MWAN مـــوان
المركز الوطني لإدارة النفايات
National Center for Waste Management

Technical Guidelines on **Landfill Waste Acceptance Criteria**

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TABLE OF CONTENTS

TABLE INDEX

TABLE OF FIGURES

List of acronyms

KSA	Kingdom of Saudi Arabia
MSW	Municipal Solid Waste
NCEC	National Centre of Environmental Compliance
C&DW	Construction and Demolition Waste
MWAN	National Center for Waste Management
WAC	Waste Acceptance Criteria
WAP	Waste Acceptance Procedures
K	Coefficient of Permeability
CQA	Construction Quality Assurance
DOC	Dissolved Organic Carbon
BTEX	Benzene, Toluene, Ethylbenzene and Xylenes
PCBs	Polychlorinated Biphenyls
PAHs	Polycyclic Aromatic Hydrocarbons
LOI	Loss On Ignition
TOC	Total Organic Carbon
L/S	Liquid/Solid ratio
l/kg	litres / kilogram
C0	Percolation Test
TDS	Total Dissolved Solids

Definitions

Biodegradable Waste: Any waste that is capable of undergoing anaerobic or aerobic decomposition.

Cell: A waste cell is the basic structural unit of a landfill and is a clearly defined area that can facilitate incoming waste by eliminating the negative impacts on the environment and human health. Waste cells are formed by spreading and compacting incoming wastes in layers within a daily defined area. Individual daily waste cells must be compacted and placed as landfill develops and always following the filling plan to maximize the capacity.

Cover: The layer used to cover waste for final closure. Cover layer may consist of both natural and artificial materials aiming to minimize landfill's impacts on the environment after closure. Final cover should be able to support vegetation if climatic conditions allow it to.

Inert waste: Is defined as waste that does not undergo any significant physical, chemical, or biological transformation. Inert waste will not dissolve, burn, or otherwise physically or chemically react, biodegrade, or adversely affect other matter with which it comes into contact in a way likely to rise environmental pollution or harm human health. The total leachability and pollutant content of the waste and the ecotoxicity of the leachate must be insignificant, and not endanger the quality of surface water and/or groundwater.

Landfill: Means an engineered waste disposal site, comprising all established and recognized engineered control methods to protect the environment (air, water, groundwater, soil, ecological settings, etc.) for the deposit of the waste onto or into land (i.e., underground).

Landfill Operator: A Service Provider who operates a landfill.

Leachate: Any liquid percolating through the deposited waste and emitted from or contained within the landfill.

Monolithic Waste: Material which has certain minimum dimensions and physical and mechanical properties that ensure its integrity over a certain period of time.

Granular Waste includes all wastes that are not monolithic.

Municipal Solid Waste: Includes Residential Waste, which is Waste resulting from the usual activity of households, whether or not they are collected mixed or separately, and also includes Commercial and Administrative Waste, which is Waste that is produced from other sources that are similar in nature and composition to Residential Waste.

Residential Waste: Waste that includes without limitation: paper and cardboard, glass, metals, plastics, food residuals, Green Waste, wood, textiles, packaging, waste electrical and electronic equipment, and bulky waste, including without limitation mattresses and furniture.

Commercial and Administrative Waste: Includes without limitation: Waste that is produced from economic activities that can be collected with that of households, having regard to their characteristics and the quantities produced, without particular technical constraints. This Waste includes without limitation Waste produced from commercial activities and businesses (including but not limited to: craftsmen, commercial, and traders.) and waste from the general service provision sectors (including but not limited to: healthcare administrations and healthcare facilities (such as non-hazardous healthcare waste), and other such Waste that is collected under the same conditions as Residential Waste.

Permeability: The rate per unit area at which fluid will pass through a porous material under a unit flow gradient. The constant of proportionality K in Darcy's Law is the permeability and is measured in m/year, m/sec, or cm/sec, which is synonymous to hydraulic conductivity.

Producer: A person who produces products locally or abroad or derives them from other materials for the purpose of selling or consuming them.

Standard: The specification of recommended procedure, quality of output, terminology, and other details, in a particular field, drawn up and published by a Standards Institution.

Waste: All materials that are discarded or disposed of, and that directly or indirectly affect public health or the environment.

Waste Producer: Every person who produces classified waste according to the provisions of the Law.

Waste Management: Organizing any activity or practice related to waste commencing from waste collection, transportation, sorting, storage, treatment, recycling, import, export, and safe disposal, including aftercare at waste disposal sites.

1 PURPOSE AND SCOPE

1.1 Purpose

This Technical Guideline establishes the criteria and procedures of the acceptance of waste at landfills in accordance with the principles set out in the Waste Management Law and the Implementing Regulations.

The key objectives of the current Technical Guideline are as follows:

- To clearly define Waste Acceptance Procedures and Criteria based on the characterization of the waste being generated, in full alignment with the Technical Guideline on Waste Classification;
- To establish the minimum sampling and testing methods that need to be adhered to prior to disposal in the relevant landfill class;
- To determine the suitability of waste for acceptance in landfills; and
- To increase environmental safety by ensuring that produced waste is directed to the most suitable landfill class, thus minimizing potential risks and impacts on the environment.

1.2 Scope

This Technical Guideline aims to provide to all relevant parties, the framework to determine the acceptability of waste at landfills. It is intended for all stakeholders, including waste producers, waste transporters, landfill operators, and competent authorities.

Waste acceptance procedures and criteria, apply to all types of waste including hazardous, non-hazardous, and inert, with specific exceptions outlined in Section 4. These procedures are applicable to all Classes of Landfills, namely Class 1 Hazardous Waste Landfills; Class 2 Non-Hazardous Waste Landfills; Class 3 Inert Waste Landfills.

