

**The ban on landfilling Biodegradable Municipal Waste (scope and testing guidance)**

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March 2024

# 1 Introduction

## 1.1 Purpose

This guidance offers advice to waste producers, managers of waste treatment facilities and landfill operators on how to comply with the ban on the disposal of Biodegradable Municipal Waste (“BMW”) to landfill. It does not cover other landfill restrictions such as those related to tyres, liquid wastes, or Persistent Organic Pollutants.

## 1.2 Scope of the ban

From 31 December 2025 landfill operators in Scotland will be prohibited from accepting BMW for disposal by landfill.

The ban is implemented via [Regulation 11 of the Landfill (Scotland) Regulations 2003 (as amended)](https://www.legislation.gov.uk/ssi/2003/235/regulation/11) and by compliance with the conditions of landfill permits.

### What is Municipal Waste?

Municipal waste is defined in the [landfill regulations](https://www.legislation.gov.uk/ssi/2003/235/regulation/2) as –

“Mixed waste and separately collected waste from households, including paper and cardboard, glass, metals, plastics, bio-waste, wood, textiles, packaging, waste electrical and electronic equipment, waste batteries and accumulators, and bulky waste, including mattresses and furniture,

mixed waste and separately collected waste from other sources, where such waste is similar in nature and composition to waste from households,

but does not include waste from production, agriculture, forestry, fishing, septic tanks and sewage network and treatment, including sewage sludge, end-of-life vehicles or waste generated by construction and demolition activities.”

Municipal waste includes household waste as well as waste which is “similar in nature to and composition to waste from households” such as commercial waste from the retail and hospitality sectors. For example, it includes residual waste and other mixed municipal wastes collected from households and commercial businesses coded as 20 03 01.

Municipal Waste also includes sorting residues from processing municipal waste. These residues are often coded as 19 12 12.

Wastes from non-municipal sources (e.g. agriculture, construction and demolition, water and wastewater treatment etc) are not banned from landfill disposal.

Treatment facilities should consider processing municipal and non-municipal wastes separately. Treatment residues from a mix of municipal and non-municipal waste are considered within the scope of the ban.

### What is Biodegradable Waste?

Biodegradable waste is defined in the [landfill regulations](https://www.legislation.gov.uk/ssi/2003/235/regulation/2) as –

“any waste capable of decomposing and includes waste such as food waste, green waste, paper and cardboard.”

Wastes such as plastics, glass, metal, soil and stones and items constructed of a mix of such materials are assumed to be non-biodegradable.

As biodegradable waste forms a significant proportion of mixed municipal waste, the ban applies to all residual waste collected from households and similar waste from other sources.

However, where BMW is treated and meets one of the following thresholds, it is no longer ‘biodegradable’. If these thresholds are met, the waste can be accepted for landfill disposal.

The [landfill regulations](https://www.legislation.gov.uk/ssi/2003/235/regulation/11) state that

“Where waste is treated –

respiration activity after a static respiration test is less than 10 milligrams of oxygen for each gram of dry material (10 mg O2/g dry matter); or

dynamic respiration over one hour is less than 1000 milligrams of oxygen for each kilogram of volatile solids;

Where waste is incinerated, the total organic carbon content is less than 5%”

## 1.3 How to determine if waste is BMW

This determination process can be represented by three steps as described below. A flowchart illustrating these steps is in Annex 2.

#### Step 1 – EWC List

Annex 1 provides a list of 27 EWC Codes to use as an initial screen. The main waste types are paper and card, food waste, wood, textiles, mixed municipal waste (residual waste), sorting residues and household bulky waste collections.

If after classification, the waste does not fall into one of the listed codes, SEPA is satisfied that it is not BMW and is not covered by the ban.

If, after classification, the waste does fall into one of the listed codes, it may be banned from landfill disposal – move to Step 2.

