

Appendix table 2. Requirements for plastic materials

Raw materials	Material test item and passing standard	Migration test			Note
		Solvent ⁽¹⁾	Migration condition	Item and passing standard	
Polyvinyl chloride [PVC]	Lead: Not more than 100 ppm. Cadmium: Not more than 100 ppm. Dibutyltin: Not more than 50 ppm (as dibutyltin dichloride) Cresyl phosphate: Not more than 1000 ppm. Vinyl chloride monomer: Not more than 1 ppm. Plasticizer ⁽³⁾ : Sum of the DEHP, DBP, BBP, DIDP, DINP, DMP, DNOP and DEP, shall not exceed 0.1%. (by mass)	Water	60°C for 30 min ⁽²⁾	Consumption of potassium permanganate: Not more than 10 ppm. Residues after evaporation: Not more than 30 ppm.	
		4 % Acetic acid	60°C for 30 min ⁽²⁾	Heavy metals: Not more than 1 ppm (as Pb); Residues after evaporation: Not more than 30 ppm.	
		n-Heptane	25°C for 1 hour.	Residues after evaporation: Not more than 150 ppm.	
		20 % Ethanol	60°C for 30 min.	Residues after evaporation: Not more than 30 ppm.	
Polyvinylidene dichloride [PVDC]	Lead: Not more than 100 ppm. Cadmium: Not more than 100 ppm. Barium: Not more than 100 ppm. Vinylidene-dichloride monomer: Not more than 6 ppm.	Water	60°C for 30 min ⁽²⁾	Consumption of potassium permanganate: Not more than 10 ppm. Residues after evaporation: Not more than 30 ppm.	
		4%Acetic acid	60°C for 30 min ⁽²⁾	Heavy metals: Not more than 1 ppm (as Pb); Residues after evaporation: Not more than 30 ppm.	
		n-Heptane	25°C for 1 hour.	Residues after evaporation: Not more than 30 ppm.	
		20 % Ethanol	60°C for 30 min.	Residues after evaporation: Not more than 30 ppm.	
Polyethylene [PE] and polypropylene [PP]	Lead: Not more than 100 ppm. Cadmium: Not more than 100 ppm.	Water	60°C for 30 min ⁽²⁾	Consumption of potassium permanganate: Not more than 10 ppm. Residues after evaporation: Not more than 30 ppm.	
		4%Acetic acid	60°C for 30 min ⁽²⁾	Heavy metals: Not more than 1 ppm (as Pb); Residues after evaporation: Not more than 30 ppm.	

		n-Heptane	25°C for 1 hour	Residues after evaporation: Not more than 30 ppm, 150 ppm for those products which are heated to not higher than 100°C during food processing and cooking.	
		20 % Ethanol	60°C for 30 min	Residues after evaporation: Not more than 30 ppm.	
Polystyrene [PS]	Lead: Not more than 100 ppm. Cadmium: Not more than 100 ppm. Volatile compounds (the sum of styrene, toluene, ethyl benzene, n-propyl benzene, and isopropyl benzene): Not more than 5000 ppm. Foaming polystyrene shall be not more than 2000 ppm, among which styrene and ethyl benzene shall not be more than 1000 ppm respectively.	Water	60°C for 30 min ⁽²⁾	Consumption of potassium permanganate: Not more than 10 ppm. Residues after evaporation: Not more than 30 ppm.	Tableware made of polystyrene are not suitable for filling foods at a temperature higher than 100°C.
		4% Acetic acid	60°C for 30 min ⁽²⁾	Heavy metals: Not more than 1 ppm (as Pb); Residues after evaporation: Not more than 30 ppm.	
		n-Heptane	25°C for 1 hour.	Residues after evaporation: Not more than 240 ppm.	
		20 % Ethanol	60°C for 30 min.	Residues after evaporation: Not more than 30 ppm.	
Poly(ethylene terephthalate) [PET]	Lead: Not more than 100 ppm. Cadmium: Not more than 100 ppm.	Water	60°C for 30 min ⁽²⁾	Consumption of potassium permanganate: Not more than 10 ppm. Residues after evaporation: Not more than 30 ppm.	
		4% Acetic acid	60°C for 30 min ⁽²⁾	Heavy metals: Not more than 1 ppm (as Pb); Antimony: Not more than 0.05 ppm. Germanium: Not more than 0.1 ppm. Residues after evaporation: Not more than 30 ppm.	
		n-Heptane	25°C for 1 hour	Residues after evaporation: Not more than 30 ppm.	
		20 % Ethanol	60°C for 30 min	Residues after evaporation: Not more than 30 ppm.	
Plastics with	Lead: Not more than 100 ppm.	Water	60°C for 30 min ⁽²⁾	Phenol: Negative Formaldehyde: Negative.	