This document lays down the following:

- **Waste acceptance procedures (WAP)** to determine whether a waste is suitable to go to landfill, and if so, to which class of landfill. The WAP consists of three steps a) Level 1: basic characterization, b) Level 2: Compliance testing and c) Level 3: On-site verification;
- **Waste acceptance criteria (WAC)** for each landfill class. Waste can only be accepted at a landfill if it satisfies the acceptance criteria set for the corresponding landfill class. In case the WAC set are not met, the landfill should not accept the waste. In such cases, additional treatment or stabilization measures may be necessary to mitigate hazards and achieve compliance with acceptance requirements, or the waste may need to be redirected to an alternative disposal route as deemed necessary;
- **Methods to be used for the sampling and testing of waste.**

2 LEGAL REGUIREMENTS

The Technical Guideline on the Waste Acceptance Criteria to the Landfill complements the information provided by the Waste Management Law and the corresponding Implementing Regulations, with a more step-by-step approach to guide users through the waste acceptance process. For legal requirements on waste landfilling, however, users should consult both the WML and the IR.

Waste Management Law (WML)

Article VIII of the WML explicitly prohibits improper waste disposal practices, such as leaving, burying, burning, dumping, or littering waste in unauthorized locations. The law mandates specific controls to govern proper waste disposal practices.

Contracting for waste management services is regulated, ensuring that service providers comply with the law's provisions and adhere to specific transportation and documentation requirements, especially for hazardous waste. The law also details the obligations of service providers in transporting and disposing of hazardous waste safely.

The Implementing Regulations of the WML includes in Chapter 4, Section 9 specific provision relating to landfilling. Figure *2-1*outlines the key aspects as detailed in the regulations.

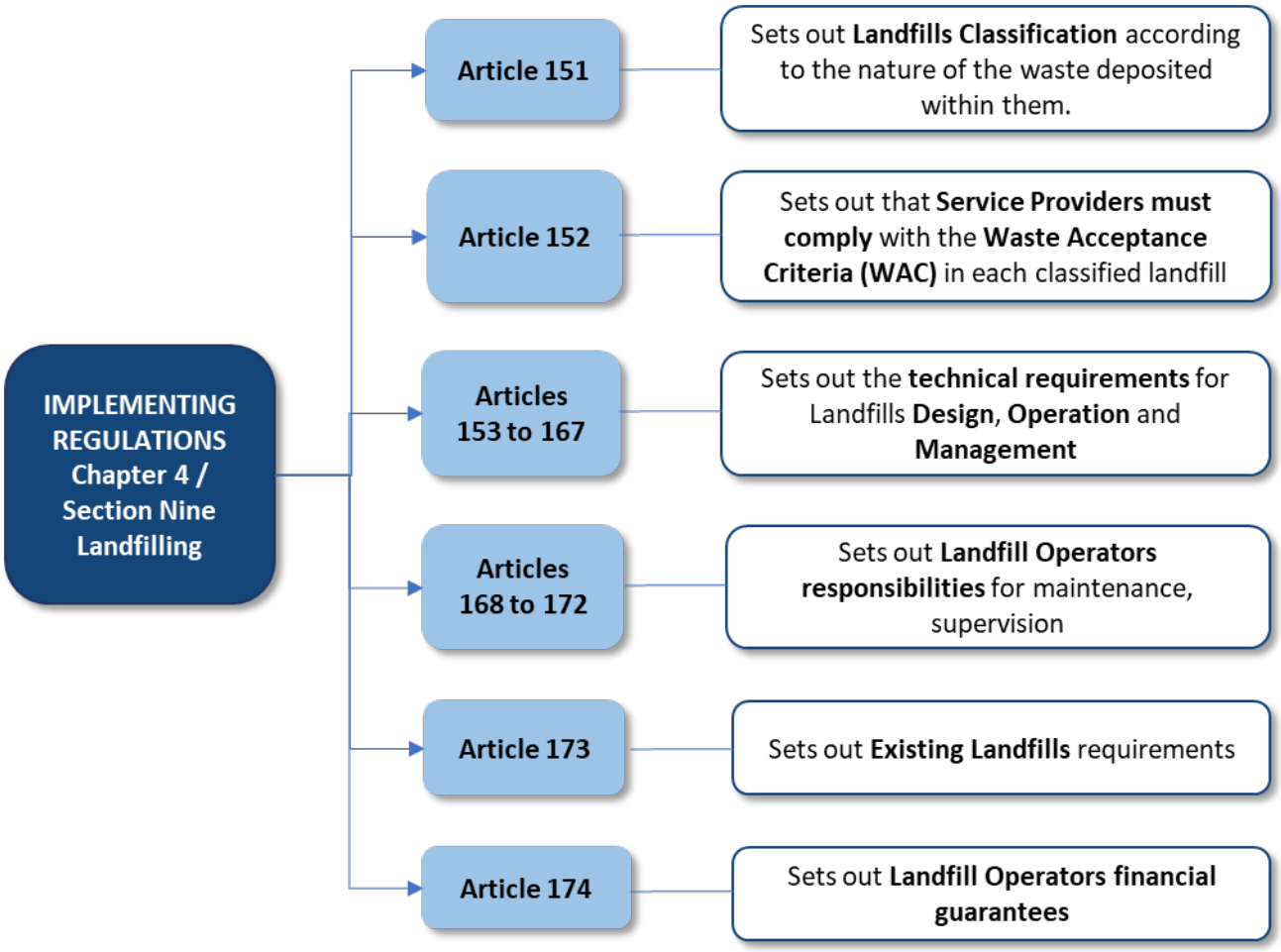

Figure 2-1: Waste Acceptance Criteria Legal Requirements

3 ROLES AND RESPONSIBILITIES

This Technical Guideline should be used by all parties involved in waste landfilling from waste producers and Competent Authorities to waste transporters and landfill operators. The key responsibilities regarding Waste Acceptance Criteria and Testing for disposal in a specific landfill class is outlined in the next table.

