



European Union Network for the Implementation  
and Enforcement of Environmental Law

## Landfill Project 2017

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*Treatment of waste before landfilling according to art. 6 of the Landfill  
Directive: first analysis*

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## Introduction to IMPEL

The European Union Network for the Implementation and Enforcement of Environmental Law (IMPEL) is an international non-profit association of the environmental authorities of the EU Member States, acceding and candidate countries of the European Union and EEA countries. The association is registered in Belgium and its legal seat is in Brussels, Belgium.

IMPEL was set up in 1992 as an informal Network of European regulators and authorities concerned with the implementation and enforcement of environmental law. The Network's objective is to create the necessary impetus in the European Community to make progress on ensuring a more effective application of environmental legislation. The core of the IMPEL activities concerns awareness raising, capacity building and exchange of information and experiences on implementation, enforcement and international enforcement collaboration as well as promoting and supporting the practicability and enforceability of European environmental legislation.

During the previous years IMPEL has developed into a considerable, widely known organisation, being mentioned in a number of EU legislative and policy documents, e.g. the 7th Environment Action Programme and the Recommendation on Minimum Criteria for Environmental Inspections.

The expertise and experience of the participants within IMPEL make the network uniquely qualified to work on both technical and regulatory aspects of EU environmental legislation.

Information on the IMPEL Network is also available through its website at: [www.impel.eu](http://www.impel.eu)



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<b>Executive Summary</b>  This Report provides the results of the section of the IMPEL Landfill Project focused on the implementation by EU Member States of art.6 of Directive 1999/31/EC on the landfill of waste, in order to investigate the situation in Member States as regards the landfilling of untreated waste. A survey was preliminary circulated. The report includes: <ul style="list-style-type: none"> <li>- an analysis of the different approaches to evaluate the need of a treatment before landfilling</li> <li>- an analysis of criteria and technologies for waste treatment</li> <li>- permitting instructions for the mixing of the waste</li> <li>- observations on a common methodology to evaluate ANC when dealing with Stable non reactive waste</li> <li>- suggestions for a proper inspection to assess compliance with treatment of both MSW and industrial waste.</li> </ul>	
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## 1. Background

All waste must be treated before it can be landfilled, with a few exceptions. This requirement comes from the Landfill Directive, which aims to reduce our reliance on landfill as a waste management option and minimise the environmental impact of landfill sites.

The essential objectives of waste pre-treatment are to enhance recycling and recovery of resources, and to reduce the environmental pollution potential of waste residuals disposed to landfill.

The mere transposition of the provisions of the Landfill Directive is not sufficient for Member States to achieve compliance with pre-treatment requirements.

This document is intended to help both permit writers and environmental inspectors to assess compliance with the treatment requirement, by reporting the results of the discussion held within the IMPEL project group, about some of the main tricky points to be tackled during this assessment.



## 2. Regulatory framework

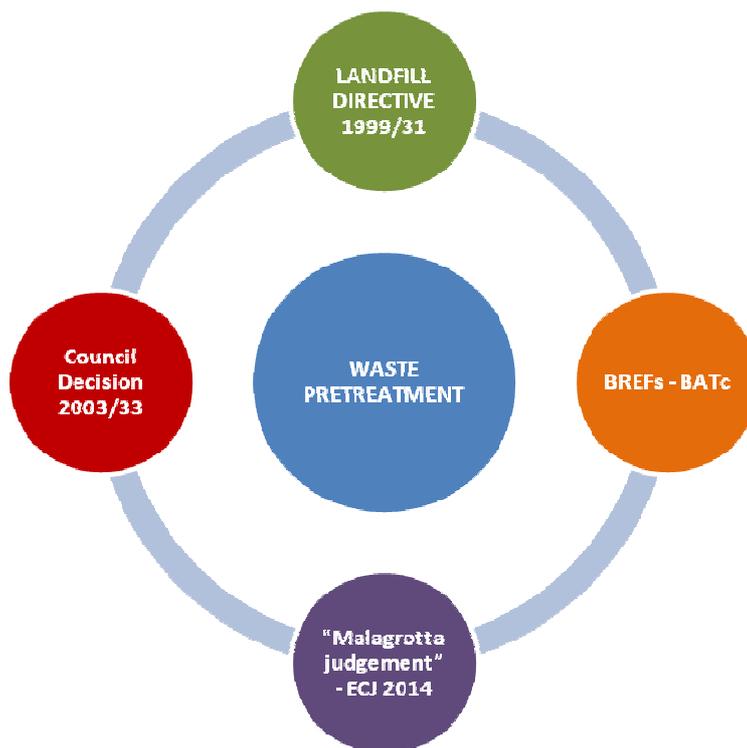


Fig.1: Regulatory framework for pre treatment

### 2.1. Council Directive 1999/31/EC

#### Article 2 Definitions

(h) "**treatment**" means the physical, thermal, chemical or biological processes, including sorting, that change the characteristics of the waste in order to reduce its volume or hazardous nature, facilitate its handling or enhance recovery;

#### Article 6: Waste to be accepted in the different classes of landfill

(a) only waste that has been **subject to treatment** is landfilled. This provision may not apply to inert waste for which treatment is not technically feasible, nor to any other waste for which such treatment does not contribute to the objectives of this Directive, as set out in Article 1, by reducing the quantity of the waste or the hazards to human health or the environment.



## 2.2. Council Decision of 19 December 2002 establishing criteria and procedures for the acceptance of waste at landfills (2003/33/EC)

### ANNEX: Criteria and procedures for the acceptance of waste at landfills

#### 1. Procedure for the acceptance of waste at landfills

##### 1.1.2. Fundamental requirements for basic characterisation of the waste

(c) Description of the **waste treatment** applied in compliance with Article 6(a) of the Landfill Directive, or a statement of reasons why such treatment is not considered necessary.

## 2.3. Proposal for a Directive amending Directive 1999/31/EC on the landfill of waste

A progressive reduction of landfilling is necessary to prevent detrimental impacts on human health and the environment and to ensure that economically valuable waste materials are gradually and effectively recovered through proper waste management and in line with the waste hierarchy. This reduction should avoid the development of excessive capacity for the **treatment** of residual waste facilities, such as through energy recovery or low grade mechanical biological treatment of untreated municipal waste, as this could result in undermining the achievement of the Union's long-term preparation for reuse and recycling targets for municipal waste as laid down in Article 11 of Directive 2008/98/EC.

Similarly, while Member States should take all necessary measures to ensure that only waste that has been subject to **treatment** is landfilled, compliance with such obligation should not lead to the creation of overcapacities for the treatment of residual municipal waste.

