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भारतीय मानक मसौदा

खाद्य पैकेजिंग के लिये प्लास्टिक की उपयुक्तता पर मार्गदर्शन

(आईएस 10171 का तीसरा पुनरीक्षण)

Draft Indian Standard

**GUIDE ON SUITABILITY OF PLASTICS FOR
FOOD PACKAGING**

(Third Revision of IS 10171)

(ICS 83.080.01; 67.250)

Plastics Packaging Sectional Committee,
PCD 21

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FOREWORD

(Formal clauses will be added later)

Packaging of foodstuffs is a universally accepted method for avoiding contamination, maintenance of hygienic conditions, conservation and also for ease of transport, handling and sale of foodstuffs. Usage of plastics for food packaging is increasing both in quantum as well as in variety. A number of plastics raw materials are available in various forms such as sheets, sachets, containers of various, shapes and sizes, both ordinary as well as co-extruded/composite type. Since there is always a possibility of migration of a part of the packaging material to the contents of the packed material due to intimate contact, it is essential to that the formulation of the package should be selected with care to ensure that any such migration is at a minimum and substances which do migrate from the package to the packed material are within limits and cause no toxic hazards when consumed.

Realizing the versatility of plastic packaging which has prompted its wide usage in food packaging in the country, this standard was first published in 1982 and subsequently revised in 1987 and 1999. In the second revision, Table 1 was thoroughly revised to incorporate Type of food products that have been classified into seven categories instead of eight based on IS 9845 : 1998, additional

thermoplastics like, linear low density polyethylene (LLDPE), polyethylene terephthalate (PET), modified polyphenylene oxide (modified PPO) and polycarbonate (PC) were incorporated as these polymers were identified for its safe use in contact with food, pharmaceuticals and drinking water and additional food products were included under the various categories and suitability of plastics were incorporated for the packing of alcohol.

The major modifications in this (third) revision are given below:

- a. Thermoplastics such as Vinyl chloride-vinyl acetate and Nitrocellulose have been deleted for use in direct contact with the food because of health safety related concern
- b. Amendments have been incorporated
- c. Additional food products have been included under various categories.
- d. Annex B has been added to provide the full form of abbreviations of polymers used.
- e. Paraffin wax has been replaced by food contact grade compliant wax
- f. Acrylic has been replaced with Ethylene Acrylic Acid (EAA)
- g. Additional thermoplastic such as Polyethylene wax (PE) and Cyclic Olefin Copolymer (COC) have been incorporated because of its safe use in food contact application

While deciding the material for labels, consideration may be given to its suitability with the thermoplastics approved for direct food contact during their post-usage phase. For example, use of PVC label is discouraged in view of their incompatibility with the recycling ecosystem of PET.

This standard, however, does not take any responsibility regarding-the suitability of the bonding material or printing ink used for food packaging applications.

The Amendment No. 2 to IS 10171 has been issued in line with Plastic Waste Management (Second Amendment) Rules, 2021, notified by MoEF&CC on 17 September 2021 stating “carry bags made of recycled plastic or products made of recycled plastic can be used for storing, carrying, dispensing, or packaging ready to eat or drink food stuff subject to the notification of appropriate standards and regulation under the Food Safety and Standards Act, 2006 (34 of 2006) by the Food Safety and Standards Authority of India.

This standard is intended to be used with the series of standards given in Annex A on food contact plastics of which it forms a part.

Full form of various polymers mentioned in col (3) of Table 1 are mentioned in Annex B.

1 SCOPE

1.1 This standard covers primarily various thermoplastics singly or in combination which are considered suitable for direct food contact applications. This standard provides a general guidance to the food packer in selecting the specific thermoplastic material, singly or in combination, to design an acceptable food packaging system.

1.2 This standard, however, does not purport to provide guidance on the actual design of the food packaging system or cover the shelf life requirements for various food products. With regard to storage of particular food products, it shall be the responsibility of the manufacturer/packer of the food product to conduct necessary shelf life/ storage-stability test so as to select the suitability of the thermoplastic material.