formaldehyde as raw material for synthesis	Cadmium: Not more than 100 ppm.	4% Acetic acid	60°C for 30 min ⁽²⁾	Residues after evaporation: Not more than 30 ppm.	
Plastics with formaldehyde-melamine as raw material for synthesis	Lead: Not more than 100 ppm. Cadmium: Not more than 100 ppm.	Water	60°C for 30 min ⁽²⁾	Phenol: Negative. Formaldehyde: Negative.	
		4% Acetic acid	60°C for 30 min ⁽²⁾	Residues after evaporation: Not more than 30 ppm.	
		4% Acetic acid	95°C for 30 min	Melamine: Not more than 2.5 ppm.	
Poly (methyl methacrylate) [PMMA]	Lead: Not more than 100 ppm. Cadmium: Not more than 100 ppm.	Water	60°C for 30 min ⁽²⁾	Consumption of potassium permanganate: Not more than 10 ppm. Residues after evaporation: Not more than 30 ppm.	
		4% Acetic acid	60°C for 30 min ⁽²⁾	Heavy metals: Not more than 1 ppm (as Pb); Residues after evaporation: Not more than 30 ppm.	
		n-Heptane	25°C for 1 hour	Residues after evaporation: Not more than 30 ppm.	
		20 % Ethanol	60°C for 30 min	Residues after evaporation: Not more than 30 ppm. Methyl-methacrylate monomer: Not more than 15 ppm.	
Polyamide [PA, Nylon]	Lead: Not more than 100 ppm. Cadmium: Not more than 100 ppm.	Water	60°C for 30 min ⁽²⁾	Consumption of potassium permanganate: Not more than 10 ppm. Residues after evaporation: Not more than 30 ppm.	
		4% Acetic acid	60°C for 30 min ⁽²⁾	Heavy metals: Not more than 1 ppm (as Pb); Residues after evaporation: Not more than 30 ppm.	
		n-Heptane	25°C for 1 hour	Residues after evaporation: Not more than 30 ppm.	
		20 % Ethanol	60°C for 30 min	Residues after evaporation: Not more than 30 ppm. Caprolactam monomer: Not more than 15 ppm.	
Polymethyl pentene [PMP]	Lead: Not more than 100 ppm. Cadmium: Not more than 100 ppm.	Water	60°C for 30 min ⁽²⁾	Consumption of potassium permanganate: Not more than 10 ppm. Residues after evaporation: Not more than 30 ppm.	
		4% Acetic acid	60°C for 30 min ⁽²⁾	Heavy metals: Not more than 1 ppm (as Pb); Residues after evaporation: Not more than 30 ppm.	

