SEPA Guidance

Classification of WEEE – Hazardous Substances and Persistent Organic Pollutants (POPs)

Background

Waste Electrical and Electronic Equipment (WEEE), that is, fridges, computers, mobile phones and televisions etc., is a growing waste stream, and depending on the individual item, it can be a complex mixture of materials and components containing hazardous substances including Persistent Organic Pollutants (POPs).

If the levels of hazardous substances or POPs are over a certain limit the item will be hazardous waste or hazardous POPs waste, which if not properly managed, can cause major environmental and health problems.

Please Note that unless proven otherwise, for example, by chemical analysis, SEPA expects that the majority of WEEE should already be classified and consigned as special waste due to the presence of hazardous substances and/or including POPs.

In the absence of such an assessment, a precautionary classification of 'hazardous waste and POP waste' status should be adopted.

Purpose of Guidance

This guidance will support waste holders in classifying and assessing their waste and help ensure that it is managed in an appropriate manner.

Please Note, however, that it is the responsibility of the waste holder to assess and classify their waste, including choosing an appropriate 6 digit LoW code, in the first instance.

To support the classification and assessment process, Appendix I, to this guidance, details the relevant threshold concentrations for the current list of POPs, additionally, Appendix II, to this guidance, details the relevant Toxic Equivalency Factors (TEFs) for Polychlorinated dibenzodioxins (PCDDs) and Polychlorinated dibenzofurans (PCDFs) and advice on assessing wastes contaminated with PCDDs and PCDFs.

Further guidance on classifying and assessing WEEE, including POPs contaminated WEEE, can be found at the following links, please note that these documents should be read in conjunction with this and other SEPA guidance:

- Waste Classification - Guidance on the classification and assessment of waste (Edition 1.1) Technical Guidance WM3**:**
https://www.sepa.org.uk/media/591437/gb-waste-classification-technical-guidance-wm3-draft-update-20210427-1.pdf
- Gov.UK **–** Identify and dispose of waste containing persistent organic pollutants:
https://www.gov.uk/guidance/dispose-of-waste-containing-persistent-organic-pollutants-pops
- An assessment of the levels of POPs in WEEE (ICER report):
https://icer.org.uk/research/

Persistent Organic Pollutants (POPs)

What are Persistent Organic Pollutants?

Persistent Organic Pollutants are organic chemical substances which pose a risk to human health and the environment due to their persistence in the environment, bioaccumulation through the food chain and long range environmental transport across a wide geographical range.

POPs fall into three broad categories

- Pesticides
- Industrial Chemicals
- Unintentional by-products of combustion and some industrial and non-industrial processes.

Globally there is concern at the continuing release of POPs into the environment and for many years the international community has called for actions to reduce and eliminate their production, use and release. The Stockholm Convention was developed to address these concerns and protect human health and the environment.

The Stockholm Convention

The Stockholm Convention1 aims to reduce or eliminate the release of Persistent Organic Pollutants (POPs) and any wastes containing POPs should be disposed of in such a way that the POP content is destroyed or irreversibly transformed.

The presence of POPs in a waste affects the legal requirements that apply to how that waste is managed for example, segregation, treatment, disposal and export.

There are currently 30 POPs listed in the convention[2]. These POPs are subject to varying controls detailed in Annexes A, B and C to the convention which can be summarised as follows:

- Annex A - Parties must take measures to eliminate the production and use of the chemicals listed under this Annex.
- Annex B - Parties must take measures to restrict the production and use of the chemicals listed under Annex B in light of any applicable acceptable purposes and/or specific exemptions listed in the Annex.
- Annex C - Parties must take measures to reduce the unintentional releases of chemicals listed under Annex C with the goal of continuing minimization and, where feasible, ultimate elimination.

When you must destroy POPs in waste

If POPs are present in a waste above certain concentrations limits (a POPs Waste) the POPs in that waste must be destroyed.

If you treat POPs waste and the treatment does not reliably destroy the POPs, any waste that results from the treatment, and contains these POPs, is also POPs waste. You must destroy the POPs in this treated waste even if the concentration is below the limits in this table. Dilution is not permitted.