2 REFERENCES

The following standards contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standard indicated below:

<i>IS No.</i>	<i>Title</i>
IS 2828 : 2019/ ISO 472 : 2013	Plastics — Vocabulary(<i>second revision</i>)
IS 7019 : 1998	Glossary of terms in plastics and flexible packaging, excluding paper (<i>second revision</i>)
IS 9845 : 1998	Determination of overall migration of constituents of plastics materials and articles intended to come in contact with foodstuffs — Method of analysis (<i>second revision</i>)
IS 9833: 2018	List of colourants for use in plastics in contact with foodstuffs and pharmaceuticals (<i>second revision</i>)
IS 14534: 2023	Plastics — Recovery and recycling of plastics waste — Guidelines (<i>second revision</i>)

3 TERMINOLOGY

For the purpose of this standard, the definitions given in IS 2828 and IS 7019 shall apply.

4 THERMOPLASTICS FOR FOOD CONTACT APPLICATIONS

Under Table 1, specific food products, type of food products as per Table 1 of IS 9845, guidance regarding type of thermoplastics, nature of packaging, possible substitutes and combinations/variations of thermoplastics have been included to provide general guidance on food contact thermoplastic systems.

All plastics mentioned in this standard shall conform to their relevant Indian Standards for food contact plastics. For those food contact plastics for which no Indian Standards are available so far, they shall also comply with their Indian standard specification as and when formulated.

Table 1 General Guide to Thermoplastic Systems for Food Contact Applications

(Clause 4)

Food Products	Type of Food Products	Thermoplastics that May be Used in direct Contact with Foods ¹⁾	Most Common Form of Usage ²⁾	Normal Combination, if any, with Other Substitutes
(1)	(2)	(3)	(4)	(5)
Bakery Foods				
1. Biscuits	IV	LLDPE, LDPE, HDPE, PP and its copolymer	Bags, Liners	None
		PS, PVC, ABS, PET, PP	Containers	None
		Coatings of EVA, PVdC, EAA, food contact grade compliant wax	Wrappers	As coatings on paper, BOPP, cellophane, aluminum foils and metallised BOPP and BOPET in laminated form
2. Bread	V	LLDPE, LDPE, PP and its copolymer, HDPE	Bags, Liners	None
		PS, LDPE, HDPE, PP, PET	Containers	–
		Coatings of EVA, PVdC, EAA, food contact grade compliant wax	Wrappers	As coatings on paper, BOPP and cellophane
Beverage Items				
1. Coffee, powder and derivatives	IV	LLDPE, LDPE, HDPE, PP and its copolymer, Nylon-6, EVA, Ionomers, PVdC coatings, metallised BOPP	Bags, Liners	For instant coffee, usually-foil laminated coatings used on cellophane, BOPP, polyester
		PS, HDPE, PVC, ABS, PP, PET	Containers	None

2. Tea leaf, powder and derivatives	IV	LLDPE, LDPE, HDPE, PP and its copolymer, Nylon-6	Bags, Liners	Plain or paper coated
		Coatings of PVdC, metallised BOPP	Wrappers, Chest Liners	Plain or coatings on cellophane
		PS, HDPE, PVC, ABS, PP, PET	Containers	None
3. Malted cocoa based beverage powders	IV	LLDPE, LDPE, HDPE, Ionomers, EAA, Nylon-6 PET	Pouches, Liners, Containers	In laminated form with aluminium foil, HDPE used without foil in laminated form
4. Alcohol and alcohol based beverages	III (i & ii)	PET	Bottles	None
5. Fruit juices, Beverages, Squashes, non-carbonated beverages, tea and coffee based beverages	II	PET, PP, HDPE	Bottles	None
		LLDPE, LDPE, HDPE, Ionomers, EAA, Nylon-6, metallised BOPP	Pouches, Cartons	In laminated form with aluminium foil, coated on paper, board
6. Carbonated beverages	II	PET, PP	Bottles	None
7. Mineral water	I	PET, PP, HDPE, PVC	Bottles, Jars	None
		LLDPE, LDPE, HDPE, PP	Pouches	As such and in laminated form
		PC	Jars	As such for bulk packaging
8. Beverage concentrates		PVC, HDPE, LDPE, LLDPE, PP, PET, PS	Bottles, bags and pouches	Singly or in Combination
Cereal Products				
1. Cereals and grain pulses	VII	LLDPE, LDPE, HDPE, PP and its copolymer	Bags and Liners	As such and laminated to paper
		HDPE, PP, PVC, ABS, PET	Containers	None