## 2.4. The “Malagrotta judgement” - European Court of Justice of 15 October 2014 in case C-323/13

The European Court of Justice (ECJ) has recently ruled that the Malagrotta landfill (Rome – Italy) is in violation of EU landfill and waste management legislation. In the final judgement 4 principles about treatment of waste before landfilling, are confirmed and explicated:

- 1) All waste is **pre-treated**: pursuant to Article 6(a) of the Landfill Directive, all waste capable of undergoing pre-treatment must be pre-treated before it is placed in a landfill.
- 2) Most appropriate **pre-treatment** option is applied: Member States are not free to choose any pre-treatment whatsoever, but must search and implement the most appropriate pretreatment option in order to reduce as far as possible negative impacts on the environment and human health.



- 3) Adequate selection of waste streams: **pre-treatment** must at a minimum include an adequate selection of the different waste streams/fractions.
- 4) Stabilisation of the organic fraction: **pre-treatment** must at a minimum include the stabilisation of the organic fraction of waste.



### 3. Definitions

<b>Municipal Waste</b>	The most comprehensive definition for statistics on MW is still the definition of the OECD/Eurostat joint questionnaire: “Municipal waste covers household waste and waste similar in nature and composition to household waste”. This definition has evolved over time by operationalising it along the 3 main dimensions for waste statistics: <b>waste origin</b> , <b>waste materials</b> and <b>waste collectors</b> . These criteria are to be found in Annex III to this document and marked in the respective colours. Eurostat stated that the principle of municipal waste includes household waste and similar waste types generated by other sources than households, regardless of whether municipalities or private actors are responsible for their collection.
<b>Mixed municipal waste/ Residual waste</b>	Means municipal waste which are unsorted. These are unsorted household waste or residual waste after separate collection. Mixed waste from households and similar institutions with the exception of separately collected fractions (EWC 20 03 01).
<b>Industrial waste</b>	Means waste materials left over from a manufacturing process in industrial buildings such as factories and mines.
<b>Treatment</b>	Means the physical, thermal, chemical or biological processes, including sorting, that change the characteristics of the waste in order to reduce its volume or hazardous nature, facilitate its handling or enhance recovery.
<b>Pre treatment</b>	Means a treatment process applied to a waste before landfilling in order to reduce the quantity of the waste or the hazards to human health or the environment.
<b>Mechanical-Biological Treatment (MBT)</b>	Means the treatment of residual municipal waste through a combination of manual & mechanical processing and biological stabilisation, in order to stabilise and reduce the volume of waste which requires disposal.
<b>Composting/digestion</b>	The input to the aerobic or anaerobic treatment of biodegradable waste may be counted as recycled where that treatment generates compost or digestate which, following any further necessary reprocessing, is used as a recycled product, material or substance for land treatment resulting in benefit to agriculture or ecological improvement. Home composting is excluded.
<b>Mixing operation</b>	Means a physical treatment that mixes different waste streams before landfilling or as preliminary step in a treatment process in order to optimize activity.
<b>Stabilization/partly stabilized waste</b>	Means processes which change the hazardousness of the constituents in the waste and transform hazardous waste into non-hazardous waste(Decision 955/2014); ‘partly stabilised wastes’ means wastes containing, after the stabilisation process, hazardous constituents which have not been changed completely into non-hazardous constituents and could be released into the environment in the short, middle or long term(Decision 955/2014).
<b>Inertization</b>	Means a treatment process which treats a specific waste stream or a mixed waste stream using hydraulic binders and or chemicals in order to stabilize, to solidify the waste or to immobilize pollutants.
<b>Immobilisation</b>	Means a process which immobilise one or more chemicals or/and ions present in a waste in order to meet landfill waste acceptance criteria, specifically such related with leaching test (BREF – Waste treatment industries – August 2006).



<b>Solidification</b>	Means processes which only change the physical state of the waste by using additives without changing the chemical properties of the waste(Decision 955/2014).
<b>Reclassification</b>	Means the transformation of an hazardous into a non hazardous waste due to a treatment process which changes the hazardouness of the waste constituents (stabilization). Reclassification of hazardous waste as non-hazardous waste may not be achieved by diluting or mixing the waste with the aim of lowering the initial concentrations of hazardous substances to a level below the thresholds for defining waste as hazardous
<b>Recovery</b>	Means any operation the principal result of which is waste serving a useful purpose by replacing other materials which would otherwise have been used to fulfil a particular function, or waste being prepared to fulfil that function, in the plant or in the wider economy.
<b>Recycling</b>	Means any recovery operation by which waste materials are reprocessed into products, materials or substances whether for the original or other purposes. It includes the reprocessing of organic material but does not include energy recovery and the reprocessing into materials that are to be used as fuels or for backfilling operations



## 4. General procedure to evaluate the need of treatment before landfilling

### 4.1 Introduction: purpose of waste treatment before landfilling.

The main purpose of waste treatment before landfilling is to meet the overall objectives defined in article 1 of Landfill Directive (LFD, Directive 31/1999/CE), specifically to “*prevent or reduce as far as possible negative effects on the environment, in particular the pollution of:*

- *surface water*
- *groundwater*
- *soil*
- *air*
- *on the global environment (including the green house effect)*

*as well as any resulting risk to human health”.*

The above mentioned objectives are achieved through both specific landfill construction technologies and waste acceptance criteria. The first are set up in the Annexes of LFD, the second are established in the Decision 33/2003/CE (WAC). Examples are shown in the following table.

Table 1: Landfill Directive construction indications and WAC

Environmental objectives of art. 1 of LFD	LDF Annex	WAC
<b>Prevention or reduction of groundwater pollution</b>	<ul style="list-style-type: none"> <li>- Geological barrier</li> <li>- Impermeable mineral layer</li> <li>- Leachate drainage and collection</li> <li>- Monitoring of groundwater quality</li> </ul>	WAC based on leaching test
<b>Prevention of soil pollution</b>	<ul style="list-style-type: none"> <li>- Geological barrier</li> <li>- Impermeable mineral layer</li> <li>- Leachate drainage and collection</li> <li>- Surface sealing and drainage of rainfall</li> </ul>	WAC based on leaching test
<b>Prevention of air and global environment pollution</b>	<ul style="list-style-type: none"> <li>- Surface sealing</li> <li>- Emission (biogas) collection system and treatment system.</li> <li>- Monitoring of biogas emissions (from engine plant, from the surface of the closed landfill) and air quality outside the landfill</li> </ul>	<ul style="list-style-type: none"> <li>- TOC for landfills for inert waste, hazardous waste and for stable non reactive waste</li> <li>- DOC limits for leachate</li> </ul>
<b>Prevention of impacts on human health</b>	<ul style="list-style-type: none"> <li>- Monitoring air quality outside the plant, groundwater quality</li> </ul>	



Beside the construction general requirements set up in LFD, WAC (Decision 33/2003/CE) are defined in order to insure that waste going to landfill comply with the overall objectives to reduce/avoid the possible negative effects on the environment.

According with this purpose it should be evaluated the need to treat a waste before landfilling, specifically to assess if a treatment is necessary to “contribute to the objectives of this Directive, as set out in Article 1, by reducing the quantity of the waste or the hazards to human health or the environment”.