#### Step 2 – Is it ‘municipal’?

Some wastes may be classified using one of the codes listed in Annex 1 but not be “similar in nature or composition to household waste” or, in the case of sorting residues, not derived from municipal waste.

If you can demonstrate the waste is not ‘municipal waste’ as defined in the Regulations, it is not covered by the ban.

If it is municipal waste, then move to step 3.

#### Step 3 – Is it ‘biodegradable’?

SEPA assumes that untreated residual waste (coded 20 03 01) and mixed bulky waste (coded 20 03 07) are biodegradable.

However, where residual waste has been treated, it may no longer be regarded as “biodegradable” subject to the thresholds in the regulations and be able to be landfilled.

Further, some bulky wastes may be made wholly of non-biodegradable materials such as plastic, glass or metal and may be able to go for landfill disposal if segregated.

If you can demonstrate the waste is not ‘biodegradable’ as defined in the Regulations, either because of its inherent composition or after testing against a relevant threshold, it is not covered by the ban.

Part 3 provides further guidance on how to determine whether wastes are biodegradable.

# 2. Roles and responsibilities

In common with existing landfill waste acceptance criteria (WAC) procedures, the responsibilities for waste characterisation and testing are as follows.

| **Action** | **Responsibility** | **Objective** |
| --- | --- | --- |
| Basic characterisation | Waste producer / manager of waste treatment facility | To gain a full understanding of the waste with respect to Annex 1, waste composition and/or the biodegradability thresholds |
| Compliance testing for continuously generated treated waste | Waste producer / manager of waste treatment facility | Periodic sampling to demonstrate ongoing compliance with biodegradability thresholds |
| On-site verification at the landfill | Landfill operator | ‘Spot checks’ for compliance with composition, biodegradability thresholds and permit conditions |

## 2.1 Waste producer / manager of waste treatment facility

Waste producers and managers of waste treatment facilities transferring waste for landfill disposal have an obligation to comply with the Duty of Care for waste (as set out in Section 34 of the Environmental Protection Act 1990) and must classify and describe the waste correctly.

* Classify waste in accordance with WM3 guidance, selecting an appropriate EWC code and determining whether the waste is hazardous or non-hazardous.
* Confirm the landfill site can accept the waste with reference to the EWC Code list in Annex 1.
* Where the EWC code is on the list of potentially banned wastes, confirm *in writing* with the landfill operator via pre-acceptance procedures that the waste is either not from a municipal source, contains only non-biodegradable materials (plastic, metal, glass etc) or has been treated and complies with the relevant biodegradability thresholds.
* Where treated BMW (particularly 19 12 12) is being transferred to landfill, carry out sampling and analysis in accordance with Part 3 below and furnish the landfill operator with the test results.
* Describe the waste clearly on the waste transfer note.
* Keep Duty of Care records for 2 years.

## 2.2 Landfill operators

Landfill Permits will contain a condition prohibiting the acceptance of BMW for landfill disposal.

The landfill operator must ensure waste accepted for landfill disposal is not BMW to remain in compliance with their Permit. These Waste Acceptance Management Plan for the site should include the following requirements.

* To check the EWC code against the list in Annex 1. This should be part of normal waste acceptance procedures.
* Where the EWC code is on the list of potentially banned wastes, to carry out pre-acceptance checks with the producer to ensure it is either not from a municipal source, contains only non-biodegradable materials (plastic, metal, glass etc), or it has been treated such that it is no longer biodegradable.
* To perform verification sampling and testing in accordance with Part 4 of this guidance.
* To keep waste acceptance records in compliance with permit requirements.

Pre-acceptance checks aim to ensure the waste is suitable for acceptance and disposal at the landfill. These checks should include –

* Pre-acceptance questionnaire & declaration form
* Waste Transfer Notes
* Visual inspections, site audits and photographs
* Testing data from the waste treatment facility

A Pre-Acceptance Questionnaire & Declaration Form should be issued to the waste treatment facility producing waste for disposal at the landfill site and returned with sufficient information to satisfy the landfill operator that the waste is not BMW. Example questions are contained in Annex 3.

