Paper no.: 12
Paper Title: Food Packaging Technology
Module-32: Coding and labelling of food packages

32.1 Introduction

The objective of foodstuff labelling is to guarantee that consumers have access to complete information on the content and composition of products, in order to protect their health and their interests. Other information may provide details on a particular aspect of the product, such as its origin or production method. Some foodstuffs, such as genetically modified organisms, allergenic foods, foods intended for infants or even various beverages, are also subject to specific regulations.

Labelling of certain non-food products must also contain particular information, in order to guarantee their safe use and allow consumers to exercise real choice. In addition, the packaging of foodstuffs must adhere to production criteria in order to avoid contaminating food products.

The nature of the labelling, the presentation of the foodstuff, and the publicity for it must not:

- Mislead the consumer as to the characteristics, the properties or the effects of the foodstuff
- Attribute to any food the property of preventing, treating or curing a human disease (with the exception of natural mineral waters and foodstuffs for particular nutritional uses for which specific provisions exist).

Information on foodstuffs must be precise, clear and easy to understand by the consumer.

32.2 Responsibilities of the Manufacturer

The manufacturer under whose name or business name the food is marketed or the importer is responsible for the information relating to the foodstuff. They must ensure the presence and accuracy of the information in accordance with the applicable food legislation and requirements of relevant national provisions.

32.2.1 Mandatory particulars

The mandatory particulars must be easy to understand and visible, clearly legible and, where appropriate, indelible. The height of the characters must be at least 1.2 mm (except for small-sized packaging or containers).

The mandatory particulars concern:

- The name

- The list of ingredients which are listed in descending order of weight and designated by their specific name
- The substances causing allergies or intolerances (nuts, milk, mustard, fish, grains containing gluten, etc.)
- The quantity of certain ingredients or categories of ingredients
- The net quantity of the food
- The date of minimum durability or the 'use by' date
- Any special storage conditions and/or conditions of use
- The name or business name and address of the food business operator or importer
- The country of origin or place of provenance for certain types of meat, milk or where failure to indicate this might mislead the consumer
- Instructions for use where it would be difficult to make appropriate use of the food in the absence of such instructions
- For beverages containing more than 1.2 % by volume of alcohol, the actual alcoholic strength by volume
- Nutritional declaration

The mandatory particulars concerning the name, net quantity and the alcoholic strength by volume shall appear in the same field of vision.

The mandatory particulars must be in language which is easy to understand by the consumer, and, if required, in several languages.

32.2.2 Omission of certain mandatory particulars

Specific provisions are provided for:

- Glass bottles intended for re-use
- Small-sized packaging
- The nutritional labelling of foodstuffs
- Beverages containing more than 1.2 % by volume of alcohol

32.2.3 Voluntary information

Information provided voluntarily must meet the following requirements:

- it shall not mislead the consumer;
- it shall not be ambiguous or misleading;
- it shall, where appropriate, be based on the relevant scientific data.

Furthermore, the voluntary food information shall not be displayed to the detriment of the space available for mandatory food information.

32.3 General Labelling Requirements

32.3.1 Vegetarian / Non-Vegetarian Symbol

A declaration to this effect shall be made by a symbol and colour code so stipulated for this purpose to indicate that the product is Non-Vegetarian Food. The symbol shall consist of a brown colour filled circle having a diameter not less than the minimum size specified in the Table 32.1.

A declaration to this effect shall be made by a symbol and colour code so stipulated for this purpose to indicate that the product is Vegetarian Food. The symbol shall consist of a green colour filled circle, having a diameter not less than the minimum size specified in the Table 32.1.

Table 32.1: Area and Diameter of Vegetarian/Non-vegetarian symbol to be printed on package

S. No.	Area of principal display panel	Minimum size of diameter, mm
1	Upto 100 cm^2	3
2	Above 100 cm^2 upto 500 cm^2	4
3	Above 500 cm^2 upto 2500 cm^2	6
4	Above 2500 cm^2	8

(a) The symbol shall be prominently displayed
  (i) On the package having contrast background on principal display panel,
  (ii) Just close in proximity to the name or brand name of the product, and
  (iii) On the labels, containers, pamphlets, leaflets, advertisements in any media

Any article of food contains egg only as Non-Vegetarian ingredient, the manufacturer, or packer or seller may give declaration to this effect in addition to the said symbol.