		food contact grade compliant wax	Liners	Coated on paper
2.Cereals flours	VII	LLDPE, LDPE, HDPE, PET	Bags, Liners, Containers	As such and laminated to paper
3. Corn flakes	VII	LLDPE, LDPE, HDPE, PP, PA, food contact grade compliant wax, PVdC, EVA, PET	Bags, Liners, Containers	Plain or coated on paper, cellophane or BOPP.
4. Processed Starch products	VII	LLDPE, LDPE, HDPE, Nylon-6, PET	Bags, Liners, Containers	As such and laminated to paper
5. Oats (cooked)	VII	LLDPE, LDPE, HDPE, Nylon-6, PET	Liners, Containers	Laminated to paper, foils
6. Barley powder	VII	LLDPE, LDPE, HDPE, Nylon-6, PET	Bags, Liners, Containers	Coated on paper, BOPP, cellophane
Confectionery Items				
1. Boiled sweets, Candies, Lozenges	I	LLDPE, LDPE, PP and its copolymer, HDPE, PVC	Bags	None
		food contact grade compliant wax, PVdC, EAA, EVA, Polyethylene wax, Ionomers	Individual wraps	Coatings on paper cellophane, BOPP foil, CPP (cast polypropylene), Laminated to foils, paper.
		PET, PVC, PP, HDPE, EAA	Containers/Jars	None
2. Chocolates, coated caramels confectionery, coated wafer, caramels, soft candy, cocoa & milk based confectionary& sugar boiled confectionery	IV	LLDPE, LDPE, PVC, HDPE, Ionomers, EAA	Pouches	Laminated to cellophane or foils and metallised BOPP
		PVdC, EVA, food contact grade compliant wax, PE Wax, EAA, BOPP, Ionomers	Individual wraps /wrappers	Coated or laminated to foil/papers, cellophane BOPP
		PVC, HDPE, PP, Nylon-6, PET	Containers / Jars	None

		LLDPE, LDPE, HDPE, PP	Strip packs	Laminated to glassine, paper
		PET, PP	Trays	Baggase, Molded fiber
3. Chewing gums	IV	LLDPE, LDPE, PVC, PP, PET	Bags, Containers	None
		Polyester, BOPP,PE wax	wraps	None
4. Cakes	IV	food contact grade compliant wax, PVdC, PA, EAA, PE wax.	Wrappers	Coated on paper, cellophane
		PS, HDPE, PP	Trays	None
Dehydrated Fruits and Vegetables				
1. Vegetables, dehydrated	VII	LLDPE, LDPE, PP, HDPE PET	Pouches, Containers	Laminated to foils, metallised BOPP
		LLDPE, LDPE, HDPE, PP and its copolymer	Bags	None
		LLDPE, LDPE, EVA	Pouches	Laminated to foil
2. AFD vegetables	VII	LLDPE, LDPE, PP and its copolymer, HDPE, Nylon-6	Bags	None
3. Dried fruits	VII	PVdC	Bags	Coated on cellophane, BOPP
		HDPE, PET, PP	Containers	None
Edible Fats				
1. Vanaspati, lard	IV	LLDPE, LDPE, HDPE, Ionomers, EAA, Nylon-6	Pouches, Liners	Coated/laminated to polyester, Nylon-6, foils and metallised BOPP
		HDPE, PVC, ABS, PP, PET	Containers	None
		LLDPE, LDPE	Diaphragm seal for containers	Laminated to foil