This process enables landfill operators to keep written records of the steps taken by the treatment facility to ensure waste is either not municipal or not biodegradable.

For example, with respect to 19 12 12 wastes, the source or treatment method may not be clear from an initial description so pre-acceptance questions will ensure a more complete understanding of the waste.

The information should be current and reviewed at least annually or more frequently if the information provided has changed and the waste treatment facility must notify the landfill operator if there are any changes to the waste or waste treatment process.

# 3 Biodegradability

As set out in Part 2, responsibility for basic characterisation and compliance testing is with the waste producer and the manager of the waste treatment facility.

The pre-acceptance process combined with the guidance in this section should enable waste treatment facilities and landfill operators to satisfy themselves that the waste is not biodegradable.

## 3.1 Non-biodegradable materials

Wastes such as plastic, glass and metal, (and items constructed of a mix of such materials) are assumed to be non-biodegradable.

Some wastes may fall into the codes in Annex 1 (e.g. the bulky waste code 20 03 07) but be made wholly of non-biodegradable materials – some furniture, mattresses, etc may fall into this category. These wastes do not need to be tested but a determination can be made solely on their composition.

Where the waste is made wholly of non-biodegradable materials, they are not subject to the ban on landfill disposal.

This should be documented by the waste producer or manager and agreed with the landfill operator prior to acceptance.

## 3.2 Thresholds – incineration residues

The landfill regulations restrict the landfilling of municipal waste incineration residues such as Incinerator Bottom Ash to those with a Total Organic Carbon (TOC) content of less than or equal to 5%.

This TOC limit also forms a permit requirement for municipal waste incineration facilities in Scotland so landfill operators can demonstrate compliance by ensuring relevant evidence and TOC results are obtained from the EfW operator.

EfW permit conditions allow either TOC or loss on ignition (LOI) testing as the means of demonstrating that residues are no longer biodegradable, and either test mechanism (and result) could therefore be used by landfill operators in demonstrating compliance with the regulations. A conversion factor is likely to be site specific and must be agreed with SEPA in advance.

## 3.3 Thresholds – bio stabilised waste

The landfill regulations also specify biodegradability thresholds for other forms of waste treatment such as bio-stabilisation.

This is less well established compared to TOC testing of incineration residues and there is potential for a higher level of variability in the biodegradability of the treated waste. There are two thresholds –

* Respiration activity after a static respiration test (AT4) is less than 10 milligrams of oxygen for each gram of dry material (10 mg O2/g dry matter); or
* Dynamic respiration over one hour is less than 1000 milligrams of oxygen for each kilogram of volatile solids.

Treated municipal waste must be tested for compliance with one of the two respiration thresholds - both test results are shown to correlate well.

## 3.4 Monitoring and sampling plan

Treated BMW must be sampled and tested to demonstrate compliance with the relevant biodegradability threshold prior to landfill.

Municipal waste treatment facilities which produce treated waste for landfill should prepare a monitoring and sampling plan to ensure samples are representative of the waste. Further guidance on waste sampling plans can be found in Appendix D of WM3 guidance. The key elements required for the monitoring plan are:

* A description of the treatment process and the treated waste to be landfilled.
* The objectives of monitoring.
* The biodegradability threshold used and the process parameters and waste characteristics to be monitored.

The sampling plan should identify the specific details of the intended sampling activities and should include details of:

* Wastes to be sampled.
* How representative samples will be collected, stored and transported.
* Who will carry out sampling.
* How many samples will be taken and when.
* The sample size (weight or volume) to be taken.
* The quality assurance/quality control (QA/QC) procedures for the monitoring activity, including record keeping.
* Provision for annual review, using 12 months of data to assess variability of the data.

It should be noted on the sampling plan if there is a sanitation phase in place and when it occurs during the biological treatment cycle. It is important that sampling does not take place immediately after the sanitation phase.