In order to evaluate the need of a treatment it should be assessed if the waste meets already the criteria that ensure to avoid/reduce the hazards to human health or the environment. Such criteria are partially defined in the **WAC** and partially in national laws set up by the Member States (**additional criteria**).

In the following table the relationship among LFD objectives, suitable treatment activity and criteria to measure the effectiveness of the treatment or to exclude the need of a treatment of a specific waste stream, is proposed.

Table 2: Treatment and criteria

LFD Objective and Circular Economy Policy	Suitable treatment activity	Criteria or parameter to check effectiveness of treatment activity	
		Decision 2003/33/CE	Additional Criteria
<b>Reducing waste volume*</b>	Sieving/selection/separate collection		
<b>Reducing hazardousness</b>	Stabilization (as defined in Decision 955/14/CE): - <b>Inorganic pollutants</b> (Removal/Chemical treatment and transformation)		Hazardous inorganic compound concentration (if removing is applied) or chemical compound obtained (for example XRD analysis if chemical transformation is applied)
	Stabilization (as defined in Decision 955/14/CE): - <b>Organic pollutants</b> (Thermal desorption, biodegradation ...)	- TOC (landfill for inert waste and stable non reactive hazardous waste) - Mineral oil - PCBs - PAHs	Specific hazardous Organic Compounds concentration
<b>Reducing impact on water (underground and surface water)</b>	Reducing high rate biodegradable compounds: <b>biological stabilization</b> (aerobic or anaerobic or both)	TOC (landfill for inert waste and stable non reactive hazardous waste)	- Respiration index (DRI, AT <sub>4</sub> , Sour) - Biomethane production (BMP, GB <sub>21</sub> )
	Reducing leaching of inorganic compounds (metals, anions): <b>immobilization</b> (adding	Limit values of leachate after leaching test	



	hydraulic binders, chemicals)		
<b>Reducing impact on air</b>	Reducing high rate biodegradable compounds: <b>biological stabilization</b> (aerobic or anaerobic or both)		- Respiration index (DRI, AT4, SOUR) Biomethane production (BMP, GB21)
<b>Reducing impact on global environment</b>	Reducing methane emission from landfill: <b>biological stabilization</b> (aerobic or anaerobic or both)	TOC	- Respiration index (DRI, AT4, SOUR) - Biomethane production (BMP, GB21)
<b>Reducing long term impacts</b>	Organic carbon treatment, increasing acid neutralization capacity: <b>chemical oxidation, stabilization/immobilization process</b>	- TOC (stable non reactive hazardous waste) - pH - ANC	
<b>Circular economy</b>	- Sorting waste to be recovered-recycled: separate collection, - Separating waste to be recovered as alternative fuel: RDF	- Diversion dry recyclables and of biodegradable municipal waste going to landfill (Art. 5 LFD)	- LHV (lower heating value)

#### 4.2 The Malagrotta ruling and the evaluation of the need of a pretreatment.

The main conclusions of the Malagrotta ruling are the following:

- The European Commission in the Malagrotta case established that the pre-treatment under the Landfill Directive may not simply consist of changing the characteristics of waste to reduce its volume or hazardous nature, facilitate its handling or enhance recovery, but *“it must also result in preventing and reducing as far as possible hazards for human health and negative impacts on environment”*.
- The European Court of Justice endorsed the European Commission’s argument that no any pre-treatment complies with Article 6 of LFD *“but only the most appropriate pre-treatment that reduce as far as possible the negative impacts of waste on the environment and, therefore on human health”*. In the conclusions of the judgement two minimum requirements for pre-treatment are added, i.e. an adequate selection of the different waste streams (separate collection) and the stabilisation of the organic fraction.

The above mentioned example of a treatment which reduces the negative impacts on the environment is linked with municipal waste, which is the case reported in the Malagrotta case. This statement may be used more generally for other waste streams considering the selection of recyclables streams and also evaluating the impacts of the residual to be landfilled.



### 4.3 Different approaches to evaluate the need of a treatment before landfilling

Directive 1999/31/CE and Decision 2003/33/CE provide the need of a waste pretreatment before landfilling in order to achieve WAC and reduce environmental impacts. Directive 1999/31/CE shortly establishes that:

*“Only waste that has been subject to treatment is landfilled”.*

*“This provision **may not apply** to inert waste for which treatment is not technically feasible, **not to any other waste for which such treatment does not contribute to the objectives of this Directive**, as set out in Article 1, by **reducing the quantity of the waste or the hazards** to human health or the environment”.*

*“**treatment** means the physical, thermal, chemical or biological processes, including sorting, that change the characteristics of the waste in order to **reduce its volume or hazardous nature, facilitate its handling or enhance recovery**”*

**UK EPA** published in 2007 (amended in 2011) the report *“Treatment of waste for landfill”*, which aims to give advices to waste producers in order to better handle their waste in compliance with waste hierarchy and to improve the general waste management in a more environmental friendly way.

**EPA of Ireland** published in 2009 a technical guidance *“Municipal Solid Waste – Pre-treatment & Residuals Management”* which deals specific with diversion of biodegradable municipal waste from landfill.

The **NORDEN** (Norden Council of Ministers which includes Denmark, Faraoe islands, Finland, Iceland, Norway, Sweden) published in the same year a specific report *“Treatment methods for waste to be landfilled”*, based on literature investigations. This report provides an overview of the treatment options available to change some of the critical properties of selected industrial waste materials that cannot meet the appropriate WAC.

Recently (2016) Italian National Institute for Environmental Protection and Research (**ISPRA**) published in cooperation with regional EPA a guideline, which sets up specific criteria to evaluate the need of a pretreatment before landfilling for several and different waste categories (household, industrial wastes, stabile non reactive hazardous waste, high biodegradable organic waste etc.). This guideline is proposed as a technical reference document for permitting writers in order to establish in landfill license the list of waste that must be treated and some criteria and parameters to evaluate if a specific waste doesn't need a treatment before landfilling.

The above mentioned documents have a different approach.



#### 4.3.1. The UK (England) Environment Agency approach

The UK guideline first principle is that “*All of the waste must have been treated*”, after that it’s described an evaluation procedure (**Three Point Test**– see § 3.4) to assess if the treatment option for waste destined for landfill comply with the definition of treatment.

The general purpose of the treatment is to:

- Reduce the amount of waste going to landfill
- Reduce the impact of waste when it is landfilled.

The three point test contains the check of the compliance with the three parts of the definition of treatment of LFD, e.g.:

- 1) the treatment must be physical, thermal, chemical, biological process, including sorting
- 2) It must change the characteristics of waste
- 3) It must do in order to reduce volume, the hazardous nature, facilitate handling or enhance recovery.

More details about this procedure are set up in § 3.4

The guideline contains a theoretical section to better understand the three point test and a practical section with examples of treatment options and good practices. There’s an additional annex listing many waste code entries with consideration of potential treatment processes and if the waste could be considered as already treated by the production site.