32.3.2 Flavour and Colour

In case both colour and flavour are used in the product, one of the following combined statements in capital letters shall be displayed just beneath the list of ingredients on the label attached to any package of food, so coloured and flavoured, namely:

CONTAINS PERMITTED NATURAL COLOUR (S) AND ADDED FLAVOUR(S)

OR

CONTAINS PERMITTED SYNTHETIC FOOD COLOUR(S) AND ADDED FLAVOUR(S)

OR

CONTAINS PERMITTED NATURAL AND SYNTHETIC FOOD COLOUR(S) AND ADDED FLAVOUR (S)

OR

CONTAINS PERMITTED NATURAL*/AND* SYNTHETIC* COLOURS AND ADDED FLAVOURS

32.3.3 Food Additives

Food additives falling in the respective classes and appearing in lists of food additives permitted for use in foods generally, the following class titles shall be used together with the specific names or recognized international numerical identifications:

Acidity Regulator, Acids, Anticaking Agent, Antifoaming Agent, Antioxidant, Bulking Agent, Colour, Colour Retention Agent, Emulsifier, Emulsifying Salt, Firming Agent, Flour Treatment Agent, Flavour Enhancer, Foaming Agent, Gelling Agent, Glazing Agent, Humectants, Preservative, Propellant, Raising Agent, Stabilizer, Sweetener, Thickener.

32.3.4 Details of Manufacturer

(i) The name and complete address of the manufacturer and the manufacturing unit, if these are located at different places and in case the manufacturer is not the packer or bottler, the name and complete address of the packing or bottling unit.

(ii) Where an article of food is manufactured or packed or bottled by a person or a company under the written authority of some other manufacturer or company, under this or its brand name, the label shall carry the name and complete address of the manufacturing or packing or bottling unit as the case may be, and also the name and complete address of the manufacturer or the company, for and on whose behalf it is manufactured or packed or bottled.

(iii) Where an article of food is imported into India, the package of food shall also carry the name and complete address of the importer in India.

32.3.5 Details of Quantity

The net weight or number or measure of volume of contents as the circumstances may require, except in the case of biscuits, breads, confectionery and sweets where the weight may be expressed in terms of either average net weight or minimum net weight.

Where a package contains a large number of small items of confectionery, each of which is separately wrapped and it is not reasonably practicable to exclude from the net weight of the commodity, the weight of such immediate wrappers of all the items of the confectionery contained in the package, the net weight declared on the package, containing such confectionery or on the label thereof may include the weight of such immediate wrapper if, and only if, the total weight of such immediate wrapper does not exceed:

(i)   8% where such immediate wrapper is a waxed paper or any other paper with wax or aluminium foil under strip; or

(ii)   6% in the case of any other paper, of the total net weight of all the items of confectionery contained in the package minus the weight of immediate wrapper.

32.3.6 Batch coding

A distinctive batch number or lot number or code number, either in numerical or alphabets or in combination, representing the batch number or lot number or code number being preceded by the words *Batch No.* or *Batch* or *Lot No.* or *Lot* or any distinguishing prefix.

In case of canned food, the batch number may be given at the bottom, or on the lid of the container, but the words *Batch No.*, given at the bottom or on the lid, shall appear on the body of the container.

32.3.7 Manufacturing date and best before

The month and year in which the commodity is manufactured or prepacked

Date of minimum durability This date consists of the day, month and year, except in the case of foodstuffs that will not keep for more than three months (the day and month are sufficient), foodstuffs which will not keep for more than 18 months (the month and year are sufficient), and foodstuffs which will keep for more than 18 months (year is sufficient).

Provided further that in case of package or bottle containing sterilised or Ultra High Temperature treated milk, soya milk, flavoured milk, any package containing bread, dhokla, bhelpuri, pizza, doughnuts, khoa, paneer, or any uncanned package of fruits, vegetable, meat, fish or any other like commodity, the declaration be made as follows:

BEST BEFORE.................DATE/MONTH/YEAR
                          OR
BEST BEFORE .... DAYS FROM PACKAGING
                          OR
BEST BEFORE ....DAYS FROM MANUFACTURE
                          OR
BEST BEFORE UPTO.... DATE/MONTH/YEAR
                          OR
BEST BEFORE WITHIN ....DAYS FROM THE DATE OF
PACKAGING/MANUFACTURE

> For the period up to and inclusive of 1st September 2001

Note: (i) Blank be filled up
       (ii) Month and Year may be used in numerals.
       (iii)Year may be given in two digits.

The date of durability is not required for the following products:

- Untreated fresh fruits and vegetables
- Wines and beverages containing 10 % or more by volume of alcohol
- Non-alcoholic soft drinks
- Fruit juices and alcoholic beverages in individual containers of more than five litres, intended for supply to mass caterers
- Bakers' or pastry cooks' wares which are normally consumed within 24 hours of their manufacture
- Vinegar
- Cooking salt
- Solid sugar
- Confectionery products consisting almost solely of flavoured and/or coloured sugars
- Chewing gums and similar chewing products
- Individual portions of ice-cream

In the case of foodstuffs which are highly perishable, the date of minimum durability shall be replaced by the 'use by' date;

32.4 Principal Display Panel, its Area, Size and Letter, etc.

(1) Principal Display Panel means that part of a label which is intended or is likely to be displayed, presented or shown or examined by the customer under normal and customary conditions of display, sale or purchase of the commodity of food contained in the package:

(2) The area of the principal display panel shall not be less than-

(a) in the case of a rectangular container, forty percent of the product of height and width of the panel of such container having the largest area:

(b) in case of cylindrical or nearly cylindrical, round or nearly round, oval or nearly oval container, twenty percent of the product of the height and average circumference of such container; or

(c) in the case of a container of any other shape, twenty percent of the total surface area of the container except where there is label, securely affixed to the container such label shall have a surface area of not less than ten percent of the total surface area of the container.