## 3.5 Taking a sample

To produce a representative composite sample from a batch of treated waste, fifteen 2kg incremental samples should be collected to make a composite sample of 30kg. Increments should be taken so that they represent the whole of the batch.

Random samples should be taken along the width and height of the batch.

The composite sample should be mixed, coned and quartered to extract a 2 kg sample. Mix the composite sample thoroughly and spread the material out into an approximate square.

Divide the square into notional quarters and take similar-sized increments from each quarter until the required combined weight is collected.

If there is a lot of inorganic material or a high moisture content in the sample, then it may be necessary to extract a larger sample of 3-4 kg.

The exact sample size should be verified with the laboratory prior to sampling.

The sample should be packaged, stored and sent to a laboratory for analysis in accordance with the laboratory requirements. Sampling should be in line with the monitoring and sampling plan.

Use of large sealable high-density polyethylene (HDPE) dustbins or containers is generally appropriate.

Samples should be refrigerated. Where this is not possible, samples should be despatched within 24 hours to ensure the integrity of the sample upon its analysis at a laboratory.

Each container should be labelled with the information necessary to identify the sample.

Further guidance on sampling may be found in CEN/TR 15310-2:2006 'Characterisation of waste – Sampling of waste materials Part 2: Guidance on sampling techniques.'

## 3.6 Compliance approach – one-off produced waste

One-off produced wastes are those which are not regularly generated from the same inputs in the same process and are not part of a well-characterised waste stream.

Each one-off waste must be representatively sampled and tested.

As one-off waste must be fully characterised, compliance testing is not necessary.

Where the results from representative composite sampling of the waste are below the relevant biodegradability threshold the waste is not subject to the landfill disposal ban.

Where multiple samples are taken from a stockpile, the 90th percentile confidence limit of the results can be compared to the relevant biodegradability threshold provided sufficient samples have been taken to ensure a robust assessment.

## 3.7 Compliance approach – continuously produced waste

Continuously or semi-continuously produced waste are generated regularly from the same inputs in the same process and are part of a well-characterised waste stream.

For these treated wastes, it may be possible to use a statistical approach to determine the biodegradability of the overall population. Statistical approaches must be agreed with SEPA.

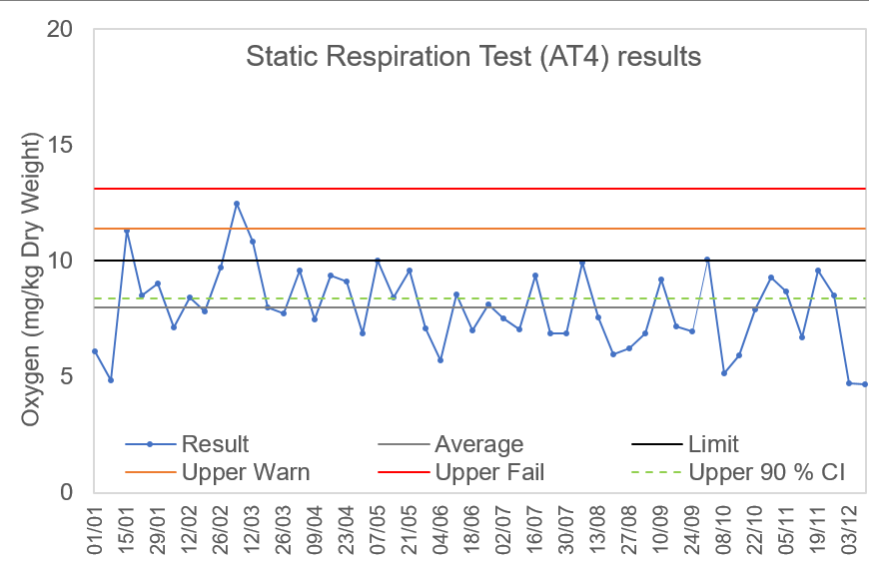
The preferred approach is based on a ‘control chart’ for the process which tracks the data over time and provides running results for the population mean and 90%th percentile.