How to destroy the POP content of your waste

You must make sure you send your waste to a suitably authorised disposal or recovery site that can completely destroy POPs or irreversibly transform them using one of the following methods:

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[1] http://www.pops.int/

[2] This information is up to date at the time of publication.

- D9 – physico-chemical treatment, such as chemical destruction
- D10 – incineration on land
- R1 – using the waste as a fuel or other means to generate energy some other way (not for material containing PCBs)
- R4 – recycling or reclamation of metals and metal compounds, under the conditions set out in Annex V Part 1 of the POPs regulations

https://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX:32019R1021

The appropriate method to use will be based on:

- the properties of the POP
- the type of waste containing the POP
- other chemicals or material present in the waste

Your legal obligations regarding WEEE and POPs

This guidance document can help you in assessing your waste, however, as the waste holder, it is your responsibility to assess and classify your waste properly.

If you produce, collect or receive waste electrical and electronic equipment (WEEE), it is your duty to know if your waste material contains or could contain hazardous substances, including POPs. If you receive waste, you should check that the previous holder has classified and described the waste correctly, for example, it has been done in accordance with WM3.

Due to the additional requirements for managing POPs content it is important that you consider the presence of POPs in the waste.

If you are not sure you can:

- ask the suppliers or manufacturers of the material or article for details of the POPs that could be present
- test the material yourself to find out the concentration of any POPs in it
- get the material analysed by a laboratory for POPs content

If you treat an item of WEEE that has not been assessed to determine if it is POPs waste, you should manage the device and treatment outputs as POPs waste as a precaution, unless and until you have ascertained the item is POPs free.

If you have assessed your waste and are still not sure if a WEEE item is POPs waste, you should manage it as POPs waste.

Guidance on the specific details of the requirements as they apply to WEEE are detailed below.

The classification and description of WEEE

The guidance below will help waste holders classify their waste in accordance with the current classification/assessment framework and help ensure that it is managed in an appropriate manner reflecting its status, as a hazardous or non-hazardous waste, and any hazardous chemicals/substances present.

Please Note, however, that it is the responsibility of the waste holder to assess and classify their waste, including choosing an appropriate 6 digit LoW code, in the first instance. Unless proven otherwise, for example, by chemical analysis, SEPA expects that the majority of WEEE should already be classified and consigned as special waste due to the presence of hazardous substances and/or including POPs.

Duty of Care for Waste

Section 34 of the Environmental Protection Act 1990 (as amended) lays out a number of duties which aim to ensure that waste is managed correctly, for example:
Waste should be stored properly:

- You should only only transfer waste to an appropriate persons
- You should ensure that when transferred it is sufficiently well described to enable its safe recovery or disposal without harming the environment.
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When transferring your waste, you must classify your waste and use the appropriate paperwork, i.e. Waste Transfer Note (WTN) for non-hazardous waste and Special Waste Consignment Note (SWCN) for hazardous waste.

In the WTN or SWCN you must, amongst other things, use an appropriate 6 digit code, as detailed in the List of Waste (LoW) and provide accurate written description. It is the chemical makeup of waste that determines the LoW code and waste status.

To enable you to assign an appropriate classification to an item of WEEE you must undertake an assessment of the chemicals (substances and mixtures) present. This assessment will determine whether you assign a hazardous or non-hazardous code.

You will find further guidance on the waste classification process in the joint UK Environment Agency Technical Document:

Guidance on the classification and assessment of waste (1st Edition v1.1.GB) Technical Guidance WM3[3].

Please Note that, if you produce, carry, deal, broker or receive a waste you must check that it is correctly classified. Where any waste is classified or described in a manner inconsistent with this guidance, you should expect to be asked for the supporting assessment.

Classification of common types of WEEE

Unless proven otherwise, for example, by chemical analysis, SEPA expects that the majority of WEEE should already be classified and consigned as special waste due to the presence of hazardous substances and/or including POPs. In the absence of such an assessment, a precautionary classification of 'hazardous waste and POP waste' status should be adopted.
It is the responsibility of the waste holder to assess and classify their waste appropriately and you should consider the presence of other Hazardous Substances.