(3) In computing the area of the principal display panel, the tops, bottoms, flanges at top and bottoms of cans, and shoulders and necks of bottles or jars shall be excluded.

(4) In the case of package having a capacity of five cubic centimeters or less, the principal display panel may be card or tape affixed firmly to the package or container and bearing the required information under these rules.

(5) The height of any numeral in the declaration required under rules, on the principal display panel shall not be less than as shown in Table below:.

TABLE -32.2: Height and Size of Letters to be printed for net quantity declared in terms of weight or volume on label

Sr. No.	Net quantity in length, area or number, Area of Principal display panel	Net quantity in weight/volume	Minimum height of numeral in mm	
			Normal case	When blown, formed, moulded or perforated on container
1	Up to 100 cm^2	Up to 50g/ml	1	2
2	Above 100 cm^2, Up to 500 cm^2	Above 50g/ml up to 200g/ml	2	4
3	Above 500 cm^2, Up to 2500 cm^2	Above 200g/ml up to 1kg/litre	4	6
4	Above 2500 cm^2	Above 1kg/litre	6	8

32.5 Miscellaneous Information

32.5.1 Languages of the Particulars or Declaration on the Label
The particulars of declaration required under these rules to be specified on the label shall be in English or Hindi in Devnagri script. Provided that nothing herein contained shall prevent the use of any other language in addition to the language required under this rule.

32.5.2 Declaration to be surrounded by Line
There shall be a surrounding line enclosing the declaration and where the words "unsuitable for babies" are required to be used there shall be another such line enclosing these words. The distance between any part of the words "unsuitable for babies" and the surrounding line enclosing these words shall not be less than 1.5 mm.

32.5.3 Labels not to Contain False or Misleading Statements
A label shall not contain any statement, claim, design, device, fancy name or abbreviation which is false or misleading in any particular concerning the food contained in the package, or concerning the quantity or the nutritive value or in relation to the place of origin of the said food.

32.6 Bar Code

A bar code may be defined as a series of bars and spaces arranged according to the encodation rules of a particular specification in order to represent data. Its purpose is to represent information in a form that is machine-readable. Bar codes are read by scanning devices that are programmed to analyse the structure of the bars and spaces and transmit the encoded data in electronic format. These data can then be stored on a file or transmitted to a computer for processing. Techniques other than bar codes achieve the same objective: capturing automatically data encoded using a particular technology. These include optical character recognition, magnetic stripe, and radio-frequency identification. The concept of encoding and reading data automatically is called automatic data capture (ADC).

32.6.1 Benefits of Bar Codes

The main benefits of bar codes are speed and accuracy. Capturing data automatically by reading a bar code can be done in a fraction of a second, much faster than manual key entry. It is commonly agreed that an operator doing key entry makes one error for every 300 characters typed. Reading bar codes makes data capture almost error-free. The error rate depends on the type of bar code and equipment being used, but usually it is lower than one error per 1,000,000 readings.

32.6.2 Bar-Code Symbologies
A bar-code symbology is a set of rules describing the way bar and spaces have to be organized to encode data characters. Since the invention of the bar code concept in the United States in the late 1950s, hundreds of bar-code symbologies have been developed, but only a few of them are actually being used on a large scale.

Typically, a symbology is qualified as being discrete or continuous. In a discrete symbology, the spaces between symbol characters do not contain information because each character begins and ends with a bar. In a continuous symbology, there is no inter-character gap; that is, the final element of one symbol character abuts the first element of the next symbol character, and all the elements carry data contiguously. The most popular bar-code symbologies are briefly described below.

32.6.2.1 Code 39
Code 39 was launched in 1975. It is widely used for industrial applications. Code 39 is a discrete, variable length symbology encoding the 36 numeric and uppercase alpha characters (A–Z, 0–9) and seven special characters: space, dollar sign ($), percent (%), plus (+), minus (–), dot (.), and slash (/). A symbol character is composed of nine elements, five bars and four spaces. An element is either wide or narrow. There are three wide elements and six narrow elements in a symbol character. A Code 39 symbol begins with a start character and ends with a stop character. It can be read from the right to the left and from the left to the right.