The UK guideline shortly has an overall approach, evaluating the composition of the waste by the producer and the actions carried out in order to comply with the three point test. In the proposed examples, a separate collection of dry recyclables (sorting), if the amount is large, of all the waste produced by the company is often the chosen treatment option. The residual mixed waste is accepted in landfill as pre-treated and no supplementary treatment is required. The same for C&D waste, where concrete or crushed bricks are removed for recycling, or contaminated soils, where part of the soil (the uncontaminated) or stone are segregated in situ.

The guideline doesn’t set up specific criteria or limit values to establish if the disposed waste comply with the definition of treatment in order to meet the overall objectives of LFD.

#### 4.3.2. The Ireland EPA pre-treatment guideline for municipal solid waste management

The EPA technical guidance of Ireland sets out standards for minimum acceptable pre-treatment for municipal solid waste accepted for landfilling or incineration. The guidance requires operators of landfill and incineration facilities to demonstrate via their waste acceptance policy (as established by licence conditions) that waste accepted at these facilities has been subjected



to appropriate pre-treatment. The document aims to evaluate the treatment obligation and biodegradable waste diversion from landfill (National Biodegradable Waste Strategy).

Some of the 10 possible public policies proposed to achieve the organic waste diversion targets, set out in art. 5 of LFD, are:

- Promote at-source composting
- Expand R&D for at source composting
- Ban the landfill of untreated municipal waste
- Undertake market research for treated organic fraction biodegradable organic waste
- Develop stabilised biowaste standards.

The gap analysis of the National Strategy on Biodegradable Waste states that only separate collection and recovery of BW are not sufficient to achieve the targets and that a pre-treatment of the biodegradable fraction of residual waste is necessary.

Three minimum acceptable pre-treatments for MSW landfills in terms of separate collection systems are set out:

- 1) A 2 bins separated collection system (Quality green waste and dry recyclables)
- 2) A 3 bins separated collection system (Quality green waste, dry recyclables and mixed organics) for urban areas (> 1,500 population).
- 3) A mechanical biological treatment of the residual waste (black bin) could be added if the diversion obligation of article 5 of LFD are not yet achieved
- 4) A mechanical biological treatment of the residual waste must be applied if a 2 or 3 bin system is not available/availed.

The effectiveness of the mechanical biological treatment is evaluated assessing the stabilisation degree of the bio-stabilised residual waste through the Respiration Activity Index: **AT<sub>4</sub> < 7 mg O<sub>2</sub>/g DM.**

**Stabilisation** means the reduction of the decomposition properties of biowaste to such an extent that offensive odours are minimised and that the Respiration Activity after four days (AT<sub>4</sub>) is <7 mg O<sub>2</sub>/g DM.

#### 4.3.3. The NORDEN investigation about treatments methods for waste to be landfilled.

In 2009 the Norden published a report about the investigation of treatment options for some industrial waste streams, like MSWI, APC residues, shredder residue from automobiles or end of life vehicles, MSWI bottom ash and bioashes.



The point of view of this document is that the need of a treatment before landfilling is necessary when the waste doesn't meet the waste acceptance criteria set out in the Council Decision 2033/33/EC or in the national laws. The focus is on WAC for hazardous waste or for stable non reactive waste disposed in a landfill for non hazardous waste. The aim of the treatment is to comply with WAC or to reduce hazardous nature of the waste in order to re-classify the hazardous waste as non hazardous. Some Nordic State have implemented the 3 factor rule, which on a case-by-case basis and after a favourable risk assessment allows to increase the WAC values by up to a factor 3.

This is a different approach in regard to the three point test above mentioned. The chemical composition of the waste and/or the compliance with limit values (f.e. for leaching test) are used to demonstrate the need or the effectiveness of the treatment, in terms of **“reducing the quantity of the waste or the hazards to human health or the environment”**.

The report presents the main critical parameters of each waste stream and the feasible technological treatment methods based on a literature review.

The need of a treatment set up in such guideline could be useful especially for industrial waste.

#### 4.3.4. The Italian guideline to evaluate the need of a treatment before landfilling.

In 2016 ISPRA, the Italian National Institute for Environmental Protection and Research in cooperation with regional EPA, issued a guideline, which defines criteria to establish when a waste pre-treatment before landfilling is not necessary in order to achieve the environmental objectives of LFD.

The document set out a general procedure for landfill permit writers to establish if it could be considered that the waste meets already the environmental requirements without the need of a treatment.

Three aspects are considered:

- 1) If the waste is municipal or industrial
- 2) The EWC entry
- 3) Specific criteria for different kinds of waste.

For **municipal waste** the following provisions are established:

- Separate collected waste has to be recovered and its disposal is banned;
- Residual waste (200301 and 200399 codes) has to be treated unless:
  - The diversion of biodegradable waste from landfill target of art. 5 of LFD has been already achieved and
  - A separate collection rate of 65% has been achieved and



- The maximum content of biodegradable waste (biowaste and green waste) in the residual waste is < 15% by weight or the Dynamic Respiration Index (DRI) is lower than 1.000 mg O<sub>2</sub>/Kg VS/h.
- Street cleaning residues (200303 code) has to be treated if the biodegradable waste (biowaste and green waste) is > 15% by weight.

For **industrial waste** the following categories are investigated:

- Sludges and other waste which need a drying treatment: a minimum content of 25% of dry matter is required otherwise a treatment is mandatory.
- Waste coming out from a waste treatment plant, wastewater sludges and others potential high rate biodegradable waste: a Dynamic Respiration Index (DRI) lower than 1.000 mg O<sub>2</sub>/Kg VS/h is required otherwise a treatment is mandatory.
- Others slow rate biodegradable waste: a TOC lower than 5% by weight is required otherwise a treatment is mandatory.
- Stable non reactive hazardous waste: the national Landfill WAC Decree, as amended in 2015, established that a waste could be labelled as stable non reactive only after a treatment process. In such way the effectiveness of the treatment is assessed by TOC (<5%), pH (>6) and especially by ANC evaluation.

#### 4.3.5. Conclusions

The overall objectives of LFD could be achieved first through a selection of recyclables and recoverable waste streams both for municipal and industrial waste.

The need of a pre-treatment may be evaluated in relation to the characteristics of the waste that has to be landfilled. Specific criteria, such as WAC and additional criteria set out by Member State have to be evaluated in order to assess if the potential environmental impacts is low or if a specific pre-treatment has to be adopted in order to achieve such objectives.

#### 4.4 The Three Point Test

Article 6 of the Landfill Directive requires that Member States shall take measures in order that only waste that has been subject to treatment is landfilled. This provision does not apply to inert waste for which treatment is not technically feasible, nor to any other waste for which such treatment does not contribute to the objectives of the Directive, as set out in Article 1, by reducing the quantity of the waste or the hazards to human health or the environment.



These requirements form the first test that must be applied as to whether or not a particular waste stream is to be treated prior to being landfilled.