In Appendix III you will find 'classification notes' which accompany some of the classification tables below. Appendix III should be viewed as being supplementary to your existing classification and assessment process. The substances referenced in Appendix III have been highlighted in a recent industry report[4] as being likely to be present in WEEE however it is not an exhaustive indication of the hazardous substances that may be present in WEEE and you should consider the presence of other hazardous substances.

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3 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/948735/Waste_classification_technical_guidance_WM3.pdf

4 https://icer.org.uk/research/

Televisions, computer monitors and other display devices:

Components such as screens, circuit boards, batteries or any plastic parts may contain hazardous chemicals or POPs.

	Waste status	Household	Industrial or commercial
Cathode ray tube (CRT), flat-screen (plasma,LCD, etc.) containing POPs	Hazardous/POPs	20-01-35*	16-02-13*

(*) An asterisk at the end of a code means the waste is hazardous.

Fridges, freezers, chillers and air-conditioning units:

Components such as circuit boards, motors and any plastic parts may contain hazardous chemicals or POPs

Coolants and foam may also be hazardous. Usually there is not enough POPs for the item to be classified as POPs waste, however this should not be assumed, and checks to verify are required.

	Waste status	Household	Industrial or commercial
Containing ozone-depleting substances as foam blowing agents or coolants	Hazardous/non-POPs	20-01-23*	16-02-11*
Other	Hazardous/non-POPs	20-01-35*	16-02-13*

(*) An asterisk at the end of a code means the waste is hazardous.

Large domestic appliances (LDA): white goods (washing machines, tumble driers, dishwashers and cookers)

Components such as circuit boards, motors or any plastic parts may contain hazardous chemicals or POPs. Usually there is not enough for the item to be classified as hazardous or POPs waste. For the purposes of this guidance Microwaves, heaters and fans are not considered to be a LDA and should be classified in accordance with the small mixed WEEE section below.

Please note that some tumble driers known as ‘heat pump’ tumble driers contain refrigerant (R134a or F-gas). They are therefore hazardous waste and should be coding using EWC 200135*. Heat pump tumble driers must be stored with fridges and sent to a fridge treatment plant. All other tumble driers can continue to go with LDA.

	Waste status	Household	Industrial or commercial
Large domestic appliances: white goods	Non-hazardous/non-POPs	20-01-36	16-02-14

Small mixed WEEE

These are small household-type electrical items collected from homes or businesses. Components such as screens, circuit boards, batteries or any plastic parts may contain hazardous chemicals or POPs.

	Waste status	Household	Industrial or commercial
Small mixed WEEE containing POPs	Hazardous/POPs	20-01-35*	n/a

(*) An asterisk at the end of a code means the waste is hazardous.

Other household-type electrical items from homes or businesses

These are waste electrical items collected from households or businesses that are not already listed and are separated from small mixed WEEE.

Components such as screens, circuit boards, batteries or any plastic parts may contain hazardous chemicals or POPs.

	Waste status	Household	Industrial or commercial
Cat 1: Large household appliances (other than LDA white goods) containing POPs	Hazardous/POPs	20-01-35*	n/a
Cat 2: Small household appliances containing POPs	Hazardous/POPs	20-01-35*	n/a
Cat 3: IT and telecommunication equipment containing POPs	Hazardous/POPs	20-01-35*	n/a
Cat 4: Consumer equipment containing POPs	Hazardous/POPs	20-01-35*	n/a
Cat 5: Lighting equipment containing POPs	Hazardous/POPs	20-01-35*	n/a
Cat 6: Electronic and electrical tools containing POPs	Hazardous/POPs	20-01-35*	n/a
Cat 7: Toys, leisure and sporting equipment containing POPs	Hazardous/POPs	20-01-35*	n/a

(*) An asterisk at the end of a code means the waste is hazardous.

Cats 1, 2, 3, 6 & 7	POPs Waste & Hazardous Waste
Cats 4 & 5	POPs Waste & Hazardous Waste unless proven otherwise.
Cats 8, 9 & 10	We advise the waste holders undertake an assessment of these streams to determine correct classification status. In the absence of reliable evidence a precautionary approach should be adopted i.e. POPs Waste and Hazardous Waste.