32.6.2.2 ITF
Interleaved two of five (abbreviated ITF) has been found to be well adapted to the materials and printing conditions frequently used on fiber-board cases. It is a continuous symbology encoding only numeric digits. A pair of digits is represented by five bars and five spaces. One of the pair is represented by the dark bars and the other by the light bars, and the dark and light bars are interleaved. Because the digits are represented in pairs, the symbol can only encode even number of digits. In addition to the digit characters, there are two auxiliary characters used as guard bars at the beginning and at the end of the digit representation. The symbol is designed to be read bi-directionally by fixed or portable scanners.

32.6.2.3 Code 128
Code 128 was introduced in 1981 in response to the need for a compact alphanumeric code symbol that could be used to encode complex data. The fundamental requirement called for a symbology capable of being printed by existing data-processing printers. Code 128 uniquely addresses this need with the most compact, complete, alphanumeric

linear symbology available. In addition, Code 128 has been designed with geometric features to improve scanner reading performance and to be self-checking.

32.6.2.4 EAN/UPC

EAN/UPC was developed in the late 1960s when researches were conducted in the United States to improve the efficiency of checkout operations in retail stores. EAN/UPC is a continuous symbology encoding fixed-length numeric digits. Several variants exist, known as EAN-13, UPC-A, EAN-8, and UPC-E. In addition, the symbology enables to encode two small symbols encoding two and five digits. These are called add-ons because the information they contain supplement the main symbols. A symbol character is composed of seven modules, two bars, and two spaces. A bar or a space is composed of one to four modules. An EAN/UPC symbol begins and ends with a guard pattern. In the EAN-13, UPC-A, and EAN-8 version, a center pattern separates the symbol into segments that can be read separately by a decoding equipment, thus making the symbol omnidirectionally readable. The EAN/UPC symbology is widely used to encode the identification number of consumer products.

32.6.2.5 PDF417

PDF417 is a two-dimensional, stacked bar-code symbology. In PDF417, the basic data unit or minimum segment containing interpretable data is called a code-word. Every code-word in the symbol is the exact same physical length, and each code-word can be divided into 17 equal modules. Within every code-word, there are four bars and four spaces. The minimum number of modules of any bar or space is one; the maximum is six. The PDF417 symbology defines 929 distinct code-words and supports 12 modes. Each mode specifies the meaning of the code-words. The standard modes are Extended Alpha Numeric Compaction Mode, Binary/ASCII Plus Mode, and Numeric Mode. The number of data characters that can be encoded in a PDF417 symbol depends on the mode being used. In the extended alphanumeric compaction mode, the maximum number of ASCII characters per symbol is 1850. In numeric mode, a symbol can encode a maximum of 2725 digits.

32.6.2.6 Data Matrix

Data Matrix is a two-dimensional matrix symbology that is made up of nominally square modules arranged within a perimeter finder pattern. Each Data Matrix symbol consists of data regions that contain nominally square modules set out in a regular array. The data region, or set of data regions and alignment patterns, is surrounded by a finder pattern, and this is in turn surrounded on all four sides by a quiet zone border. The number of data characters per symbol is up to 2335 alphanumeric characters or 3116 numeric only characters. Data Matrix Symbols are read by two-dimensional imaging scanners or vision systems. Most other scanners that are not two-dimensional imagers cannot read Data Matrix. Data Matrix Symbols are designed for use with applications that involve imaging scanners throughout the supply chain.

32.6.3 Applications

The bar-coding technology has gained wide acceptance in numerous applications. Today, virtually all packages, from the smallest units intended for sale to a consumer to the

biggest transport units, bear one or several bar codes carrying their identification number and other data relevant to the parties shipping, carrying, or receiving goods.

Scanning at retail point of sale is a major application using bar-code technology. Millions of stores around the world have implemented scanning systems relying on the GS1 identification number and the associated EAN/UPC bar-code symbol.

A rapidly growing field of applications using bar-coding technologies lies within the supply chains. Goods ready for shipment by a supplier are packed, and each package is numbered and bar-coded with a unique number. Before the physical delivery of the merchandise, the supplier sends an electronic message to the delivery point, advising about the arrival of the goods. This electronic message contains the unique identification number of each package and the description of its contents.

32.6.4 Printing Bar Codes

Virtually any printing technology can be used to print bar codes, provided that it is accurate enough to achieve the right level of required quality. The printing processes fall into two categories: commercial and on-site. The choice between these two approaches is determined by the nature of the information to be encoded and the number of codes to be printed. Typically, if the information is static (e.g., the identification number of a product to be placed on a package) and if the number of codes to be printed is large, the traditional commercial method using film masters is appropriate. If the information is variable (i.e., different for each item or short series of items or if the quantity required is small), then on-site printing processes should be used.