

# PLASTIC WASTE AND Y48 EXEMPTIONS: CURED RESINS, CONDENSATION PRODUCTS, AND FLUOROPOLYMERS DO NOT MEET THE CRITERIA

## BACKGROUND

The listing of plastic wastes as Y48 in annex II of the Basel Convention includes exemptions for a range of plastics “provided it is destined for recycling in an environmentally sound manner and almost free from contamination and other types of wastes”.

There are significant questions about the ability of some of these exempted plastics to be recycled in an environmentally sound manner, free from contamination and other types of wastes. This fact sheet aims to provide further insights into the feasibility of cured resins, condensation products and fluoropolymers to meet these criteria.

## CURED RESINS

Cured resins are thermoset plastics polymers formed by cross-linking polymer chains (see UNEP/CHW.15/6/Add.7).

Type of cured resin	Examples of common uses
Urea Formaldehyde (UF) resin	Adhesives in particle board (PB), medium density fibreboard (MDF) and plywood used in the construction industry
Phenol Formaldehyde (PF) resins	Glues and adhesives in the paint and varnish, decorative laminate, rubber, aircraft, aerospace, boating, shoe, artificial nail, leather and electronic industries.
Melamine Formaldehyde (MF) resins	Plastics used to produce kitcheware, flooring and decorative laminates, and as flame- and water-resistant paper and textile coatings.
Epoxy resins	Adhesives in the construction of aircrafts, automobiles, bicycles, boats, and skis. Also used in anticorrosion coatings, as insulators in the electronics industry and in industrial tooling applications to produce molds, master models, laminates, castings, fixtures, and other industrial production aids.
Alkyd resins	Binders in paints and other coatings

### *Can cured resins meet the exemption criteria?*

Cured resins are thermosets, which means that they cannot be reprocessed through heat-melting. They are also mostly used as integral parts of products, which means that they are not free “from contamination and other types of waste”. They therefore do not meet the exemption criteria in the Y48 listing.

## CONDENSATION PRODUCTS

Condensation products are thermoset plastics formed by the removal of water or alcohol during polymerization (see UNEP/CHW.15/6/Add.7). Examples of such polymers are Polyamides and Polyesters. Polyamide 6 and polyamide 6.6 account for the majority of the commercial polyamide production.

Type of condensation product	Examples of common uses
Polyamides	Polyamides are used as fibers in the textile industry, and to produce e.g. toothbrushes, ropes, and technical parts of vehicles and gears
Polyesters	Polyesters are used for coatings, adhesives, clear casting, buttons, body fillers, work-surfaces, road drainage, cladding panels, sheeting, roofing tiles, pipes, bathroom furniture, such as baths and shower trays, fibre reinforced plastics and filled plastic products, including sanitary-ware, tanks, pipes, gratings as well as high-performance components for the marine and transportation industry, such as closure and body panels, fenders and boat hulls/decks

### *Can condensation products meet the exemption criteria?*

Condensation products are thermosets. Like other thermosets, they cannot be remolded in other products by heat-melt method. They therefore do not meet the exemption criteria on recycling in the Y48 listing.

## FLUOROPOLYMERS

Fluoropolymers are solid materials that consists of a carbon-backbone with fluorine atoms bound to the carbon atoms.

Type of fluoropolymer	Examples of common uses
Fluorinated ethylene propylene (FEP)	Liner in piping and valves in contact with corrosive chemicals, cable insulation.
Polyvinylfluoride (PVF)	Laminated to wood, paper, plastic, rubber or metal used to coat e.g. aircraft interiors, solar panels, metal surfaces, wall coverings, residential and commercial roofing.
Polyvinylidene fluoride (PVDF)	Insulation on electrical wires, pipes and fittings. It is also one of the most commonly used fluoropolymers used in lithium ion batteries.
Perfluoroalkoxy Alkanes (PFA and MFA)	Materials for piping and fittings in contact with corrosive chemicals, as well as corrosion-resistant lining of vessels in the chemical-processing industry. Also used in plastic labware.
Polytetrafluoroethylene (PTFE)	It is used in many types of consumer products such as non-stick coatings in cookware, waterproof fabrics, lubricants, stain protection of carpets, etc. Also used in the chemical industry in reactor vessels, storage tanks, valves and pump fittings.

### Can fluoropolymers meet the exemption criteria?

Several types of fluoropolymers are thermoplastics, i.e. the material can be re-melted and reprocessed. This includes FEP, PVF, PVDF and PFA. However, these polymers are typically used in applications where they become an integral part of the product, which means that they are not free “from contamination and other types of waste”. Post-use products containing fluoropolymers therefore do not meet the exemption criteria in the Y48 listing.

Currently some scrap generated during production of the thermoplastic fluoropolymers is recycled, including small quantities of some polymers that do not meet specifications and cannot be used in the intended applications. This means that some production waste can meet the Y48 criteria. However, the small quantities of polymers that are relevant are typically recycled in-house and do not warrant an exemption under the Basel Convention.

It should be noted that PTFE was not included in the exemption of the Y48 listing and transboundary movement of all PTFE waste is required to follow the Prior Informed

Consent procedure. PTFE cannot be mechanically recycled through heat-processing and is in most cases used as integral parts of products, **which means that they are not free “from contamination and other types of waste”**. Therefore, PTFE does not meet the criteria in the Y48 listing and does not qualify for exemptions.

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