Table 3-1: Roles and Responsibilities on WAC to the Landfill

Roles and Responsibilities on Waste Acceptance Criteria (WAC) and Testing	
Role	**Responsibilities**
NCEC	■ Issue Environmental Permits for the landfills in accordance with the legal provisions.
MWAN	■ Issue licenses for the landfills in accordance with the legal provisions. ■ Establishes the design criteria for the required lining and closure of various landfill types as per the established technical guidelines for landfills. ■ Monitor performance of service providers based on the license conditions. ■ Approve Waste Acceptance Criteria and Testing methods. ■ Set the limit values for WAC Testing for all different landfill classes. ■ Monitor and Inspect activities related to Waste Acceptance Criteria and Testing procedures.
Waste Producers	■ Classify waste as hazardous or non-hazardous in compliance with the Implementing Regulation of the WML and TG on Waste Classification ■ Perform the basic characterisation of waste (level 1 waste assessment), ensuring that the waste they produce is properly classified and obtain a full understanding of waste and the appropriate class of landfill. Waste generators cannot use basic characterisation to classify waste as hazardous or non-hazardous. It is a separate process. ■ Apply any required treatment before sending waste to landfill. ■ Ensure that is sent to licenced landfills. ■ Ensure that the waste fulfils the acceptance criteria of the receiving landfill. ■ Ensure they contract with Licensed Waste Transporters to collect their produced waste and initiate the waste manifest process prior to collection and transportation. ■ The waste producer, or the person responsible for their management, has the responsibility and obligation of the physico-chemical characterization of the generated waste and is responsible for the correctness of the characterization data of their own waste.

Roles and Responsibilities on Waste Acceptance Criteria (WAC) and Testing	
Role	**Responsibilities**
Waste Transporters	▪ Acquire the required documentation and ensure the transportation manifest for waste shipments is completed.
Landfill Operators	▪ Perform on-site verification to check consistency/compliance with basic characterisation for visually non-conforming waste and "quick check" of key relevant characteristics where appropriate. ▪ Ensure that the waste load received is consistent with the waste described on the manifest. ▪ Must decide what parameters should be compliance tested (Level 2), using the results of the basic characterisation (Level 1). ▪ Refuse to accepte non-compliant Waste. ▪ Maintain records of the essential information in accordance with the provisions of the Environmental Permit and the License.

4 OVERVIEW

The waste acceptance procedure commences prior to the actual disposal of waste in the landfill, since it is required to:

- Classify the waste as hazardous or non-hazardous in accordance with the provisions of the WML and IR and with the Technical Guideline on Waste Classification;
- Ensure the landfill site can accept the waste to be disposed; and
- Implement any necessary treatment before sending waste to disposal.

The treatment must both i) be a physical, thermal, chemical, or biological process including sorting and ii) change the characteristics of the waste to reduce its volume or hazards or to make it easier to handle or recover. Waste compaction is not considered to be treatment.

Treatment may not apply to:

- Inert waste where treatment is not technically feasible; and
- Non-hazardous or hazardous waste where treatment would not reduce its quantity or the risk to people's health or the environment.

Before waste can be accepted at a landfill site, the following steps need to be completed:

a. Conduct a waste characterization in line with the waste acceptance procedures (WAP) detailed in Section 5;

b. Verify whether the waste satisfies the acceptance criteria set for the corresponding landfill class, in line with the Waste acceptance criteria (WAC) provided in section 6; and

c. Follow the minimum sampling and testing methods as detailed in Section 7.

Figure 4-1 shows at what stage waste assessment and WAC testing are required.

a. Waste Acceptance Procedures (WAP)

The Waste Acceptance Procedure consists of three levels to identify and periodically check the main characteristics of the waste (see Section 5)[1]:

Level 1: Basic characterisation includes a thorough determination, according to standardised analysis and behaviour-testing methods, of the short and long-term leaching behaviour and/or composition and properties of the waste.

Level 2: Compliance testing includes periodical testing utilising simpler standardised analysis and behaviour-testing methods. In the case of regularly generated wastes, e.g. from an industrial process, the waste must be checked regularly to ensure that those properties have not changed.

Level 3: On-site verification includes rapid check methods to confirm that the waste matches what has undergone compliance testing and what is described in accompanying documents. This may involve a visual inspection of the waste load before and after unloading at the landfill.

Testing Level	Responsibility	Objective
Level 1: Basic Characterisation	Waste Producer	▪ Full understating of waste to determine the appropriate landfill class for disposal.
Level 2: Compliance with Basic Characterisation	Landfill Operator and Waste producer	▪ It is the landfill operator who must decide what parameters should be compliance tested (Level 2), using the results of the basic characterisation (Level 1). The landfill operator is responsible for ensuring that only waste acceptable at his site is taken and he must be prepared to refuse to accept waste that he is not certain about. ▪ Periodic sampling to demonstrate consistency with original understanding of a regularly generated waste (i.e., the basic characterisation) using key characteristics. ▪ For waste that is not produced on a regular basis, i.e. where the entire waste stream has been considered as part of the Basic characterisation, Level 2 testing is not required.
Level 3: On-site characterisation	Landfill Operator	▪ Consistency /compliance with basic characterisation and "quick check" of key relevant characteristics where appropriate.

Waste producers should use the Basic Characterisation information to design a strategy for how they will manage their waste and, for regularly generated wastes, ensure that the selected management strategy remains appropriate. Where Level 2 Compliance testing or Level 3 Verification testing indicates variation from

[1] As per the EU Counsil Decision 19/12/2002 *establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 of and Annex II to Directive 1999/31/EC.*

the original Level 1 Basic Characterisation, the waste must be re-characterised in full, and the management strategy reappraised.

Cases where testing is not required

Testing for basic characterisation can be dispensed in the following cases:

a. the waste is on a list of wastes not requiring testing as laid down in section 6 of this guideline;

b. all the necessary information, for the basic characterization, is known and duly justified to the full satisfaction of MWAN; and

c. certain waste types where testing is impractical or where appropriate testing procedures and acceptance criteria are unavailable. This must be justified and documented, including the reasons why the waste is deemed acceptable at this landfill class.

b. Waste Acceptance Criteria (WAC)

Section 6 of this guidelines specifies waste acceptance criteria for inert, non-hazardous and hazardous waste[2]. These are:

- a list of wastes which may be accepted at a landfill without testing;
- limits on the leachability of certain parameters; and
- limits on the organic content of the waste.

The WAC limits cannot be used to make an assessment of whether a waste is hazardous. These are for a different purpose and must not be confused.

c. Sampling and testing of waste

Methods to be used for the sampling and testing of waste are detailed in Section 7.