2.Edible vegetable oil	IV	LLDPE, LDPE, HDPE, EAA, Ionomers, Nylon-6	Pouches, Liners	Coated/laminated to polyester, Nylon-6, foils and metallised BOPP
		PP, HDPE, PET, PVC, ABS	Containers	None
3. Ghee	IV	LLDPE, LDPE, HDPE, Ionomers, EAA, Nylon-6,	Pouches, Liners	Coated/laminated to polyester, Nylon-6, foils and metallised BOPP
		PET, HDPE, PP, PVC	Containers	None
4. Mayonnaise	VI	HDPE, PP, PVC, ABS, PET	Containers	None
		LLDPE, LDPE, HDPE, BOPP	Pouches, Liners	As such or in laminated form
Snacks, Fruits, Vegetables				
1. Fresh fruits and vegetables	VI	LLDPE, LDPE, PP, PVC, HDPE	Bags, Sleeves with/without perforations Container Pouch	Flexible packaging material (paper board or aluminium foil or polyethylene) based multilayered structure. Thermoformed plastic container (blister pack) with aluminum foil or polyethylene (PE) based lid.
		Cellulose acetate, PS, PVC, PP, LLDPE, LDPE	Windows	None
		PVdC, PP, LDPE, LLDPE, PVC	Overwrap	Coating for cellophane, BOPP
2. Frozen foods	VI	LLDPE, LDPE, HDPE, PET	Bags, Containers Pouch	As such and laminated to cellophane

				Flexible plastic pouch made of either polyethylene (PE) or laminated structure.
		food contact grade compliant wax, EVA	Liners on cartons	Coatings on board
3. Dried snacks and savoury	IV	LLDPE, LDPE, HDPE, PP, PET	Bags, Containers	As such and laminated to cellophane, BOPP, polyester
		PVdC, EAA, EVA	Liners	Coated on cellophane, BOPP
4. Fried and roasted snacks	IV	LLDPE, LDPE, HDPE, PP, PET	Bags, Containers	As such and laminated to cellophane, BOPP, polyester
		PVdC, EAA, EVA	Liners	Coated on cellophane, BOPP
Indian Sweets				
1. Shrikhand	I	ABS, HIPS, HDPE, LDPE, LLDPE, PP, PET	Containers	None
2. Milk based	V	LLDPE, LDPE, HDPE, Ionomers, EAA, PP	Pouches	None
		ABS, HIPS, HDPE, LDPE, LLDPE, PET, Modified PPO	Containers	None
3. Rasagolla	I	LLDPE, LDPE, HDPE	Filling	None
		LLDPE, LDPE, HDPE	Pouches	None
		ABS, HIPS, HDPE, LDPE, LLDPE, PET, PP	Containers	None
Meat and Poultry Products				
1. Fresh meat	VI	LLDPE, LDPE, PVC, Ionomers, Nylon-6, HDPE EAA, PP, EVA, COC	Bags and Vacuum packing/modified	As such and laminated form and Aluminium foil

			atmospheric packaging	
		PS, HIPS, HDPE, PP	Trays	None
2. Cooked meat	VI	LLDPE, LDPE, Ionomers Nylon-6, HDPE, EAA, PP EVA, COC	Bags and Vacuum packing/ modified atmospheric packaging	As such and laminated form and Aluminium foil
3. Cured meat	VI	LLDPE, LDPE, Ionomers Nylon-6, HDPE, EAA, PP, EVA, COC	Pouches and Vacuum packing/ Modified atmospheric packaging	Laminated to BOPP cellophane, polyester and Aluminium foil
		PVdC, PVC, HDPE, EVA, COC	Bags and Vacuum packing/ Modified atmospheric packaging	Aluminium foil
		Polyester, Nylon-6 PP, HIPS, PVC, HDPE	Trays	None
4.Dressed poultry	VI	PVdC, LLDPE, LDPE, PP, PVC	Shrinkable bags	None
5. Shelled eggs	VI	PS, HIPS, ABS, PVC, HDPE, PP	Trays	None
6. Egg powder	IV	LLDPE, LDPE, PVC, HDPE, PP, Ionomers, Nylon-6, EAA	Bags, Pouches	As such and in laminated form
		PET, PP, HDPE, PVC, HIPS	Containers	None
7. Fish products	VI	PET, PP, HDPE, HIPS	Containers	None
		Polyester, Nylon-6, PP, HIPS, PVC, HDPE, PET	Trays	None
		LLDPE, LDPE, PP, HDPE Ionomers, EAA, Nylon-6	Bags, Pouches	As such and laminated form
Milk and Milk Products				