Lightbulbs and lamps

Components such as circuit boards, plastic parts or casings may contain POPs and hazardous chemicals, such as flame retardants.

You must check the levels of hazardous substances and POPs in the bulbs before you can classify the waste.

	Waste status	Household	Industrial or commercial
Fluorescent tubes and low energy - excluding LED and other gas-discharge lamps	Hazardous	20-01-21*	16-02-13*

LED, halogen and incandescent containing POPs	Hazardous/POPs	20-01-35*	16-02-13*
LED, halogen and incandescent not containing hazardous components	Non-hazardous	20-01-36	16-02-14

(*) An asterisk at the end of a code means the waste is hazardous.

Batteries

	Waste status	Household	Industrial or commercial
Lead acid (vehicle)	Hazardous	16-06-01*	16-06-01*
Lead acid (other)	Hazardous	20-01-33*	16-06-01*
Nickel-Cadmium	Hazardous	20-01-33*	16-06-02*
Mercury containing	Hazardous	20-01-33*	16-06-03*
Alkaline	Non-hazardous	20-01-34	16-06-04
Other - Lithium or Lithium ion	Non-hazardous	20-01-34	16-06-05
Mixed household-type batteries - separately collected	Hazardous	20-01-33*	Not allowed

(*) An asterisk at the end of a code means the waste is hazardous.

When POPs affect the outputs from WEEE treatment

Where an item of WEEE is POPs waste, you must destroy or irreversibly transform the POPs. If you treat an item of WEEE containing POPs, unless the process destroys the POPs, the post-treatment output will still contain POPs and the outputs are classed as POPs waste. This applies even if the treatment has diluted the level of POPs, in the waste mass, to below the concentration limit

If you know the WEEE item is not POPs waste, it may still contain low levels of POPs. Therefore separating materials during treatment may result in increased concentrations of POPs in segregated outputs that contain plastics, cable or printed circuit boards. These segregated streams are POPs waste if the level of POPs, in the waste mass, is above the concentration limit. You must assess the concentration of POPs in these wastes or manage it as POPs waste. Therefore, assessment of waste items/articles is not an activity undertaken once only during the waste collection and treatment process, but may be required at several stages.

Further guidance on identifying, classifying and disposing of POPs waste can be found at the following link:
https://www.gov.uk/guidance/dispose-of-waste-containing-persistent-organic-pollutants-pops

Wastes from treating WEEE and WEEE components

If you treat an item of WEEE that has not been assessed to determine if it is POPs waste, you should manage the device and treatment outputs as POPs waste as a precaution.
If you have assessed your waste and are still not sure if a WEEE item is POPs waste, you should manage it as POPs waste.

Here is some advice on how to classify some:

- components removed from WEEE before or after treatment
- plastic containing wastes produced by the WEEE treatment

- We have not provided advice on all waste streams from WEEE treatment.

If you receive waste from another person, you should check that it is classified and described correctly. You must identify if any item of WEEE is POPs waste before you treat it.

Printed circuit boards

We expect printed circuit boards to contain levels of POPs, hazardous brominated flame retardants and antimony trioxide above concentration limits. Nickel may also be present.
This advice also applies to printed circuit boards removed or separated during waste treatment.
Use this code to classify the waste.

Waste type	Waste status	Household type	Industrial or commercial
Printed circuit boards	Hazardous/POPs	Does not apply	16 02 15*

(*) An asterisk at the end of a code means the waste is hazardous.

Cables and granulated cable plastics

We expect internal and external cables and wiring to contain levels of POPs, hazardous brominated flame retardants, antimony trioxide, plasticisers, and other chemicals above concentration limits.

This advice also applies to cables or wiring removed from devices or separated during waste treatment.

Use these codes to classify the waste.

Waste type	Waste status	Household type	Industrial or commercial
Cables from WEEE	Hazardous/POPs	Does not apply	16 02 15*
Cable plastics from WEEE	Non-hazardous/POPs	Does not apply	19 12 04

(*) An asterisk at the end of a code means the waste is hazardous.