[2] As per the EU Counsil Decision 19/12/2002 *establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 of and Annex II to Directive 1999/31/EC.*

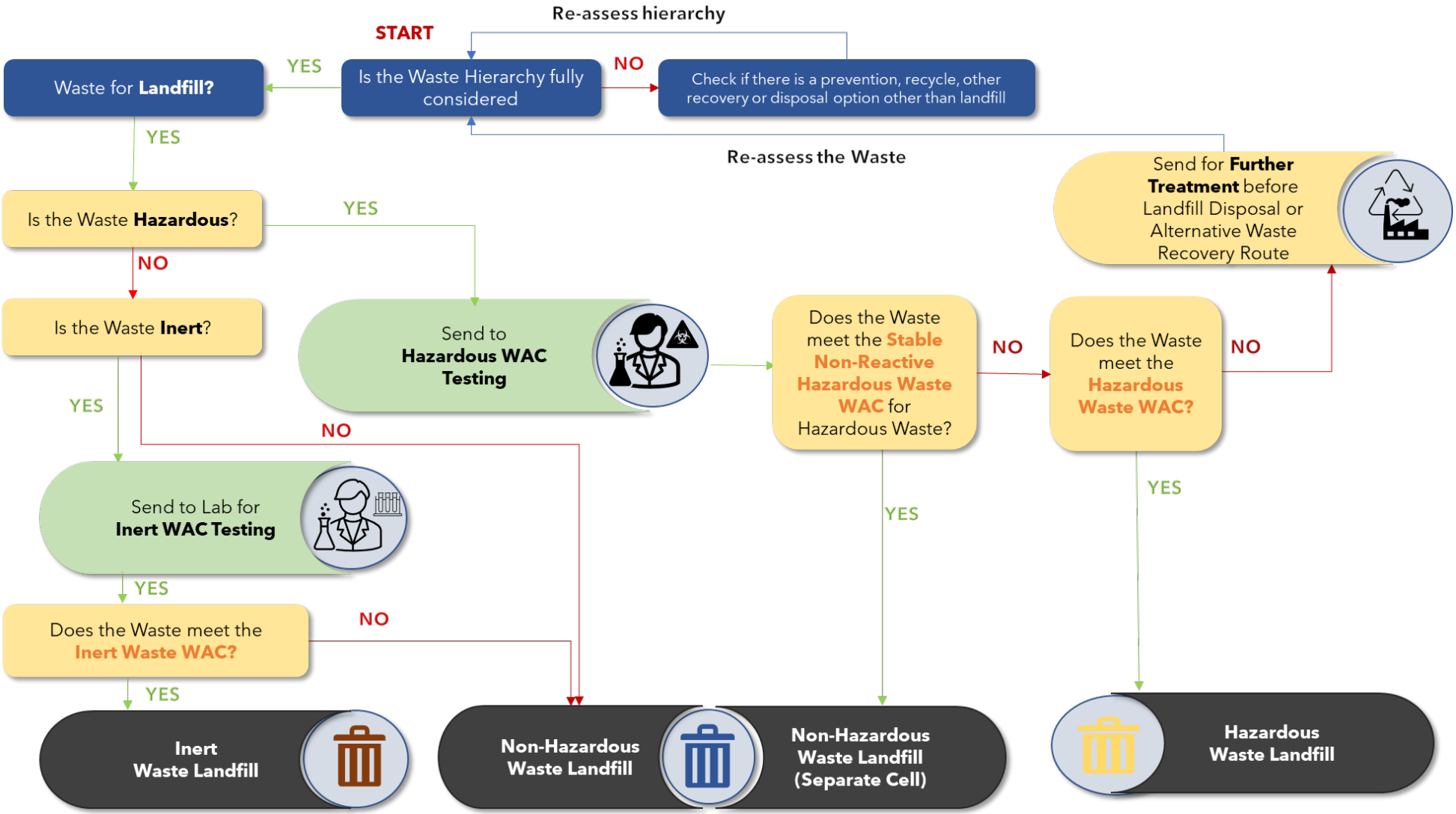

Figure 4-1: Outline the Waste Acceptance Procedure Flow Chart.

5 LANDFILL WASTE ACCEPTANCE PROCEDURES

5.1 Basic characterization (Level 1 waste assessment)

Basic characterization plays a crucial role in determining the appropriate landfill class for the generated waste. However, it should not be employed for waste classification, as that is a distinct and separate process.

5.1.1 Functions of basic characterization

The Functions of basic characterization are:

- Provide basic information on the waste (type and origin, composition, consistency, leachability and - where necessary and available - other characteristic properties);
- Provide basic information for understanding the behaviour of waste in landfills and options for treatment;
- Assessing waste against limit values; and
- Detection of key variables for Compliance Testing and options for simplification of compliance testing (leading to a significant decrease of constituents to be measured).

The waste generator, or in the absence of the generator, the responsible party overseeing its management, is accountable for ensuring that basic characterization is carried out accurately and the information is correct.

5.1.2 Fundamental requirements for basic characterization

The fundamental requirements for basic characterization of waste must include:

- Source and origin of the waste;
- Information on the process producing the waste (description and characteristics of raw materials and products);
- Confirmation that the waste cannot be recycled or recovered;
- Description of the waste treatment method applied, or a statement of reasons why such treatment is not considered necessary;
- Testing data on the composition of the waste and its leaching behaviour, where relevant;
- Appearance of the waste (smell, colour, physical form);
- For hazardous waste: the relevant hazard properties according to Waste Hazardous Properties as listed in the Annex 1 of the Implementing Regulations of the Waste Management Law and the Technical Guidelines on Waste Classification;
- Information to prove that the waste does not fall under the exclusions of wastes not accepted in a landfill as mentioned in Section 6;
- The landfill class at which the waste may be accepted; and
- If necessary, additional precautions to be taken at the landfill.

5.1.3 Testing for basic characterization

Generally, waste must be tested to obtain the above information. In addition to the leaching behaviour, the composition of the waste must be known or determined by testing.

The content of the characterisation, the extent of laboratory testing required and the relationship between basic characterisation and compliance checking depends on the type of waste. A differentiation can be made between:

- wastes that are regularly generated in the same process; and
- wastes that are not regularly generated.

Regularly generated means it is an individual, consistent waste. It is generated by the same well-defined process, and you know its inputs. For these wastes the basic characterisation will comprise the following:

- the range of its composition;
- the range and variability of characteristic properties;
- if required, the leachability of the wastes determined by a batch leaching test and/or a percolation test and/or a pH dependence test, and
- key variables for periodic testing.