1. Liquid milk and dairy based beverages	I	LLDPE, LDPE, HDPE, PP	Bags, aseptic pack and Pouches	As such and in laminated form
		LLDPE, LDPE, HDPE, PP, PET, PS, PC	Containers	None
		food contact grade compliant wax, EVA, LDPE, LLDPE, PE Wax	Cartons	Coated on board
2. Whole milk powder	VII	LLDPE, LDPE, HDPE, EAA, Ionomers, PET	Bags, Pouches, Containers	Laminated to paper, cellophane foil, BOPP, polyester
3. Skimmed milk powder	VII	LLDPE, LDPE, HDPE, PP, PET, HIPS (high impact polystyrene)	Bags, Containers, Pouch	None
4. Yoghurt / Dahi	VI	HDPE, ABS, HIPS (high impact polystyrene), PP, PVC, Cellulose acetate, PET, LDPE	Containers Pouch	None
5.Butter /Margarine/ Cocoa butter	V	PVdC, EVA, Nylon-6, EAA, Ionomers, HIPS, PP	Pouches Container	Coatings on board, cellophane, foils, metallised BOPP, polyester
6. Cheese	IV	PVdC, HDPE LLDPE, LDPE, Ionomers EAA, Nylon-6, PET, PP	Wrappers, Pouches, Containers	Laminated to cellophane, BOPP, polyester, foil
		HDPE, HIPS (high impact polystyrene), PP, ABS	Containers	None
7. Ice cream	IV	PS, ABS, HDPE, PET, PP and its copolymer, LDPE	Containers, Pouch	Laminated to cellophane, BOPP polyester, foil
		LLDPE, LDPE, HDPE, PP, Cellophane, PET	Cartons	Laminated to paper or board
Spice Powder				
1. Ground spices	IV	LLDPE, LDPE, HDPE, Ionomers, EAA, PP	Pouches	Laminated to cellophane, glassine, foil, Nylon-6, metallised polyester, BOPP

		PVC, HDPE, PP,PET ABS, HIPS, PS	Containers	None
Liquid, Semi-Liquid Products				
1. Honey	I	HDPE, PP, PVC, LLDPE, LDPE, PS, PET, HIPS	Containers	None
2. Pickles	VI	PVC, HDPE, PP, PET, Nylon-6, HIPS, PS, ABS	Containers	None (Discolouration of container is possible with pickles containing mustard, turmeric)
		LLDPE, LDPE, Ionomers EAA, PVdC, BOPP	Pouches	Laminated to foils, Nylon-6, BOPP, PS
3. Sauces, soups broths, vegetable puree or paste	II	Ionomers, EAA	Pouches	Laminated to foils metallised polyester
		PVC, HDPE, PP, PET, PS	Containers	None
4. Vinegar	II	PVC, HDPE, PP, PET, PS	Bottles	None
5. Jams and jellies	II	PVC, HDPE, PP, PET, PS	Bottles	None
		LLDPE, LDPE, Ionomers, EAA, BOPP, HDPE, PVdC	Bags, Pouches	As such and in laminated form
Miscellaneous Food Items				
1. Dried yeast	VII	LLDPE, LDPE, Ionomers, EAA, BOPP, HDPE, PVdC	Bags, Pouches	As such and in laminated form
2. Sugar, salt	VII	PVC, HDPE, PP, PET, PS	Containers	None
		LLDPE, LDPE, Ionomers, EAA, PVdC, BOPP	Bags	As such and in laminated form
3. Sugar syrups	I	PVC, HDPE, PP, PET, PS	Bottles	None
4. Murabba, molasses	I	PVC, HDPE, PP, PET, PS	Bottles	None
		LLDPE, LDPE, Ionomers EAA, BOPP, HDPE, PVdC	Bags, Pouches	As such and in laminated form
5. Pre-cooked	VII	Modified PPO	Containers	None

microwave oven food items				
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- 1) For all plastics listed in col (3), their recycled/ reprocessed versions for which standards and guidelines are notified by FSSAI may be used for food contact applications. Additionally, such recycled plastic materials shall conform to provisions and parameters of their relevant Indian Standard.
- 2) In addition to the illustrative forms of packaging listed in col (4), other appropriate plastic packaging forms may also be used.

