat meat curried and in brine</p>	<ul style="list-style-type: none"> • Wrapped in polyethylene sheets or bags • Wrapping material like BONF/LDPE • PET/LDPE • Polyethylene sheets • Suitable wrapping material like BONF /LDPE or PET / LDPE (vacuum packed) • Wrapped first in hosiery or linen cloth, then in kraft paper or Polyethylene film and finally in hessian cloth • Polyethylene bags • Butter paper and then in kraft paper • Wrapping material, such as, BONF / LDPE, PET / LDPE • Wrapped in butter paper and then put in big polyethylene cover • Wrapping materials such as, BONF/ LDPE, PET/LDPE • Wrapped in grease-proof cellophane material or butter paper • Each can should be coated on the inner side with edible gelatin, lard or lined with vegetable parchment paper • Open top sanitary cans, hermetically sealed

Sr. No.	Food Product	Packaging Materials
	d) Poultry and Poultry Products d ₁) Dressed Chicken d ₂) Chicken Essence d ₃) Egg Powder	<ul style="list-style-type: none"> • Polyethylene bags (50µ) • Hermetically sealed ampoules • Tinplate containers • Flexible pouches of PET / LDPE
XII PACKAGING OF OIL AND FAT		
1	Oil	<ul style="list-style-type: none"> • Tinplate containers • Glass bottles • Rigid plastic containers of HDPE, food grade PVC, PET • Flexible pouches made of plastic film / foil / laminate • Flexible pouches of BONF/ionomer and co-extruded nylon/ionomer.
2	Fat (vanaspati, bakery shortening, etc.)	<ul style="list-style-type: none"> • Flexible packs • Tin containers

APPENDIX TABLE 2
Thermoplastics for Food Contact Applications

Food Product	Thermoplastics that may be used in contact with food	Most common form of usage	Normal Combination, if any, with other Substrates
Bakery Food			
1) Biscuits	LDPE, HDPE, PP, PS, PVC, ABS Coatings of EVA, NC, PVDC, acrylic, VC-VA, PW	Bags, containers Containers Wrappers	None None As coatings on paper, BOPP, cellophane, foil in laminated form
2) Bread	LDPE, PP, HDPE, PS, LDPE, HDPE, PP Coatings of EVA, NC, PVDC, acrylic, VC-VA, PW	Bags Containers Wrappers	None None As coatings on paper, BOPP, cellophane
Beverage Items			
1) Coffee Powder	LDPE, HDPE, PP NC, PVDC Coatings PS, HDPE, PVC, ABS, PP	Bags Bags Containers	For instant coffee, usually foil laminated coatings used on cellophane, BOPP None
2) Tea	LDPE, HDPE, PP Coatings of PVDC, NC Metallised Polyester	Bags, liners Wrappers, chest liners	Plain or paper coated Plain PVDC, NC coatings on cellophane
3) Malted and coco-based beverage powders	LDPE, HDPE	Pouches, liners	In laminated form with aluminium foil, HDPE used without foil in la-minated form
Cereal Products			
1) Cereals and grains	LDPE, HDPE, PP PW	Bags, liners Liners	As such and laminated to paper Coated on paper
2) Cereal Flours	LDPE, HDPE	Bags, liners	Coated on paper, cellophane

Food Product	Thermoplastics that may be used in contact with food	Most common form of usage	Normal Combination, if any, with other Substrates
3) Corn Flakes	LDPE, HDPE PW, PVDC, EVA	Bags Liners	None Coated on paper, cellophane
4) Processed starchy products	LDPE, HDPE	Bags, liners	As such and laminated to paper
5) Oats (cooked)	LDPE, HDPE	Liners	Laminated to paper, foil
6) Barley powder	LDPE, HDPE	Bags, liners	Laminated to paper
Confectionery Items			
1) Boiled sweets	LDPE, PP, HDPE, PVC NC, PW, PVDC Acrylic, EVA	Bags Individual Wraps	None Coatings on paper, cellophane, BOPP, foil
2) Chocolate, coated caramels	LDPE, PVC, HDPE	Pouches	Laminated to cellophane and foil
	PVDC, EVA, PW	Individual wraps	Coated to foil, paper, cellophane, BOPP
	Rigid PVC, HDPE	Containers	None
3) Chewing gums	LDPE, HDPE	Strip packs	Laminated to glassine
4) Cakes	LDPE, PVC Polyester, BOPP PW, NC, PVDC	Bags Wraps Wrappers	None None Coated on paper, Cellophane
	PS, HDPE	Trays	None
Dehydrated Fruits and Vegetables			
1) Dehydrated Vegetables	LDPE, PP	Pouches	Laminated to foil
	HDPE	Bags	None
2) AFD vegetables	LDPE, EVA	Pouches	Laminated to foil