Once characterized, a periodic compliance testing can be applied if the process remains the same. Landfill Operator must be informed in the event process changes.

Wastes are not regularly generated where they are not:

- part of a well characterised waste stream, for example they are mixed or inconsistent; and
- generated by the same process at the same facility.

Each batch produced of such waste will need to be characterised. The basic characterisation shall include the fundamental requirements for basic characterisation. As each batch produced has to be characterised, no compliance testing is needed.

5.1.4 Cases where testing is not required

Basic characterization testing is not considered necessary only when:

- The waste falls under the category exempt from testing, as outlined in Section 6 of this document:
- The waste is treated, non-hazardous municipal waste and the same non-hazardous materials from other origins uncontaminated by other substances or objects, as outlined in Section 6.2;
- All the necessary information, for the basic characterisation, is known and duly justified to the full satisfaction of MWAN;
- Testing is either impractical, or suitable testing procedures and acceptance criteria are unavailable. In such cases, a comprehensive record should be maintained, along with a clear explanation of why waste has not been tested and why it is considered acceptable for a specific landfill class;
- It is asbestos waste, displaying no other hazards which is destined for a hazardous waste landfill (Class 1) or a separate cell within a non-hazardous landfill, as outlined in Section 6.3.

5.2 Compliance testing (Level 2 waste assessment)

Once waste has been determined as suitable for a specific landfill class based on the results of the basic characterization, it is subsequently subjected to compliance testing. Compliance testing is conducted to ascertain whether the waste aligns with the findings of the basic characterization and meets the relevant waste acceptance criteria specified in Section 6 of this document.

The function of the compliance testing is periodically to check regularly arising waste streams.

The relevant parameters to be tested are determined during basic characterization. These parameters should be linked to the information derived from basic characterization. Only critical parameters, known as key variables, as determined in the basic characterization, require examination. This check must confirm that the waste adheres to the limit values for these critical parameters.

The tests used for compliance testing shall be one or more of those used in the basic characterisation. The testing shall consist at least of a batch leaching test. For this purpose, the methods listed in Section 7 (Sampling and test methods) should be utilized.

Waste that is exempted from the testing requirements for basic characterization, as presented in sections 6.2 and 6.3, is also exempted from compliance testing. However, they will still need to be checked for compliance with basic characterization information other than testing.

Compliance testing should be carried out at least once annually, and the Landfill Operator must ensure that it aligns with the scope and frequency determined by the basic characterization.

5.3 On-site verification (Level 3 waste assessment)

There are three levels of on-site verification:

- Documentation check;
- Visual inspection; and
- Periodic sampling.

Each load of waste delivered to a landfill shall be visually inspected before and after unloading. The required documentation shall be checked by the Landfill Operator of the site.

Waste can only be accepted at the landfill if it matches the waste that has been subject to both basic characterization and compliance testing and is consistent with the description provided in the accompanying documents. If this alignment is not met, the waste must not be accepted.

MWAN shall determine the testing requirements for on-site verification, including where appropriate rapid test methods Section 7 (SAMPLING AND TEST METHODS).

Upon delivery, samples shall be taken periodically. The samples taken shall be kept after acceptance of the waste for a period as per the provisions of Environmental Permit and the License. (in any case not less than one month).

6 LANDFILL WASTE ACCEPTANCE CRITERIA

This section sets out the Waste Acceptance Criteria for each landfill class.

The following wastes are banned from landfilling:

a. liquid waste;

b. waste which, in the conditions of landfill, is explosive, corrosive, oxidising, highly flammable or flammable, as defined in Annex 1 to the IRs;

c. hospital and other clinical wastes arising from medical or veterinary establishments, which are infectious as defined (property HP9 in Annex 1 to the IRs);

d. all types of used tires, whether whole or cut, excluding tires used for construction, are prohibited in landfills.

e. waste that has been separately collected to prepare it for reuse or recycling (e.g., paper, carboard, metal, plastic, glass, food waste, textile waste etc);

f. any other type of waste which does not fulfil the acceptance criteria determined in accordance with this guideline;

g. any other waste stream not listed above banned from landfilling by MWAN.

Waste can only be accepted at a landfill if it meets the Waste Acceptance Criteria and passes the testing specific to the relevant landfill class, as specified. If the sample results exceed the WAC leaching limit value (as per the tables below), the waste must either undergo treatment to fall below the limits or be directed to an alternative disposal route before being transported off-site.

Furthermore, WAC testing will also provide comprehensive information about how the material might degrade or affect the surrounding area once it has been placed in the landfill.

Under certain circumstances, it is acceptable to allow up to three times the limit values for certain parameters listed in this section, with the exceptions of dissolved organic carbon (DOC) in sections 6.1.1, 6.3.1, and 6.4.2.1, BTEX, PCBs and mineral oil in section 6.4.2.2. Additionally, it is essential to limit any potential increase of the limit value for TOC in section 6.1.2 to only two times the limit value, if:

- MWAN gives a permit for specified waste on a case-by-case basis for the recipient landfill, considering the characteristics of the landfill and its surroundings; and
- Emissions (including leachate) from the landfill, considering the limits for those specific parameters in this section, will present no additional risk to the environment according to a risk assessment report.

Waste may be accepted at a landfill only if it fulfils the acceptance criteria of the relevant landfill class as laid down.

6.1 Waste Acceptance Criteria for Hazardous-Waste Landfills

Landfills for hazardous waste can only accept hazardous waste.

As outlined in Section 5.1, the criteria that make a waste hazardous and the WAC limits are different and may involve different parameters and different tests. They have been established for different purposes and must not be confused.

Refer to the Technical Guideline on Waste Classification as a first step in establishing whether a waste is hazardous. If identified as hazardous, an assessment against the Waste Acceptance Criteria becomes necessary before its disposal in a hazardous waste landfill.

This assessment will involve conducting the basic characterisation of the waste, including testing and comparison against limit values ('WAC limits'). For instance, a waste could be hazardous because it contains an organic carcinogen, but it might be unacceptable at a landfill for hazardous waste because the DOC (dissolved organic carbon) exceeds the relevant limit.