Use 19 12 04 to classify waste granulated cable plastics, from which copper and other non-plastic materials have been removed.

If the cable plastics contain non-plastic materials, like copper, the waste is mixed. You must also check the concentration of hazardous chemicals and use the appropriate 19 12 11* or 19 12 12 code instead of 19 12 04.

Plastic cases removed from display devices

Plastic cases from display devices, including both flat panel displays and cathode ray tubes, will contain hazardous chemicals and POPs above concentration limits. These are hazardous and POPs waste.

This advice also applies to compact, baled or shredded plastics from display devices.

Use this code to classify the waste.

Waste type	Waste status	Household type	Industrial or commercial

Plastics from display devices	Hazardous/POPs	Does not apply	16-02-15*

(*) An asterisk at the end of a code means the waste is hazardous.

Mixed wastes, containing plastic from the treatment of WEEE devices that are hazardous and POPs waste

This waste type, which includes wastes produced from treating devices that are hazardous and POPs waste, remains a hazardous and POPs waste.

An example of a hazardous and POPs waste is mixed waste from treating small mixed WEEE. This is because it contains the contaminated plastics.

Waste type	Waste status	Household type	Industrial or commercial
Mixed waste from treating WEEE containing hazardous components and POPs	Hazardous/POPs	Does not apply	19-02-04*

(*) An asterisk at the end of a code means the waste is hazardous.

Plastic wastes from treating fridges and freezers

Fridges and freezers have plastic components containing POPs, hazardous flame retardants and antimony trioxide. These will be present in the treated waste.

You must check the concentration of POPs in the plastic to determine if the waste is POPs waste. Use these codes to classify pure plastic fractions from treating fridges and freezers.

Waste type	Waste status	Household type	Industrial or commercial
Plastics from treating fridges and freezers containing POPs	Non-hazardous/POPs	Does not apply	19-12-04
Plastics from treating fridges and freezers not containing POPs	Non-hazardous/non-POPs	Does not apply	19-12-04

(*) An asterisk at the end of a code means the waste is hazardous.

If your plastic fraction contains other materials like foam or cable it is a mixed waste. You must also check the concentration of hazardous chemicals and use the appropriate 19 12 11* or 19 12 12 code instead of 19 12 04.

Plastic containing residues from treating certain large domestic appliances (LDA)

White goods like household type washing machines, tumble driers, dishwashers and cookers are not hazardous or POPs waste.

However they include plastic components and printed circuit boards which may contain POPs, hazardous flame retardants, and antimony trioxide. The concentration of these chemicals may be increased in the treatment outputs that contain these components.

You must check the concentration of hazardous chemicals and POPs in these treatment residues to determine if the waste is hazardous or POPs waste.

The code you select will also depend on the process you use to produce the waste and the output from that. Here are some examples.

Waste type	Waste status	Household type	Industrial or commercial
Metal shredding light fraction containing POPs and hazardous chemicals	Hazardous/POPs	Does not apply	19 10 03*
Metal shredding light fraction not containing POPs and hazardous chemicals	Non-hazardous	Does not apply	19 10 04

(*) An asterisk at the end of a code means the waste is hazardous.

If other types of devices are present in the LDA waste stream, you should remove those that are hazardous or POPs waste before processing. If you process a WEEE device that is POPs waste, the outputs containing those POPs will remain POPs waste – even if diluted below concentration limits by the treatment process.

Wastes from treating outputs from other WEEE treatments by density separation

There are currently no density separation plants operating in Scotland. Density separation treatment is used to separate plastics containing brominated flame retardants (including hazardous chemicals and POPs) from uncontaminated plastics. The brominated (heavy) fraction is POPs waste.

Further advice can be sought from the appropriate regulator for the density separation plant. For England, the regulator is the Environment Agency and advice is available here: https://www.gov.uk/guidance/classify-some-waste-electrical-devices-components-and-wastes-from-their-treatment

Mixed batteries from treating WEEE

See the guidance above for the codes you can use for batteries.