Food Product	Thermoplastics that may be used in contact with food	Most common form of usage	Normal Combination, if any, with other Substrates
3) Dried fruits	LDPE, PP, HDPE NC PVDC	Bags Bags	None Coated on cellophane
Edible Fat			
1) Vanaspati	HDPE, PVC, ABS LDPE	Containers Diaphragm for containers	None Laminated to foil
2) Edible vegetable oils	HDPE, PVC, ABS LDPE	Containers Pouches	None Laminated to foil, paper or other thermoplastics
3) Ghee	LDPE, HDPE	Bags	None
Snacks, Fruits and Vegetables			
1) Fresh fruits and vegetables	LDPE, PP, PVC, HDPE Cellulose acetate, PS PVDC, NC	Bags, sleeves with or without perforations Windows Over wraps	None None Coatings for cellophane
2) Frozen fruits	LDPE, HDPE PW, EVA	Bags Cartons	As such, laminated to Cellophane Coatings on board
3) Dried snacks	LDPE, HDPE	Bags	As such, laminated to cellophane, BOPP, polyester
	NC, PVDC, Acrylic	Bags	Coated on cellophane, BOPP
Indian Sweets			
1) Shreekhand	ABS, HIPS, HDPE, LDPE	Containers	None
2) Laddu	ABS, HIPS, HDPE LDPE	Containers	None

Food Product	Thermoplastics that may be used in contact with food	Most common form of usage	Normal Combination, if any, with other Substrates
3) Rasogolla	ABS, HIPS, HDPE LDPE	Containers	None
4) Peda	HDPE, LDPE	Filling	None
Meat and Poultry Products			
1) Fresh meat	LDPE, PVC, PVDC, Nylon, HDPE PS	Bags Trays	As such and laminated form None
2) Cooked meat	LDPE, PVDC, Nylon, HDPE	Bags	As such and laminated form
3) Cured meat	LDPE, POLYAMIDE, HDPE PVDC, PVC, HDPE Polyester, polyamide	Pouches Bags Trays	Laminated to BOPP, cellophane, polyester None None
Milk and Milk Products			
1) Liquid milk	LDPE, HDPE LDPE, HDPE PW, EVA	Bags, pouches Containers Cartons	As such and in laminated form None Coated on board
2) *Whole milk powder/ Skimmed milk powder	LDPE, HDPE HDPE PVDC	Bags, pouches Bags, containers Bags	Laminated to paper and foil None Coated to cellophane
3) Yoghurt/Dahi	HDPE, ABS, HIPS, PP, Cellulose acetate, PVC	Containers	None
4) Butter/ Margarine	NC, PVDC, VC-VA PVC, ABS, PP, HDPE, HIPS	Pouches Containers	Coating on cellophane, Foil None

Food Product	Thermoplastics that may be used in contact with food	Most common form of usage	Normal Combination, if any, with other Substrates
5) Hard cheese	NC, PVDC, HDPE, LDPE, HDPE PVDC	Wrappers and Pouches Bags	NC, PVDC as coating None
6) Processed cheese	LDPE, HDPE PS, ABS, HDPE	Pouches Containers	Laminated to cellophane, BOPP, polyester, foil None
Poultry Products			
1) Dressed poultry	PVDC, LDPE, PP	Shrinkable bags	None
2) Shell eggs	PS, ABS, HIPS, PVC	Trays	None
Spice Powder			
1) Ground spices	LDPE, HDPE PVC, HDPE	Pouches Containers	Laminated to cellophane, glassine, foil, polyester None
2) Curry powders	LDPE PP, PVC	Pouches Containers	Laminated to cellophane, Foil, polyester, BOPP None
Semi Liquid Products			
1) Honey	HDPE, PP, PVC, LDPE, PS	Containers	None
2) Pickles	PVC, HDPE, PP, PET	Containers	None. Discolouration of container possible with pickles containing mustard
3) Sauces	PVC, HDPE, PP, PET	Containers	None

Food Product	Thermoplastics that may be used in contact with food	Most common form of usage	Normal Combination, if any, with other Substrates
4) Jam, Jellies	ABS, PS, HIPS, PP, HDPE, PET, PVC	Containers	None
5) Fruit juices, squashes, syrups	HDPE, PVC, PET LDPE	Containers Pouches	None Laminated to foil
6) Mineral water, Beer and carbonated soft drinks	PVC, PET, HDPE PET, PVC	Containers Containers	None None
7) Ice cream	ABS, HIPS, HDPE, LDPE PP	Containers	None
8) Wine/ Alcohol	PVC	Containers	None
Miscellaneous			
1) Salt	LDPE	Bags Containers	None None
2) Instant mix food	HDPE LDPE	Bags Containers	None Laminated to foil
* For whole milk powder, foil is an essential substrate of the package – for baby food (spray dried) gas packing is recommended by ISI.			

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10. Relevant Indian Standards listed in the write-up