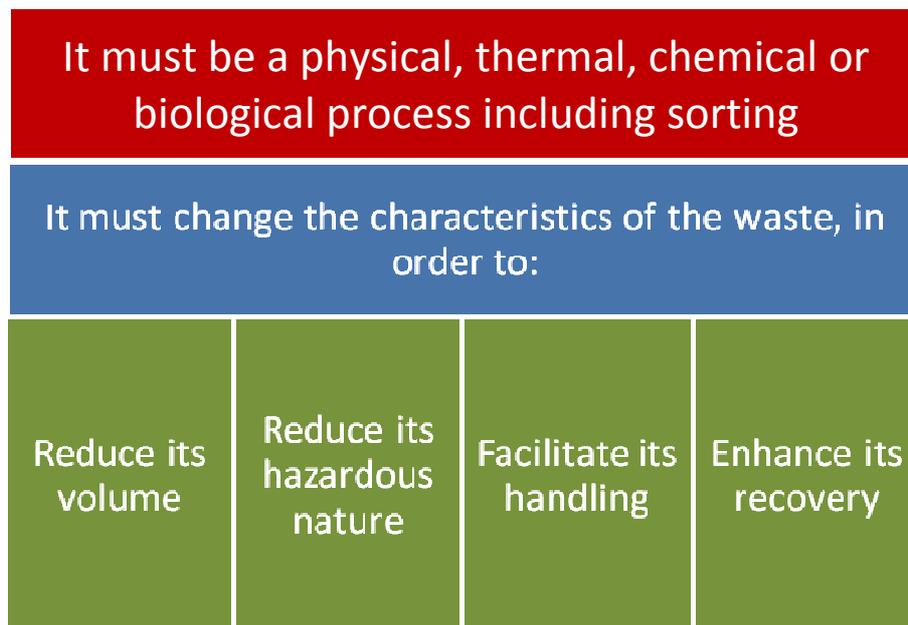
In practice this means that wastes must be treated if a treatment is available which will reduce either the amount of waste to be landfilled and/ or the hazards to human health or the environment.

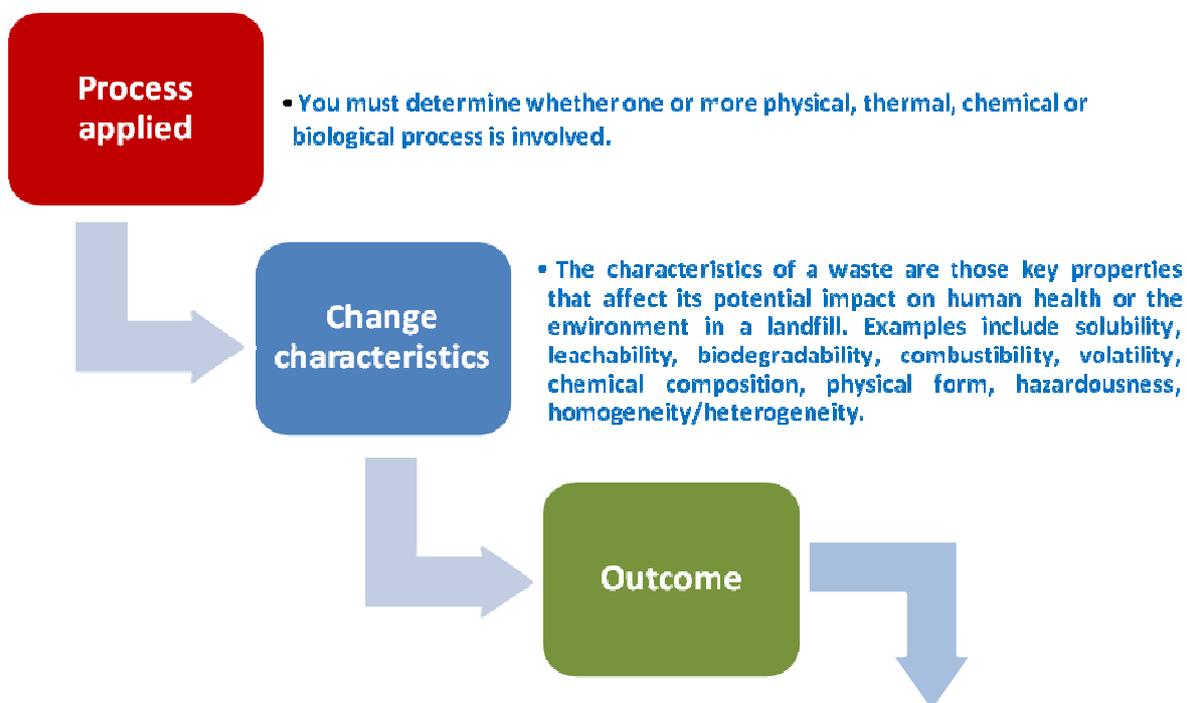
It can only be decided that treatment would not contribute to the objectives of the Landfill Directive after a thorough evaluation of the treatment options and bearing in mind the need to consider the waste hierarchy.

The Landfill Directive places the obligation on the landfill operator and defines treatment as:

*'the physical, thermal, chemical or biological processes, including sorting, that change the characteristics of waste in order to reduce its volume or hazardous nature, facilitate its handling or enhance recovery'.*

This requirement can be broken down into a '**Three-Point Test**', against which the proposed treatment option can be assessed:





**a. Reduce volume:** Processes that reduce the volume of the waste by compaction do not change the characteristics of the waste so don't meet the second criterion. Examples of processes that change the characteristics of the waste in order to reduce the quantity landfilled include: the incineration of waste; the sorting of waste to divert a stream from landfill; or the composting of waste to remove organic matter.

**b. Reduce hazardous nature:** This must be interpreted in relation to the waste being landfilled. The simplest way to demonstrate a reduction in hazardousness is to treat hazardous waste, for example to, remove one or more of the hazards associated with the waste or reduce one of the hazards to a lower hazard. For non-hazardous waste, reducing hazardous nature may include removing biodegradable waste to reduce the residual wastes impact on methane production and thus on climate change.

**c. Facilitate handling:** Where the proposed treatment is to facilitate handling, the change in characteristics that will facilitate handling should reduce the negative effects on the environment or health arising from landfilling the waste. Examples include treatments that cause long-term change in the characteristics of the source term in terms of leachability, generation of gas, volatile compounds or odour.

**d. Enhance recovery:** The key provision is that the requirement is 'in order to' enhance recovery. There are two exceptions to the need for treatment (as outlined by the Landfill Directive, article 6(a)) because there are sometimes no treatments available that would contribute towards the aim of the Landfill Directive. These exceptions are: a. inert waste for which treatment is not technically feasible; b. waste other than inert waste where treatment would not reduce its quantity or the hazards that it poses to human health or the environment.



Treatment is for the purposes of reducing the amount of waste going to landfill and reducing the impact of waste when it is landfilled. This purpose originates from the overall aims of the Landfill Directive and should be kept in mind when applying the 3-point test to potential treatment options. This will ensure that the treatment delivers appropriate environmental outcomes.