You must give the appropriate 16 06 XX code(s) for each type of battery present.

You must not use the 20 01 33* code for separately collected municipal fractions of mixed batteries for batteries you have separated during waste treatment.

Hazardous Waste Controls

Wastes classified as Special Waste (as indicated in the Table above) are subject to specific waste controls within Scotland:

- the movement of Special Waste must be accompanied by a Special Waste Consignment Note;
- records must be kept by all parties;
- a site (permitted or exempt) receiving them must:

i) report waste data to SEPA on a quarterly or annual basis as specified in their licence, permit or the terms of the exemption;
ii) reject any waste arriving without a consignment note, and report this to SEPA;
iii) be authorised to accept the waste.

Only the initial movement of WEEE from a domestic household to its first destination (for example to a household waste recycling centre - HWRC) is exempt from these controls. Subsequent movements, for example collections from HWRCs, are not exempt.

In Scotland, the Special Waste Regulations 1996 set out procedures to be followed when disposing of, carrying and receiving special waste.

Further information on regulations and other requirements relating to the management of special waste, such as classification and assessment, can be found on SEPA's website:

https://www.sepa.org.uk/regulations/waste/special-waste/
Further guidance on how to consign special waste can be found in the SEPA guidance document 'Consigning Special Waste':

https://www.sepa.org.uk/media/36660/consigning_special_waste_guidance.pdf

Management of waste containing Persistent Organic Pollutants (POPs)

The waste management of WEEE devices containing levels of POPs that are above legal limits is controlled by the Persistent Organic Pollutants Regulations 2007.

The POPs present in the plastics of waste display devices,small mixed WEEE, cables and printed circuit boards must be destroyed (or irreversibly transformed). Recycling these plastics is prohibited.

In practice, this means the plastics containing the POPs must be destroyed by incineration (or potentially other high temperature processes like a cement kiln). Bromine separation technologies may be used to separate these POP containing plastics from other plastics and wastes. The latter may then be suitable for recycling.

Further information on the requirements for POPs can be found on gov.uk:

https://www.gov.uk/guidance/dispose-of-waste-containing-persistent-organic-pollutants-pops

Please note that this website is managed by the Environment Agency and although the content is relevant to the UK, please contact SEPA if you require further assistance.

Export of Waste

The export of the waste from Scotland, to outside the UK, is always subject to notification controls under the Transfrontier Shipment of Waste Regulations 2007. Further information can be found on the SEPA website:

https://www.sepa.org.uk/regulations/waste/transfrontier-shipment-of-waste/

You must apply to the SEPA to obtain consent to export the waste. You must not move wastes containing POPs under 'green list' controls.

The fact that a waste containers POPs severely restricts both destination countries and waste management options.

These wastes can however be notified for export to the OECD (Organisation for Economic Co-operation and Development) for incineration with energy recovery. This may include pre-treatment using bromine separation techniques to separate the contaminated plastics which must be destroyed from the uncontaminated plastics that could then be recycled.

With respect to other destinations and waste management options:

Export to non-OECD countries is prohibited. A list of the 36 OECD countries is available at:
https://www.oecd.org/about/members-and-partners/

Export for disposal is prohibited to OECD countries that are not EU/EFTA countries, and restricted to EU/EFTA countries.

Export for recovery will be allowedprovided it can be demonstrated by the applicant that POP's will be separated from non POP's and then the POP's fraction is incinerated at a suitable facility that export for recycling should be permitted.

Please to contact the transfrontier@sepa.org.uk mailbox if you wish to discuss in more detail. with the exception of destructive technologies like incineration with energy recovery, is prohibited for waste containing POPs.

Imports of this waste are also subject to Notification controls and disposal is normally prohibited.