6.1.1 Leaching limit values[3]

The following leaching limit values are applicable to granular waste accepted at hazardous waste landfills, calculated at L/S = 2 and 10 l/kg for the total release, and directly expressed in mg/l for C_0 (in the first eluate of percolation test at L/S = 0,1 l/kg). Granular waste includes all waste that is not monolithic.

MWAN shall determine which of the test methods (Section 7 - SAMPLING AND TEST METHODS) and corresponding limit values in the table should be used.

Table 6-1: Leaching limit values for granular hazardous waste acceptable at hazardous waste landfills

COMPONENT	L/S = 2 l/kg	L/S = 10 l/kg	C_0 (PERCOLATION TEST)
	mg/kg dry substance	mg/kg dry substance	mg/l
As	6	25	3
Ba	100	300	60
Cd	3	5	1,7
Cr total	25	70	15
Cu	50	100	60
Hg	0,5	2	0,3
Mo	20	30	10
Ni	20	40	12
Pb	25	50	15
Sb	2	5	1
Se	4	7	3
Zn	90	200	60
Chloride	17 000	25 000	15 000
Fluoride	200	500	120
Sulphate	25 000	50 000	17 000

[3] Leaching limit values were based on the values included in EU Counsil Decision 19/12/2002 *establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 of and Annex II to Directive 1999/31/EC*.

COMPONENT	L/S = 2 l/kg	L/S = 10 l/kg	C_0 (PERCOLATION TEST)
	mg/kg dry substance	mg/kg dry substance	mg/l
DOC (*)	480	1 000	320
TDS (**)	70 000	100 000	—

(*) If the waste does not meet these values for DOC at its own pH, it may alternatively be tested at L/S = 10 l/kg and a pH of 7,5-8,0. The waste may be considered as complying with the acceptance criteria for DOC, if the result of this determination does not exceed 1 000 mg/kg. (A draft method based on EN 14429 is available.)

(**) The values for TDS can be used alternatively to the values for sulphate and chloride.

The monolithic limit values are also required to provide the same level of environmental protection given by the above limit values.

If the criteria for acceptance at a hazardous waste landfill are not met, the waste maybe subjected to further treatment and tested again against the criteria. If, following the chosen treatment, the waste still doesn't comply with the limit values, then the waste should not be landfilled and treated in another manner.

6.1.2 Other criteria for Waste Acceptance in Hazardous Waste Landfills

In addition to the leaching limit values under section 6.1.1., hazardous wastes must meet the following additional criteria:

Table 6-2: Additional criteria for hazardous waste acceptable at Hazardous Waste Landfills

PARAMETER	VALUE
LOI (*)	10 %
TOC (*)	6 % (**)
ANC (acid neutralisation capacity)	Must be evaluated

(*) Either LOI or TOC must be used.

(**) If this value is not achieved, a higher limit value may be admitted by MWAN, provided that the DOC value of 1 000 mg/kg is achieved at L/S = 10 l/kg, either at the material's own pH or at a pH value between 7,5 and 8,0.

6.2 Waste Acceptance Criteria for Non-hazardous Waste Landfills

Non-hazardous waste as classified in accordance with the provisions of the Implementing Regulation of the Waste Management Law and the Technical Guideline on Waste Classification, may be accepted without testing at landfills for non-hazardous waste. **The key requirement is to ensure the waste is not hazardous and does not pose any hazardous risk.**

The non-hazardous waste may not be admitted at non-hazardous landfills if it has not been subjected to prior treatment or if they are contaminated to an extent which increases the risk associated with the waste sufficiently to justify their disposal in other facilities.

There may however be site-specific reasons why testing of non-hazardous waste may be required. This would be specified in the landfill permit, if there are suspicions of the waste containing high levels of leachable parameters which must be assessed in the risk assessment.

6.3 Waste Acceptance Criteria for stable, non-reactive hazardous waste

This option allows hazardous waste that has been e.g. stabilised and thus has a low leaching potential to be deposited in cells with a standard of containment consistent with non-hazardous wastes.

Stable, non-reactive hazardous waste means that the leaching behaviour of the waste will not change adversely in the long-term, under landfill design conditions or foreseeable accidents:

a. in the waste alone (for example, by biodegradation);

b. under the impact of long-term ambient conditions (for example, water, air, temperature or mechanical constraints); and

c. by the impact of other wastes (including waste products such as leachate and gas).

6.3.1 Leaching limit values for stable, non-reactive hazardous waste

The following leaching limit values apply to granular hazardous waste acceptable at landfills for non-hazardous waste, calculated at L/S =2 and 10l/kg for total release and directly expressed in mg/l for C_0 (the first eluate of percolation test at L/S =0,1 l/kg). Granular waste includes all waste that are not monolithic.

Table 6-3: Leaching limit values for hazardous waste acceptable at Non-Hazardous Waste Landfills

COMPONENT	L/S = 2 l/kg	L/S = 10 l/kg	C_0 (PERCOLATION TEST)
	mg/kg dry substance	mg/kg dry substance	mg/l
As	0,4	2	0,3
Ba	30	100	20
Cd	0,6	1	0,3
Cr total	4	10	2,5
Cu	25	50	30
Hg	0,05	0,2	0,03
Mo	5	10	3,5
Ni	5	10	3
Pb	5	10	3
Sb	0,2	0,7	0,15
Se	0,3	0,5	0,2
Zn	25	50	15
Chloride	10 000	15 000	8 500
Fluoride	60	150	40

COMPONENT	L/S = 2 l/kg	L/S = 10 l/kg	C_0 (PERCOLATION TEST)
	mg/kg dry substance	mg/kg dry substance	mg/l
Sulphate	10 000	20 000	7 000
DOC (*)	380	800	250
TDS (**)	40 000	60 000	—

(*) If the waste does not meet these values for DOC at its own pH, it may alternatively be tested at L/S = 10 l/kg and a pH of 7,5-8,0. The waste may be considered as complying with the acceptance criteria for DOC, if the result of this determination does not exceed 800 mg/kg.

(**) The values for TDS can be used alternatively to the values for sulphate and chloride.

The monolithic limit values are also required to provide the same level of environmental protection given by the above limit values.