Typically it is expected that for each waste stream, operators should consider the available treatment options that could apply to that type of waste and assess the ability of those treatment options to deliver the objectives of treatment.

The processes that can be applied in treating a waste are very broad covering physical, thermal, chemical or biological processes (including sorting). Clearly for any specific waste stream many treatment systems can be screened out from detailed consideration. It is anticipated that detailed consideration would only be required for those most likely to meet the treatment objectives.

In each case it is for the landfill operators, as part of their waste acceptance procedures, to present evidence as to what treatment has been undertaken in order to satisfy the three point test. Alternatively the operators must present evidence to justify why treatment of any specific waste stream does not lead to the reduction in quantity or the hazards which the waste poses to human health or the environment. This by necessity must be based on a waste stream specific and landfill specific basis.

The following principles should help in applying the test:

**A**

*All of the waste must have been treated. Collection services that mix treated and untreated waste are not meeting the requirement and all the waste will need further treatment before landfill. In many cases it will be easier to treat the waste before collection or undertake separate collection rounds. If the treatment option is to separate out certain recyclable material, one could reasonably expect all of that material to have been removed, not just one or two items.*

**B**

*Sorting is an acceptable form of treatment because if it is carried out properly it will change the characteristics of the waste and meet one of the four strands of point 3 of the test, e.g. reducing volume to landfill. Source segregation meets the same criteria and is acceptable treatment. Where the sorted or segregated waste is then recovered or re-cycled, it also moves that waste up the waste hierarchy.*

**C**

*Compaction is not an acceptable treatment, as it does not change the characteristics of the waste that will have the same impact on the environment as un-compacted waste.*



## 5 Treatment of waste before landfilling: criteria and technologies

### 5.1 Choosing a treatment option: technical considerations

A suitable treatment for your waste is likely to depend on the exact physical form and chemical composition of your waste and whether a particular treatment facility can accept it.

It may also depend on the amount you produce in relation to the other wastes being accepted by the treatment plant. For example, a composting process may be able to accept a small proportion of animal waste or wood shavings, but this may be limited.

#### 5.1.1. The composition of the waste

Considering the composition of the components of the waste will give you a broad indication of the types of process that will meet the first criterion of the three-point test. This may narrow the range of possible treatments to consider. The examples provided are intended to be used for early treatment, preferably at or just after the waste is produced.

#### 5.1.2. Example treatment processes for different types of waste

##### Composition of the waste and Potential treatment processes

*Insoluble inorganic* (e.g. concrete, bricks) - Direct reuse (e.g. as bricks), Physical treatment (e.g. size reduction or screening) to make the waste suitable for use (e.g. as aggregate).

*Soluble /partially soluble inorganic* (e.g. soils or thermal process residues that are not hazardous waste) - For non-hazardous inorganic wastes, consider reuse or recovery.

*Biodegradable organic* (e.g. food waste) - Biological treatment: There are a range of treatment options available for treating biodegradable waste and the technology is developing all the time. They include; composting and anaerobic digestion. Thermal treatment: usually incineration.

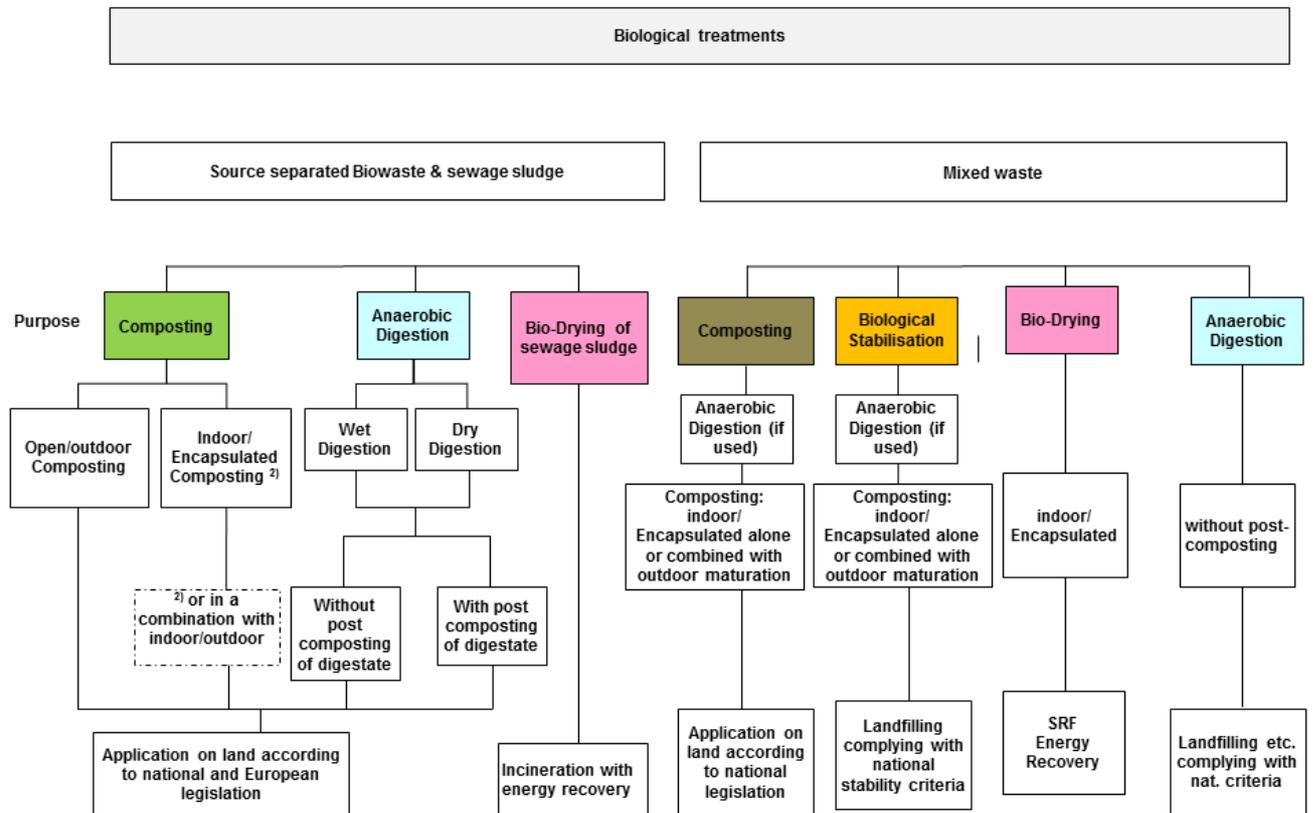


Fig.2: Biological treatment route (BREF Waste Treatment)

'Dry' recyclable materials (e.g. paper, plastic, glass, metal) - Preparing for reuse to a product again.

Mixture (e.g. household waste) – Separation.