Appendix I

POPs Concentration limit table

Persistent organic pollutant (POP)	Concentration threshold
Aldrin	50 mg per kg
Alkanes C10 – C13, chloro (short-chain chlorinated parafins) (SCCPs)	10,000 mg per kg
Chlordane	50 mg per kg
Dieldrin	50 mg per kg
Endosulfan	50 mg per kg
Endrin	50 mg per kg
Heptachlor	50 mg per kg
Hexabromobiphenyl	50 mg per kg
Hexachlorobutadiene	100 mg per kg
Hexabromocyclododecane	1,000 mg per kg
Hexachlorobenzene	50 mg per kg
Mirex	50 mg per kg
Toxaphene	50 mg per kg
Polychlorinated Biphenyls (PCB)	50 mg per kg (if you are not sure whether your waste contains PCBs, use the calculation method given in European standards EN 12766-1 and EN 12766-2, which you can buy online)
Polychlorinated napthalenes	10 mg per kg
DDT (1,1,1-trichloro-2,2-bis (4-chlorophenyl) ethane)	50 mg per kg
Chlordecone	50 mg per kg
Polychlorinated dibenzo-p-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs)	15 µg (micrograms) per kg, meaning 0.000015g of PCDD or PCDF per kg of waste (you need to use the toxic equivalency factor of

Persistent organic pollutant (POP)	Concentration threshold
	each PCDD or PCDF, to calculate concentration)
Hexachlorocyclohexanes (HCH), including lindane	50 mg per kg
Total of tetra-, penta-, hexa-, hepta- and deca-bromodiphenyl ether	Sum of concentrations: 1,000 mg per kg
Perfluorooctane sulfonic acid (PFOS) and PFOS derivatives	50 mg per kg
Pentachlorobenzene	50 mg per kg

You can find the chemical formulae, European Community (EC) numbers and Chemical Abstract Service (CAS) numbers for each of the POPs in this table in the list of POPs.

Your laboratory analysis for polybromodiphenyl ethers (PBDEs) in plastic may significantly underestimate the concentration present because the extraction efficiency may be poor. You must measure the extraction efficiency and adjust the results accordingly.

Appendix II

Toxic equivalency factors of PCDDs and PCDFs

To find out the concentration of PCDDs and PCDFs in your waste, you need to multiply the concentration of the specific PCDD or PCDF in your waste by its toxic equivalency factor (TEF). We have provided the TEFs of each PCDD or PCDF in this section if you want to make calculations yourself.

TEFs of PCDDs

PCDD	TEF
2,3,7,8-TeCDD	1
1,2,3,7,8-PeCDD	1
1,2,3,4,7,8-HxCDD	0.1
1,2,3,6,7,8-HxCDD	0.1
1,2,3,7,8,9-HxCDD	0.1
1,2,3,4,6,7,8-HpCDD	0.01
OCDD	0.0003
1,2,3,6,7,8-HxCDF	0.1
1,2,3,7,8,9-HxCDF	0.1
2,3,4,6,7,8-HxCDF	0.1
1,2,3,4,6,7,8-HpCDF	0.01
1,2,3,4,7,8,9-HpCDF	0.01
OCDF	0.0003

TEFs of PCDFs

PCDF	TEF
2,3,7,8-TeCDF	0.1
1,2,3,7,8-PeCDF	0.03
2,3,4,7,8-PeCDF	0.3
1,2,3,4,7,8-HxCDF	0.1

Mixtures of multiple PCDDs or PCDFs

If your waste contains a mixture of several different PCDDs and PCDFs. You need to multiply each PCDD or PCDF by its TEF, and then add the concentrations together.

Example calculation

If your waste contains 1,2,3,7,8-PeCDD at a concentration of 14 µg per kg and 1,2,3,4,7,8-HxCDD at a concentration of 30 µg per kg, you would calculate the concentration of PCDDs and PCDFs as follows.

14 µg per kg x 1 (TEF of 1,2,3,7,8-PeCDD) + 30 µg per kg x 0.1 (TEF of 1,2,3,4,7,8-HxCDD)
= 14 µg per kg + 3 µg per kg
= 17 µg per kg

In this case the concentration of PCDDs and PCDFs in your waste would be above the threshold in the concentrations table (15 µg per kg). Therefore you would have to follow this guide when you dispose of it.