It is important to note that non-hazardous wastes deposited in the cells with stable, non-reactive hazardous wastes must also meet the same criteria and therefore must not biodegrade as per provision of Section 6.2

6.3.2 Other criteria

In addition to the leaching limit values under the above section, granular wastes must meet the following additional criteria:

Table 6-4: Additional criteria for hazardous waste acceptable at Non-Hazardous Waste Landfills

PARAMETER	VALUE
TOC (total organic carbon)	5 % (*)
pH	Minimum 6
ANC (acid neutralisation capacity)	Must be evaluated

(*) If this value is not achieved, a higher limit value may be admitted by the competent authority, provided that the DOC value of 800 mg/kg is achieved at L/S = 10 l/kg, either at the material's own pH or at a pH value between 7,5 and 8,0.

The monolithic limit values are also required to provide the same level of environmental protection given by the above limit values.

6.3.3 Asbestos waste

Asbestos is a highly hazardous material with the potential to cause severe health issues when inhaled.

Construction materials containing asbestos and other suitable asbestos waste may be landfilled in accordance with Section 6.3.1 without testing at landfills for non-hazardous waste in a separate cell suitable for non-reactive hazardous waste, if the following criteria are fulfilled:

- The waste contains no other hazardous substances than bound asbestos, including fibers bound by a binding agent or packed in plastic;
- The landfills accept only construction material containing asbestos and other suitable asbestos waste. These wastes may also be landfilled in a separate cell of a landfill for non-hazardous waste, if the cell is sufficiently self-contained;
- To prevent the dispersion of fibers, the deposit zone is covered daily and before each compacting operation using suitable materials. Immediately after deposition, the waste must be covered to a depth of at least 250 mm. By the end of the working day, a minimum of one meter of cover should be applied to all flanks and surfaces. The primary objective of covering in these cells is to ensure that no asbestos or asbestos-containing waste is left exposed, thereby preventing the aerial dispersion of asbestos fibers from the deposit zone. Deviation from the specified depth may be acceptable, provided the operator demonstrates that the proposed depth and application method offer an equivalent level of protection to the environment and human health;
- A map of the landfill's cells shall be available and updated;
- Crushing of construction materials containing asbestos shall be prevented e.g. by foreseeing a passage for the excavators and trucks;
- Prevailing winds study shall be performed to prevent dispersion of fibers in inhabited areas or farming (e.g. livestock);
- No works are carried out on the landfill/cell that could lead to a release of fibers (e.g., drilling of holes);
- Where it is proposed to place non-hazardous waste above the asbestos waste, the separation layer must provide a stable foundation so that the separation layer remains effective;
- A final top cover is put on the landfill/cell to avoid the dispersion of fibers;
- The upper surface of the asbestos cell must be covered with at least 2 meters of suitable material. The material must be incombustible, granular material free from any objects that could disrupt the waste or any packaging;
- After closure, a plan is kept of the location of the landfill/cell indicating that asbestos wastes have been deposited;
- The key principle behind the use of discrete cells for asbestos is to ensure that the asbestos remains physically separate from the main body of waste in the site and isolated from the landfill gas extraction system; and
- Appropriate measures are taken to limit the possible uses of the land after closure of the landfill to avoid human contact with the waste.

Initially and prior to disposal at a non-hazardous or hazardous landfill, all asbestos waste must be appropriately packaged in accordance with the international standards.

If a waste contains asbestos but fails to meet the stable non-reactive hazardous waste WAC limits, it should undergo treatment if possible. Alternatively, if it meets the WAC, it may be accepted at a landfill for hazardous waste.

Wastes that contain asbestos and that are also hazardous by virtue of other constituents can only be disposed of at a landfill for hazardous waste permitted to accept both the asbestos and the other hazards. These wastes can be disposed of within a defined area that is not necessarily a separate cell.

6.4 Waste Acceptance Criteria for Inert Waste Landfills

Where technically feasible, waste must be treated before being deposited in a landfill.

6.4.1 List of waste acceptable at Inert Waste landfills without testing

The waste listed in Table *6-5* is assumed to fulfil the criteria as set out in the definition of inert waste and the criteria listed in section 6.4.2.

This type of waste can be admitted without testing at a landfill for inert waste. The waste must be a single stream (only one source) of a single waste type. Different wastes contained in the list may be accepted together, provided they are from the same source. In case of suspicion of contamination (either from visual inspection or from knowledge of the origin of the waste) testing should be applied or the waste refused. If the listed waste is contaminated or contain other material or substances such as metals, asbestos, plastics, chemicals, etc. to an extent which increases the risk associated with the waste sufficiently to justify their disposal in other classes of landfills, they may not be accepted in a landfill for inert waste.

If there is a doubt that the waste fulfils the definition of inert waste or about the lack of contamination of the waste, testing must be applied. For this purpose, the methods listed under section 7 - SAMPLING AND TEST METHODS shall be used.

Table 6-5: List and restrictions of acceptable Inert Waste without testing

DESCRIPTION	RESTRICTIONS
Waste glass-based fibrous materials	Only without organic binders
Concrete	Selected CDW waste only (*)
Bricks	Selected CDW only (*)
Tiles and ceramics	Selected CDW only (*)
Mixtures of concrete, bricks, tiles and ceramics	Selected CDW only (*)
Soil and stones	Excluding topsoil, peat; excluding soil and stones from contaminated sites
Glass	Separately collected glass only
Soil and stones	Only from garden and parks waste; Excluding topsoil, peat

(*) Selected construction and demolition waste (CDW): with low contents of other types of materials (like metals, plastic, soil, organics, wood, rubber, etc.). The origin of the waste must be known.

- No CDW accepted, polluted with inorganic or organic dangerous substances, e.g., because of production processes in the construction, soil pollution, storage and usage of pesticides or other dangerous substances, etc., unless it is made clear that the demolished construction was not significantly polluted;
- No CDW treated, covered, or painted with materials, containing dangerous substances in significant amounts.

Waste not appearing on this list must be subject to testing as laid down under section 5 to determine if it fulfils the criteria for waste acceptable at landfills for inert waste as set out in following section 6.4.2.

6.4.2 Limit values for inert waste

6.4.2.1 Leaching limit values[4]

Once the waste material has been classified as inert, WAC testing is applied.

The following leaching limit values apply for waste acceptable at landfills for inert waste, calculated at liquid to solid ratios (L/S) of 2 l/kg and 10 l/kg for total release and directly expressed in mg/l for C_0 (the first eluate of percolation test at L/S = 0,1 l/kg).