		n-Heptane	25°C for 1 hour	Residues after evaporation: Not more than 120 ppm.	
		20 % Ethanol	60°C for 30 min.	Residues after evaporation: Not more than 30 ppm.	
Rubber-except milk feeders for babies	Lead: Not more than 100 ppm. Cadmium: Not more than 100 ppm. 2-Mercaptoimidazole: Negative.	Water	60°C for 30 min ⁽²⁾	Phenol: Not more than 5 ppm. Formaldehyde: Negative. Residues after evaporation: Not more than 60 ppm.	
		4% Acetic acid	60°C for 30 min ⁽²⁾	zinc: Not more than 15 ppm. Heavy metals: Not more than 1 ppm (as Pb)	
		20 % Ethanol	60°C for 30 min	Residues after evaporation: Not more than 60 ppm.	
Rubber-milk feeders for babies	Lead: Not more than 100 ppm. Cadmium: Not more than 100 ppm.	Water	40°C for 24 hours	Phenol: Not more than 5 ppm. Formaldehyde: Negative. Residues after evaporation: Not more than 40 ppm. zinc: Not more than 1 ppm.	
		4% Acetic acid	40°C for 24 hours	Heavy metals: Not more than 1 ppm (as Pb)	
Polycarbonate [PC]	Lead: Not more than 100 ppm. Cadmium: Not more than 100 ppm.	Water	95°C for 30 min	Consumption of potassium permanganate: Not more than 10 ppm. Residues after evaporation: Not more than 30 ppm. Bisphenol A (except feeding bottle): Not more than 0.6 ppm.	
		4% Acetic acid	60°C for 30 min	Heavy metals: Not more than 1 ppm (as Pb); Residues after evaporation: Not more than 30 ppm. Bisphenol A (except feeding bottle): Not more than 0.6 ppm.	
Polyphenyl sulfone [PPSU]-feeding bottle	Lead: Not more than 100 ppm. Cadmium: Not more than 100 ppm.	Water	95°C for 30 min	Consumption of potassium permanganate: Not more than 10 ppm. Residues after evaporation: Not more than 30 ppm.	
		4% Acetic acid	60°C for 30 min	Heavy metals: Not more than 1 ppm (as Pb); Residues after evaporation: Not more than 30 ppm.	
Polyethersulfone [PES]-feeding bottle	Lead: Not more than 100 ppm. Cadmium: Not more than 100 ppm.	Water	95°C for 30 min	Consumption of potassium permanganate: Not more than 10 ppm. Residues after evaporation: Not more than 30 ppm.	

		4% Acetic acid	60°C for 30 min	Heavy metals: Not more than 1 ppm (as Pb); Residues after evaporation: Not more than 30 ppm.	
Polylactic acid [PLA]	Lead: Not more than 100 ppm. Cadmium: Not more than 100 ppm.	Water	50°C for 4 hr (60°C for 30 min for those products which are heated to higher than 50°C during food processing or cooking, or use the composite material of PLA.)	Consumption of potassium permanganate: Not more than 10 ppm. Residues after evaporation: Not more than 30 ppm. Total of lactic acid: Not more than 30 ppm.	Food utensils, containers and packages made of polylactic acid are not used for high temperature sterilization during food processing or cooking and are not suitable for filling foods at a temperature higher than 100°C.
		4% Acetic acid		Heavy metals: Not more than 1 ppm (as Pb); Residues after evaporation: Not more than 30 ppm.	
		20 % Ethanol		Residues after evaporation: Not more than 30 ppm.	
		n-Heptane	25°C for 1 hour	Residues after evaporation: Not more than 30 ppm.	

(1) The simulation objects of each solvent are described as follow:

- Water: simulate the contact with foods containing $\text{PH} > 5$.
- 4% Acetic acid: simulate the contact with foods containing $\text{PH} \leq 5$.
- n-Heptane: simulate the contact with foods containing surface oils or oils and fatty foods.
- 20% Ethanol: simulate contact foods containing alcohol.

(2) The products which are heated to higher than 100°C during food processing or cooking, the migration condition shall set 95°C for 30 min.

(3) Abbreviation table of plasticizers:

Abbreviations	English name
DEHP	Di(2-ethylhexyl) phthalate
DBP	Dibutyl phthalate
BBP	Benzyl butyl phthalate
DIDP	Di-isodecyl phthalate
DINP	Di-isononyl phthalate
DMP	Dimethyl phthalate
DNOP	Di-n-octyl phthalate
DEP	Diethyl phthalate