Most wastes are mixtures for which you will have two options: to separate the components or to treat the whole waste stream. For example, the options for general waste might include separate collection at source or separation of the waste components at a materials recovery facility (MRF). Alternatively, all the mixed general waste could be incinerated.



### 5.1.3. Other types of treatment

A range of technologies is available or being developed to treat those wastes that cannot be recycled or composted. These include:

*Thermal treatment*. This includes incineration, usually with energy recovery and preferably at a combined heat and power (CHP) facility. It also includes pyrolysis and gasification. The technology is usually referred to as energy-from-waste (EfW); although other processes such as landfill gas utilisation and burning refuse-derived fuel (RDF) from mechanical biological treatment, are also sometimes referred to as EfW.

*Mechanical biological treatment (MBT)*. MBT operations involve the partial processing of mixed household waste by mechanically removing some parts of the waste and biologically treating others by composting or anaerobic digestion, so that the volume of the residual fraction is reduced and is biologically stabilized. MBT in itself does not result in the final treatment of residual waste. A variation is mechanical heat treatment (MHT), where the waste is heated by hot air or steam to sterilise it and prepare the organic content for further treatment. Such MHT systems are sometimes described as thermal, but they operate at a lower temperature than the processes mentioned above. MBT and MHT aim to separate further recyclables and to produce a bio-organic material that can be used in a variety of ways such as reuse of the fibre, production of bioethanol, use as a fuel, application to land, or disposal to landfill of a material with a reduced biodegradable content.

*Anaerobic digestion (AD)*. This is sometimes grouped with MBT. It processes mixed and shredded waste to produce useable gas and a bio-organic residue, which can be used as described above for MBT.

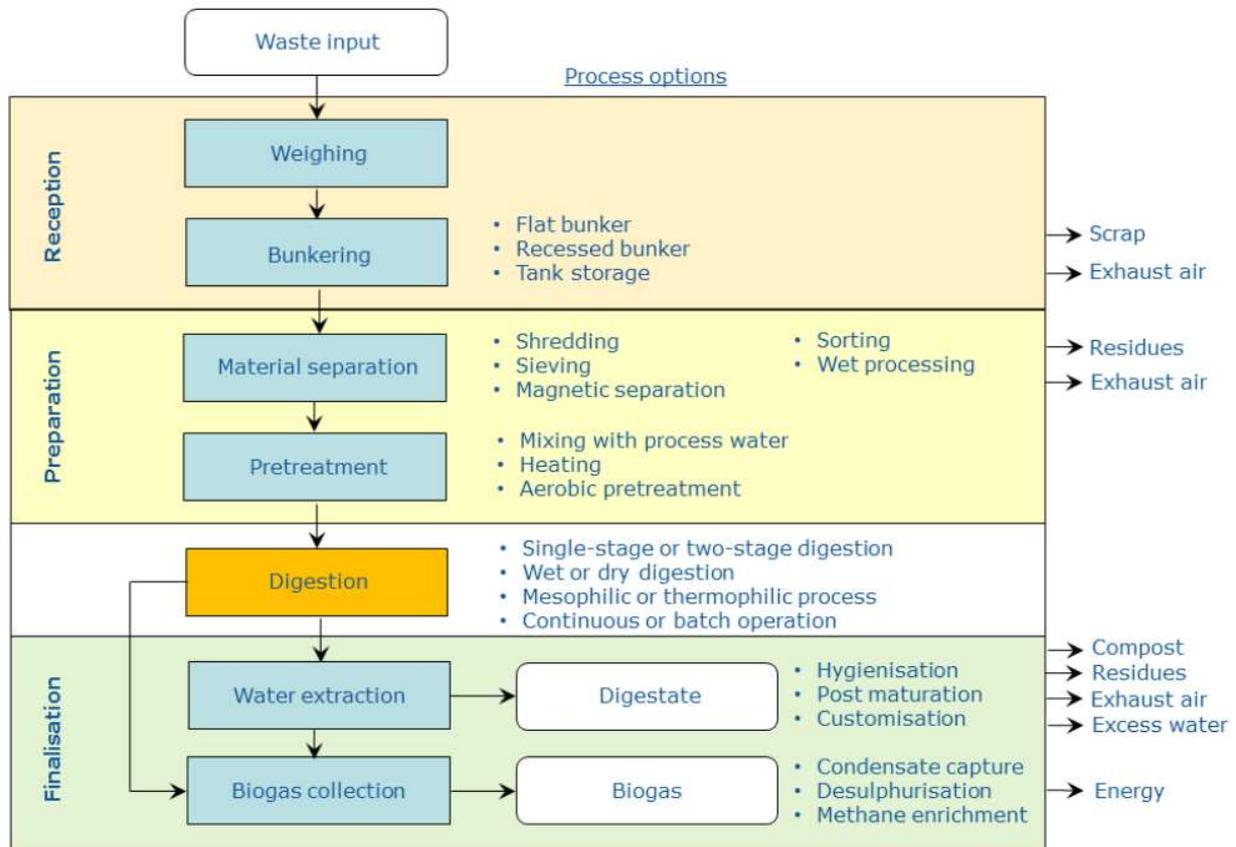


Fig.3: Anaerobic digestion plant design (BREF Waste Treatment)

**Thermal desorption (TD).** This is a remediation technology that utilises heat to volatilise contaminants such that they can be removed (separated) from the solid matrix (typically soil, sludge or filter cake). Thermal desorption is not incineration. The volatilised contaminants are then either collected or thermally destroyed. A thermal desorption system therefore has two major components; the desorber itself and the off-gas treatment system.

## 5.2 Municipal waste

The pretreatment of municipal waste can include processes such as:

**Separate collections** – waste is segregated at source by providing for the separate collection of recyclable materials. This may apply to waste produced by householders or similar waste from commercial premises. It is a matter of discussion in Member States, whether any residual municipal waste from such schemes can be regarded as treated for the purposes of the Landfill Directive or not.



Malagrotta Judgement (European Court of Justice in case C-323/13) stated that the method of separate collection could not constitute a treatment for the Article 6 (a) of Directive 1999/31 / EC, since a high rate of separate collection does not allow the conclusion that the part of waste that remains undifferentiated should not be subject to appropriate treatment, including stabilization of the organic fraction of the waste.

According to the Italian Guidelines, it is considered that, in order to exclude the need to treat residual waste from separate collection, it must be ensured that:

- the target of reducing the biodegradable fraction of urban waste in the landfill has been achieved;
- a separate collection percentage of at least 65% has been achieved.

Under such conditions pretreatment may not be necessary if the residual waste has a Dynamic Respirometric Index (DRI) of less than  $1.000 \text{ mg O}_2 \cdot \text{kgSV}^{-1} \cdot \text{h}^{-1}$ .