On start-up, there will be limited data on the performance of the municipal waste treatment process with relatively few samples tested for biodegradability. Basic Characterisation should consist of 10 to 12 samples over the first quarter of operation but can be accelerated to manage storage constraints.

Use compliance sampling to maintain an ongoing statistical record for regularly generated waste. The aim is to allow sample results to be tracked and to ensure that the outputs are assessed appropriately.

The confidence interval is calculated using Method B from the WM3 waste classification guidance. A minimum number of samples of 20 is recommended.  Sample sizes below this can be used but the upper confidence limit will either be close to the maximum or the maximum value in the dataset. The method uses the data collected to calculate an upper confidence interval.

An example control chart showing a bio stabilised waste suitable for landfill is in figure 1.



**Figure 1: Example Control Chart**

The control chart is used to ensure that the results from the testing carried out is below the threshold (in this example, the AT4 limit of 10 mg O2/g dry matter is used).

* If the upper 90th percentile confidence interval is below the biodegradability threshold the treatment facility is producing an output that is suitable for landfill. Individual results may exceed the threshold, but all outputs are considered compliant.
* If the average or the upper 90th percentile confidence interval is above the threshold the treatment facility is producing an output not suitable for landfill.

The upper failure limit in this example is based on two standard deviations from the mean. If a sample exceeds the failure limit, this may be limited to the specific sub-population tested or may reflect a real change in the waste population. The waste treatment operator should immediately investigate the cause of the exceedance, identify the cause, remove it, and commence a rapid reassessment of the treated waste.

The objective of the rapid re-assessment is to demonstrate that:

* the cause has actually been removed, and
* the treated waste is now consistent and within the biodegradability thresholds.

Where a cause cannot be found despite investigation it is important that re-assessment and on-going monitoring is used to demonstrate that biodegradability has returned to ‘normal’ levels, and there are no exceedances that indicate the underlying cause remains.

During an investigation, the waste can continue to go to landfill provided the upper 90th percentile confidence interval for the waste population remains below the threshold.

The confidence interval, warning and fail limits should be recalculated as required. This may be after a set period of time or if the process undergoes a material change.

The initial variability of treated waste should be determined from the results of the first quarter monitoring. This variability should inform the sampling frequency for the rest of the year.

In subsequent years the level of monitoring will be set following a review of the previous year’s monitoring data and will be the same for each quarter.

Having established the sampling frequency, samples should be collected on randomly selected working days throughout each quarter.

Compliance testing data should be supplied to the receiving landfill operator as part of the pre-acceptance information. The waste producer or manager of the waste treatment facility should also identify the cumulative quantity of waste disposed of under each Basic Characterisation and the frequency of testing.

# 4. Verification sampling at a landfill

Verification testing is for the landfill operators to confirm that the waste conforms to the description provided. Checks at this stage are primarily visual and through verification of the accompanying documentation for each load received both in terms of the description on the Waste Transfer Note and the information provided via the pre-acceptance questionnaire. However, landfill operators should also routinely sample and test the waste they receive.

## 4.1 Verification sampling – waste from treatment sites

In addition to receiving monitoring data from the treatment facility, landfill operators should perform their own confirmatory sampling to verify the information provided.

For continuously produced treated wastes, where sampling has been carried out by the treatment site in accordance with Section 3 of this guidance and results show the waste is suitable for landfill, confirmatory sample frequency should be set at once per quarter.

Given the quantities of treated biodegradable municipal waste accepted for landfill disposal and the lag time in confirming the results, it would be impracticable to expect landfill operators to store (or quarantine) this waste stream pending the test results.