MWAN shall determine which of the test methods (Section 7 - Sampling and test methods) and corresponding limit values in the table should be used.

Table 6-6: Leaching limit values for waste acceptable at Inert Waste Landfills

COMPONENT	L/S = 2 l/kg	L/S = 10 l/kg	C_0 (PERCOLATION TEST)
	mg/kg dry substance	mg/kg dry substance	mg/l
As	0,1	0,5	0,06
Ba	7	20	4
Cd	0,03	0,04	0,02
Cr total	0,2	0,5	0,1
Cu	0,9	2	0,6
Hg	0,003	0,01	0,002
Mo	0,3	0,5	0,2
Ni	0,2	0,4	0,12
Pb	0,2	0,5	0,15
Sb	0,02	0,06	0,1
Se	0,06	0,1	0,04
Zn	2	4	1,2
Chloride	550	800	460
Fluoride	4	10	2,5

[4] Leaching limit values were based on the values included in EU Counsil Decision 19/12/2002 *establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 of and Annex II to Directive 1999/31/EC*.

COMPONENT	L/S = 2 l/kg	L/S = 10 l/kg	C_0 (PERCOLATION TEST)
	mg/kg dry substance	mg/kg dry substance	mg/l
Sulphate	560 (*)	1 000 (*)	1 500
Phenol index	0,5	1	0,3
DOC (**)	240	500	160
TDS (***)	2 500	4 000	—

(*) If the waste does not meet these values for sulphate, it may still be considered as complying with the acceptance criteria if the leaching does not exceed either of the following values: 1 500 mg/l as C0 at L/S = 0,1 l/kg and 6 000 mg/kg at L/S = 10 l/kg. It will be necessary to use a percolation test to determine the limit value at L/S = 0,1 l/kg under initial equilibrium conditions, whereas the value at L/S = 10 l/kg may be determined either by a batch leaching test or by a percolation test under conditions approaching local equilibrium.

(**) If the waste does not meet these values for DOC at its own pH value, it may alternatively be tested at L/S = 10 l/kg and a Ph between 7,5 and 8,0. The waste may be considered as complying with the acceptance criteria for DOC, if the result of this determination does not exceed 500 mg/kg.

(***) The values for total dissolved solids (TDS) can be used alternatively to the values for sulphate and chloride.

If the criteria for acceptance at an inert waste landfill are not met, inert waste may alternatively be placed in landfills for non-hazardous waste provided it fulfils the appropriate criteria.

6.4.2.2 Limit values for total content of organic parameters

As mentioned above, inert WAC testing must be applied once the waste material has been classified as an inert or if it is considered as potentially inert and there may be an option for it to be disposed to an inert landfill (Class 3).

In addition to the leaching limit values under section 6.4.2.1, inert waste must meet the following additional limit values:

Table 6-7: Limit values for total content of organic parameters for waste acceptable at Inert Waste Landfills

PARAMETER	VALUE (mg/kg)
TOC (total organic carbon)	30 000 (*)
BTEX (benzene, toluene, ethylbenzene and xylenes)	6
PCBs (polychlorinated biphenyls, 7 congeners)	1
Mineral oil (C10 to C40	500
PAHs (polycyclic aromatic hydrocarbons)	(**)

(*) In the case of soils, a higher limit value may be admitted by MWAN, provided the DOC value of 500 mg/kg is achieved at L/S = 10 l/kg, either at the soil's own pH or at a pH value between 7,5 and 8,0.

(**) They are established by MWAN following the performance of specialized studies carried out by the Waste Producer.

7 SAMPLING AND TEST METHODS

7.1 Introduction

Sampling and testing for basic characterisation and compliance testing shall be carried out by certified entities. Laboratories shall have proven experience in waste testing and analysis and an efficient quality assurance system.

MWAN may decide that:

1. The sampling may be carried out by Waste Producers or Landfill Operators under the condition that sufficient supervision of independent and qualified entities ensures that the objectives set out in this Technical Guideline are achieved; and
2. The testing of the waste may be carried out by Waste Producers or Landfill Operators if they have set up an appropriate quality assurance system including periodic independent checking.

The following methods shall be used:

Sampling

For the sampling of waste — for basic characterisation, compliance testing and on-site verification testing — a sampling plan shall be developed according to the national and international standards and procedures that provide data of the same quality and scientific comparability.

General Waste Properties

EN ISO 13137:2022 Determination of TOC in waste, sludge, and sediments

EN 15934:2012 Calculation of dry matter by determination of dry residue or water content

Leaching tests

EN 14405:2017 Leaching behaviour test – Up-flow percolation test (Up-flow percolation test for inorganic constituents)

EN 12457/1-4:2004 Leaching — Compliance test for leaching of granular waste materials and sludges:

part 1: L/S = 2 l/kg, particle size <4 mm

part 2: L/S = 10 l/kg, particle size <4 mm

part 3: L/S = 2 and 8 l/kg, particle size <4 mm

part 4: L/S = 10 l/kg, particle size <10 mm

Digestion of raw waste

EN 13657:2004 Digestion for subsequent determination of aqua regia soluble portion of elements (partial digestion of the solid waste prior to elementary analysis, leaving the silicate matrix intact)

EN 13656:2020 Microwave-assisted digestion with hydrofluoric (HF), nitric (HNO_3) and hydrochloric (HCl) acid mixture for subsequent determination of elements (total digestion of the solid waste prior to elementary analysis)

Analysis

CEN/TR 16192:2020 Analysis of eluates — Determination of pH, As, Ba, Cd, Cl, Co, Cr, CrVI, Cu, Mo, Ni, NO_2, Pb, total S, SO_4, V and Zn (analysis of inorganic constituents of solid waste and/or its eluate; major, minor and trace elements).

CEN/TR 16192:2020 Analysis of eluates — Determination of ammonium, AOX, conductivity, Hg, phenol index, TOC, easily liberatable CN, F (analysis of inorganic constituents of solid waste and/or its eluate (anions)).

EN 14039:2004 Determination of hydrocarbon content in the range of C10 to C40 by gas chromatography.

Alternative national or international test methods maybe considered by MWAN on a case-by-case basis.