ANNEX A

(Foreword)

List of Indian Standards on Plastics Suitable for use with Foodstuff

<i>IS No.</i>	<i>Title</i>
IS 9833 : 2018	List of colourants for use in plastics in contact with foodstuffs and pharmaceuticals (<i>second revision</i>)
IS 9845 : 1998	Determination of overall migration of constituents of plastics materials and articles intended to come in contact with foodstuffs - Method of analysis (<i>second revision</i>)
IS 16738 : 2018	Positive list of constituents for polypropylene, polyethylene and their copolymers for its safe use in contact with foodstuffs and pharmaceuticals
IS 10142 : 1999	Polystyrene (crystal and high impact) for its safe use in contact with foodstuffs, pharmaceuticals and drinking water – Specification (<i>first revision</i>)
IS 10146 : 1982	Specification for polyethylene for its safe use in contact with foodstuffs, pharmaceuticals and drinking water
IS 10148 : 2023	Positive list of constituents of polyvinyl chloride (PVC) and its copolymers in contact with foodstuffs, pharmaceuticals and drinking water(<i>first revision</i>)
IS 10149 : 1982	Positive list of constituents of polystyrene (crystal and high impact) in contact with foodstuffs, pharmaceuticals and drinking water
IS 10151 : 2019	Polyvinyl Chloride (PVC) and its copolymers for its safe use in contact with foodstuffs, pharmaceuticals and drinking water — Specification (<i>first revision</i>)
IS 10910 : 1984	Specification for polypropylene and its copolymers for its safe use in contact with foodstuffs, pharmaceuticals and drinking water
IS 11434 : 2023	Ionomers resins for its safe use in contact with foodstuffs, pharmaceuticals and drinking water — Specification (<i>first revision</i>)
IS 11435 : 2024	Positive list of constituents of ionomer resins for its safe use in contact with foodstuffs, pharmaceuticals and drinking water (<i>first revision</i>)
IS 11704 : 2023	Ethylene/acrylic acid (EAA) copolymers for its safe use in contact with foodstuffs, pharmaceuticals and drinking water (<i>first revision</i>)
IS 11705 : 2024	Positive list of constituents of ethylene/acrylic acid (EAA) copolymers for their safe use in contact with foodstuffs, pharmaceuticals and drinking water (<i>first revision</i>)
IS 12252 : 2017	Polyalkylene Terephthalates (PET and PBT), Their Copolymers and List of Constituents in Raw Materials and End Products for Their Safe Use in Contact with Foodstuffs and Pharmaceuticals (<i>first revision</i>)
IS 12247 : 2024	Nylon-6 polymer for its safe use in contact with foodstuffs, pharmaceuticals and drinking water (<i>first revision</i>)
IS 12248 : 1988	Positive list of constituents of nylon-6 polymer for its safe use in contact with foodstuffs, pharmaceuticals and drinking water
IS 13449 : 1992	Positive list of constituents of ethylene vinylacetate (EVA) copolymers in contact with foodstuffs, pharmaceuticals and drinking water

IS 13576 : 1992	Ethylene methacrylic acid (EMAA) copolymers and terpolymers for their safe use in contact with foodstuffs, pharmaceuticals and drinking water
IS 13577 : 1992	Positive list of constituents of ethylene methacrylic acid (EMAA) copolymers and terpolymers in contact with foodstuffs, pharmaceuticals and drinking water
IS 13601 : 1993	Ethylene vinyl acetate (EVA) copolymers for its safe use in contact with foodstuffs, pharmaceuticals and drinking water
IS 14534:2023	Plastics- Recovery and recycling of plastic waste- guidelines (<i>second revision</i>)

ANNEX B*(Foreword)***LIST OF COMMON PLASTICS RAW MATERIALS**

<i>Polymer Abbreviation</i>	<i>Full Form</i>
LLDPE	Linear Low Density Polyethylene
LDPE	Low Density Polyethylene
HDPE	High Density Polyethylene
PVC	Polyvinyl Chloride
PS	Polystyrene
PP	Polypropylene
PET	Polyethylene Terephthalate
PVdC	Polyvinylidene Chloride
PTFE	Polytetrafluoroethylene
modified PPO	Modified Polyphenylene Oxide
PC	Polycarbonate
EVA	Ethylene Vinyl Acetate
BOPP	Biaxially Oriented Polypropylene
ABS	Acrylonitrilebutadiene-Styrene
PW	Paraffin Wax
HIPS	High Impact Polystyrene
EAA	Ethylene Acrylic Acid
CA	Cellulose Acetate
COC	Cyclic Olefin Copolymer