In the event of a verification exceedance,

1. Notify the treatment facility so they can initiate an investigation and rapid reassessment in accordance with Section 3.7.
2. Confirm with the treatment facility that the mean and 90th percentile of the waste population remains within the biodegradability threshold. If so, continue accepting waste and go to Step 5. If not, cease accepting waste and go to Step 3.
3. Seek confirmation from the treatment site that the biodegradability has returned to normal and request results of their investigation and reassessment.
4. Take a further confirmatory sample within the first six weeks of the reassessment.
5. If the six-week sample confirms a return to normal, the verification sampling frequency can revert to the normal set frequency of at least one sample per quarter.

# Annex 1 – EWC Codes within scope

15 01 01 Paper and cardboard packaging

15 01 05 Composite packaging

15 01 06 Mixed packaging

15 01 09 Textile packaging

19 05 01 Non-composted fraction of municipal and similar waste

19 05 03 Off-specification compost

19 06 04 Digestate from anaerobic treatment of municipal waste

19 12 01 Paper and cardboard

19 12 06 Wood containing dangerous substances

19 12 07 Wood other than that mentioned in 19 12 06

19 12 08 Textiles

19 12 10 Combustible waste

19 12 11 Other wastes (including mixtures of materials) from mechanical treatment of wastes containing dangerous substances

19 12 12 Other wastes (including mixtures of materials) from mechanical treatment of wastes other than those mentioned in 19 12 11

20 01 01 Paper and cardboard

20 01 08 Biodegradable kitchen and canteen waste

20 01 10 Clothes

20 01 11 Textiles

20 01 25 Edible oil and fat

20 01 26\* Oil and fat other than those mentioned in 20 01 25

20 01 37\* Wood containing dangerous substances

20 01 38 Wood other than that mentioned in 20 01 37

20 01 99 Wastes not specified otherwise

20 02 01 Biodegradable wastes from gardens and parks

20 03 02 Waste from markets

20 03 01 Mixed municipal waste

20 03 07 Bulky wastes

20 03 99 Wastes not otherwise specified

# Annex 2 – Decision Tree

**EWC List**

**Is the waste classified using one of the codes in Annex 1?**

**Is the waste Municipal?**

**Is the waste from households or is it similar in nature to waste from households?**

**Is the waste Biodegradable?**

**Is it made from non-biodegradable materials or been treated such that it is no longer biodegradable?**

**BMW – waste cannot be sent for landfill disposal.**

**Not BMW – waste can be sent for landfill disposal.**

**Not BMW – waste can be sent for landfill disposal.**

**No**

**No**

**No**

**Yes**

**Yes**

**Not BMW – waste can be sent for landfill disposal.**

**Yes**

# Annex 3 – Pre-acceptance checklist

### Facility Information

* Name, address and contact details of waste producer
* Details of the treatment process that generates the waste

### Waste Information

* Description of the input wastes to the process and their EWC Codes
* Description of the wastes and their EWC Codes
* Characterisation of the waste including WM3 classification
* Composition of the waste if justification is based on being wholly made up of non-biodegradable materials.

### Monitoring Plan

For newly commissioned waste treatment processes does the monitoring plan allow for more frequent testing? (to help build up baseline data on plant performance)

* Post-commissioning, what are the onward monitoring arrangements?
* Is there a dedicated project manager in charge of the monitoring plan and sampling regime?
* Has the monitoring plan been made available to SEPA?
* Which biodegradability test is deployed?
* Is the monitoring plan (and monitoring activities) covered by a quality control process?
* How often is the monitoring plan reviewed? (at least annually)

### Sampling Plan

* What is the sampling frequency (for new waste treatment plants, testing frequency may vary between start-up and the post-commissioning stage)
* What are the sample sizes?
* How are representative samples of waste outputs collected?
* How will be samples be stored and transported?
* Is there a system for independent sampling of treated outputs and verification of the results?
* What are the test results of the sampled outputs?
* Are these from a UKAS accredited laboratory? (a list of approved laboratories will in time be agreed between SEPA and the industry once a market demand for such is established)

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