Appendix III

Classification Notes – Supplimentary to Classification Tables

Waste Type	Classification Notes
Televisions, computer monitors and other display devices	Deca-BDE and Antimony Trioxide are the main substances of concern however it is recommended that you also consider tetra-BDE, penta-BDE, hexa-BDE and hepta-BDE when assessing your waste.
Fridges, freezers, chillers and air-conditioning units	Deca-BDE and Antimony Trioxide are the main substances of concern however it is recommended that you also consider nona-BDE and octo-BDE when assessing your waste. The PBDE's and Antimony Trioxide are present in some components however when assessed as a unit these concentrations are not sufficient enough make an entire item a Hazardous/POPs however if assessed in isolation the components would likely be deemed a 'Hazardous/POPs Waste'. However other hazardous substances are likely to be present and unless proven otherwise the entire item will be deemed a Hazardous Waste.
Large domestic appliances (LDA): white goods (washing machines, tumble driers, dishwashers and cookers)	Deca-BDE and Antimony Trioxide are the main substances of concern however it is recommended that you also consider hexa-BDE, hepta-BDE, nona-BDE and octo-BDE when assessing your waste. The PBDE's and Antimony Trioxide are present in some components however when assessed as a unit these concentrations are not sufficient enough to the entire item a Hazardous/POPs however if assessed in isolation the components would likely be deemed a 'Hazardous/POPs Waste'. Microwaves, heaters and fans are not considered to be a LDA and should be classified in accordance with the small mixed WEEE. 'heat pump' tumble driers contain refrigerant (R134a or F-gas) must be stored with fridges and sent to a fridge treatment plant. All other tumble driers can continue to go with LDA.
Small mixed WEEE	Deca-BDE and Antimony Trioxide are the main substances of concern however it is recommended that you also consider nona-BDE and octo-BDE when assessing your waste. The PBDE's and Antimony Trioxide are present in some components and when assessed as a unit these concentrations are sufficient enough to make the individual items a Hazardous/POPs waste. Therefore, any SMW collection stream is a Hazardous/POPs waste stream.
Other household-type electrical items from homes or businesses	Deca-BDE and Antimony Trioxide are the main substances of concern however it is recommended that you also consider nona-BDE and octo-BDE when assessing your waste.

	The PBDE's and Antimony Trioxide are present in some components and when assessed as a unit these concentrations are sufficient enough to make the individual items a Hazardous/POPs waste.
Lightbulbs and lamps	In a recent industry although POPs-PBDEs were not found to be present at concentrations above relevant threshold values their presence was detected however complications with analysis and comparison with the other SMW categories mean that PBDEs are likely to be present. Therefore, a precautionary approach should be adopted until proven otherwise. Antimony Trioxide was also found to be present in levels at or above the relevant threshold values and unless proven otherwise a precautionary approach should be adopted.
Printed circuit boards	In a recent industry although POPs-PBDEs were not found to be present at concentrations above relevant threshold values their presence was detected, however, complications with analysis and comparison with the other categories mean that PBDEs are likely to be present. Furthermore, tetrabromobisphenol A (TBBPA) is known to have been used in the manufacture of printed circuit boards and thermoplastics, therefore, a precautionary approach should be adopted until proven otherwise. Antimony Trioxide was also found to be present in levels at or above the relevant threshold values and unless proven otherwise a precautionary approach should be adopted.
Cables and granulated cable plastics	In a recent industry although POPs-PBDEs (deca, nona and octo) and Antimony Trioxide were not found to be present at concentrations above relevant threshold values their presence was detected however complications with analysis means that these substances are likely to be present. Therefore, a precautionary approach should be adopted until proven otherwise.
Plastic cases removed from display devices	Deca-BDE and Antimony Trioxide are the main substances of concern however it is recommended that you also consider tetra-BDE, penta-BDE, hexa-BDE and hepta-BDE when assessing your waste.
Mixed wastes, containing plastic from the treatment of WEEE devices that are hazardous and POPs waste **Plastic wastes from treating fridges and freezers** **Plastic containing residues from treating certain large domestic appliances (LDA)**	Any assessment and classification should be based on the inputs however in light of the mixed sources it is recommend that a precautionary approach is followed with all PBDEs and Antimony Trioxide being treated as substances of concern in addition to your existing classification and assessment process.