

PAPER AND PAPER BOARD FOR FOOD PACKAGING APPLICATIONS - REVIEW OF STANDARD REGULATIONS



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Abstract :

While paper and Paper board has traditionally been used for packaging of food, in the past 10-15 years India has witnessed a significant rise in use paper and other packaging materials like plastics for food packaging applications. Changing urban lifestyles accompanied with a rise in number of working couples in the country has lead to a phenomenal growth of the food service industry.

Food packaging materials provide protection against spoilage microorganisms and ensure the shelf life and safety of the packaged food. Cross contamination of food with spoilage microorganisms and pathogens and migration of harmful chemicals from paper and paper board can adversely influence the safety of packed food. It is essential that the packaging material is itself not a source of contamination. Individual countries have regulations to assess the suitability of paper and paper board intended for contact with food. Several guidelines are also available for ensuring the hygiene and safety of food packaging paper & paper board. This article reviews the existing regulation for Paper and Paper Board for food packaging Applications both in India and around the globe.

INTRODUCTION

Paper and Paper Board form one of the major food packaging materials. Depending upon the nature of the food to be packaged, different grades of paper and board are used for packaging. For example Folding Box Board having barrier properties for grease, humidity or gases are employed for packaging of frozen foods, or as liquid cartons or pastry boxes. Coated papers and paper board with or without plastic layers and aluminium linings providing necessary barrier properties are used alone or in combination with different preservation methods for packaging of foods. While Virgin fibres are generally used for direct food contact packaging, recycled fibre based packaging products are used for disposable products.

Packaging materials serve multiple purposes. They serve to protect product deterioration, increase transportation efficiency, preserve the health and hygiene value of food and enhance the shelf life of the packaged food product. For an effective packaging, it is therefore imperative that the packaging material itself is of high purity and not a

source of contamination both chemical and microbiological.

Potential source of contamination in Paper / Board

A large number of functional additives and process chemical and printing inks are added during papermaking and converting operation to impart desirable property to the paper and Board products. The presence and also migration of these chemical from the packaging material to the food product can bring about undesirable changes in the food like change in flavour or deterioration of organoleptic changes. The migration of chemicals can often be a function of the contact time and temperature.

Further, Paper and Board is made of biodegradable materials like cellulose and starch. As a consequence paper product can itself be contaminated with microorganisms. high temperature and near neutral ph , storage of pulp suspension in chests, and high process water recycling rates also make papermaking environment conducive to growth of microorganisms .

Undesirable migration of packaging material components or cross contamination of food with pathogens or spoilage can deteriorate the quality of food and also pose health hazard to the consumers.

Consequently several best practice and litigations are enforced the world over to regulate the quality of paper and board intended for food packaging applications. This article reviews some of the most prominent guidelines and regulation prevalent across the globe.

Review of Available best practices and Regulations for paper and board for food packaging

E. U Guidelines and regulations

For ensuring the quality of paper and board for food packaging applications, CEPI and CIPTA published the Industry Guidelines for the compliance of paper and board materials and articles for food contact in 2010. The core requirement of the guideline is to establish compliance to regulation (E C) no 1935/2004 that applicable to all materials and articles made of paper and paper board intended for food contact .

In accordance to this regulation, it is mandatory to manufacture paper and paper board in compliance with good manufacturing practices so that their constituents are not transferred to food and do not endanger human health, bring about unacceptable change in composition of food and deterioration of organoleptic characteristics of food.

The guidelines also enlist a mechanism to ensure the suitability of the paper which includes the following.

Demonstration of compliance – requires a formal declaration of compliance for each type or grade of food contact material food

contact by the manufacturer and Maintenance of documentation and record of declaration of compliance by the business operators.

Methodology – for assessing compliance through control of permissible raw materials, control of process through GMP and product requirement covered by chemical testing and traceability.

Chemical Testing – Gives restriction limits and testing requirements based on paper and board used and type of food. The purity requirement list includes 22 chemicals including heavy metals, host of organic compounds.

Good Manufacturing Practice - includes guidelines for responsible sourcing and supply of recovered paper and relevant standards for converting and papermaking operations.

Best Practice for treatments applied during converting operations – includes requirements to ensure lowest possible migration of Inks, varnishes, adhesives used during printing and converting to meet specification of 2023/2006.

Other clauses in the guidelines include Requirement for use within multilayer, packaging layers not actually in food contact and traceability guidelines.

The annexure 1 of the document gives a list of

Table 1 – Purity Requirements covered by EU Guidelines

Substance	Limit in food	Tested in paper & board	remark
	sml (mg/kg food)	Limit	
Cadmium -	-	0.5 mg/kg	#
Mercury	-	0.3 mg/kg	#
Lead	-	3.0 mg/kg	#
Pentachlorophenol		0.15 mg/kg	
Antimicrobial Substances	-	No release of substances in quantities which have an antimicrobial effect	
4,4'-bis (dimethylamino)-benzophenone (Michler's ketone)	0.01 mg/kg (non-detectable)	0.0016 mg/dm ²	# *
4,4'-bis (diethylamino) benzophenone (DEAB)	0.01 mg/kg (non-detectable)	0.0016 mg/dm ²	# *
Azo colourants ⁴	-	0.1 mg/kg as aromatic amine ⁵ (non-detectable)	#
Dyes and colourants ⁶	-	no bleeding	#
Fluorescent Whitening Agents (FWAs) ⁶	-	no bleeding	#
Polycyclic Aromatic Hydrocarbons (PAHs)	0.01 mg/kg (non-detectable)	0.0016 mg/dm ² ⁷	*
Di-n-butylphthalate (DBP)	0.3 mg/kg	0.05 mg/dm ²	*
Diethylhexylphthalate (DEHP) *	1.5 mg/kg	0.25 mg/dm ²	*
Diisobutylphthalate (DiBP)	0.3 mg/kg	0.05 mg/dm ²	*
SUM DBP + DiBP	0.3 mg/kg	0.05 mg/dm ²	*
Benzylbutylphthalate (BBP)	30 mg/kg	5 mg/dm ²	*
Diisononylphthalate (DINP)	9 mg/kg	1.5 mg/dm ²	*
Diisodecylphthalate (DIDP)	9 mg/kg	1.5 mg/dm ²	*
Benzophenone	0.6 mg/kg	0.1 mg/dm ²	*
SUM benzophenone+ hydroxy-benzophenone+ 4-methylbenzophenone	0.6 mg/kg	0.1 mg/dm ²	
Diisopropyl naphthalenes (DIPN)	-	As low as technically possible	*
Bisphenol A	0.6 mg/kg	0.1 mg/dm ²	# *

Source : CEPI Industry Guidelines for the compliance of Paper and Board Materials and articles for food contact

permissible substances for use in paper and board for food contact. The best practices regarding Requirements for use of recovered paper are given in Annexure 2. While Annexure 5 highlights that the draft for methodology for microbiological testing is in place.

U.S regulation for Recycled food contact materials

The U.S Food and Drugs authority regulated the use of food packaging through the food additive regulation and the food contact notification program .Both RCF and virgin materials are required to meet the same regulatory requirements and also comply with the FDA good manufacturing practices. It however restricts the use of Recycled paper that has been primarily been used to hold or ship poisonous or deleterious substances. The purity of the paper is established by limiting concentration chemical contaminants including heavy metals, pesticides, and polychlorinated biphenyls, volatile and semi-volatile organics and dioxins.

Indian Regulations for food contact paper & Board

The Food safety and standards Authority of India monitors the food packaging materials through Food safety and Standards

(Packaging and Labelling Regulation, 2011) The regulation gives general requirements for packaging materials like metal containers and plastics. Plastic materials need to conform to Indian standard specifications .No specific requirements are given for Paper and paper board materials.

However the Bureau of Indian Standards specification for general purpose packaging and wrapping paper IS 6615 puts limits on the heavy metals like cadmium , chromium VI , lead and Mercury , Pentachlorophenols and polychlorinated biphenyls for papers intended for use in packaging of food products. Different limits of these metals and compounds are specified for paper intended to come in contact with dry food, wet food and food with fatty surface and paper for filtration . It also specifies that food packaging paper should be manufactured from virgin pulp and shall be free of dioxins.

Separate BIS standards are also available for specific uses like waxed paper for confectionary , Greece proof paper , vegetable parchment on grease proof paper and aluminium foil laminate for wrapping butter , wrapped [a]er for bread and biscuits , ice cream cups, etc.

Contaminant	Paper Intended to Come into Contact with Dry Food (mg/kg of paper)	Paper Intended to Come into Contact with Wet Food and Food with Fatty Surface (mg/kg of paper)	Paper for Filtration (mg/kg of paper)
Cadmium (Cd)	—	0.5	0.5
Chromium(Cr6+)	—	0.1	0.1
Lead (Pb)	—	3.0	3.0
Mercury (Hg)	—	0.3	0.3
Pentachlorophenol (PCP)	0.05	0.05	0.05
Polychlorinated biphenyls (PCBs)	2.0	2.0	0.5

Source BIS IS 6615

Conclusion

The review of food contact paper requirements reveal that both European Union and United states have elaborate good manufacturing and best practice guidelines to ensure that the materials conform to the specific regulations.

In India the FSSAI Packaging and Labelling Regulation, 2011 has no specific requirements for paper and board for food packaging application. However the BIS IS 6615 does limit the heavy metals and Pentachlorophenols and polychlorinated biphenyls . There is also no availability of good manufacturing and best practice guidelines for manufacture of paper and board for food packaging in India.

With regards to the microbial contaminants, none of the reviewed regulations have specified any limits.

References:

1. FSS (Packaging and Labelling) Regulation 2011
2. BIS Specification for general purpose packaging and wrapping paper IS 6615
3. CEPI Industry Guidelines for the compliance of Paper and Board Materials and articles for food contact.