The Irish EPA has identified the following standard to assist operators in demonstrating the effectiveness of any treatment applied to residual biodegradable municipal waste (BMW) in respect of the biodegradable component (where destined for landfill disposal):

*'Stabilisation' of residual wastes intended to be placed in a landfill means the reduction of the decomposition properties of biowaste to such an extent that offensive odours are minimised and that the Respiration Activity after four days (AT4) is  $<7 \text{ mg O}_2/\text{g DM}$ .*

Irish EA document re composting

[http://www.epa.ie/pubs/reports/research/waste/STRIVE\\_22\\_Prasaad\\_Compost\\_web.pdf](http://www.epa.ie/pubs/reports/research/waste/STRIVE_22_Prasaad_Compost_web.pdf)



Where there is no source segregation of household or similar commercial waste, this waste will need to be separately treated prior to landfill (e.g. at a materials recovery facility). This may include manual sorting, mechanical treatment (crushing, grading, magnetic separation, eddy current separation, ballistic separation, trommeling, sorting, etc).

There is a certain proportion of residual biowaste, which is not suitable for recycling or biological treatment or is not collected separately which remains. Two broad categories of treatment for this material are thermal treatment with energy recovery, and Mechanical Biological Treatment (MBT).

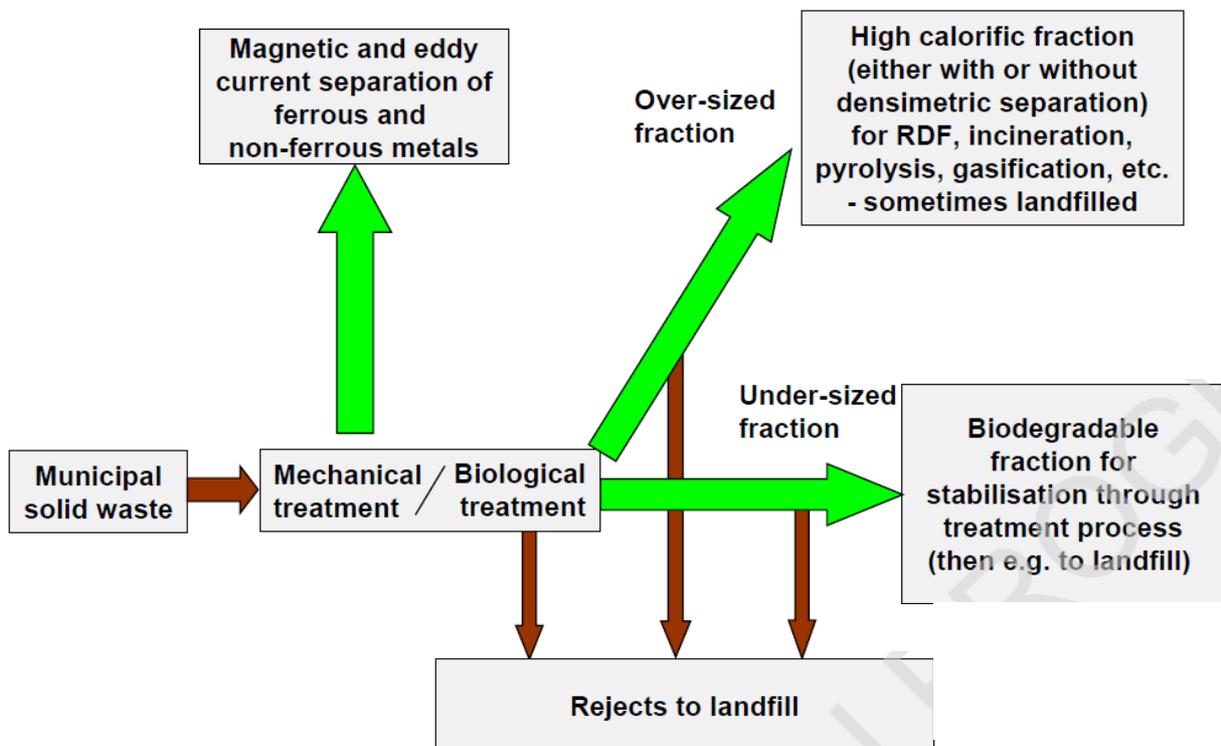


Fig.4: Schematic representation of mechanical/biological treatment inputs and outputs (BREF Waste Treatment)

MBT is usually designed to recover materials for one or more purposes and to stabilise the organic fraction of the residual waste. The practical advantages of MBT plants are, above all, the reduction of:

- the volumes of waste;
- the organic matter content of the waste, which are sent to final disposal (landfill or incineration).



Another purpose of MBT is to break down the material for further processing (e.g. preparation of solid waste fuels). Biological digestion is intended to reduce the weight, and to render inert any biologically active organic materials (typically called 'stabilised residue'). Typical values for the combined loss of water and biodegradable materials may be in the range of between 20 % and 35 %, mainly depending on the duration of treatment. Further reductions of the waste volume sent to landfill may be achieved by mechanical separation of the output and can be even higher than 60 %.

Mechanical biological treatment is a tool for pre-treating wastes prior to landfilling or for preparing solid wastes (typically municipal solid waste) to be used as fuels.

The flow chart below illustrates the usual final municipal waste treatment operations. Municipal waste treatment data are broken down into these categories:

- Incineration (separately for with and without energy recovery)
- Landfilling
- Recycling (excluding composting/digestion)
- Composting/digestion

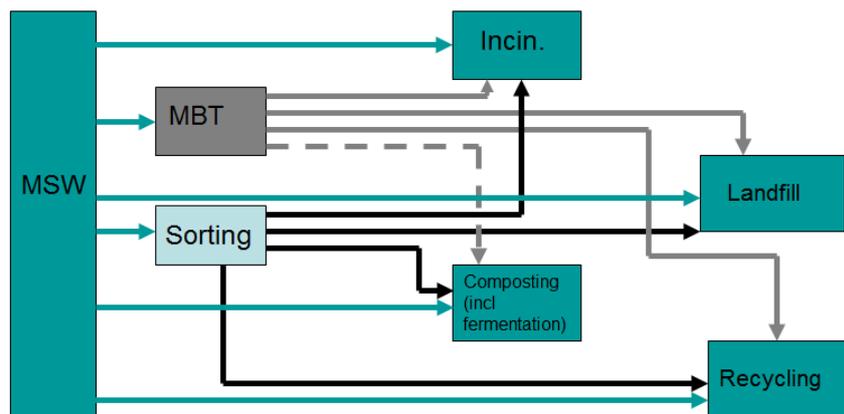


Fig. 5: MSW treatment options

The output from MBT plants is greatly reduced in weight and stabilised (emission releases from the output compared with the untreated material could be reduced approximately 90–98 % under landfill conditions). In some countries, the output may be used as landfill cover if contamination is low enough, or it may be landfilled. The quality of the output is generally not acceptable for widespread use because of the contaminants related to both the inert content (glass, plastic, etc.) and also to the heavy metals content arising from other wastes entering the stream (batteries, etc.). Other outputs are combustible fractions and recyclable materials (e.g. metals, plastic).

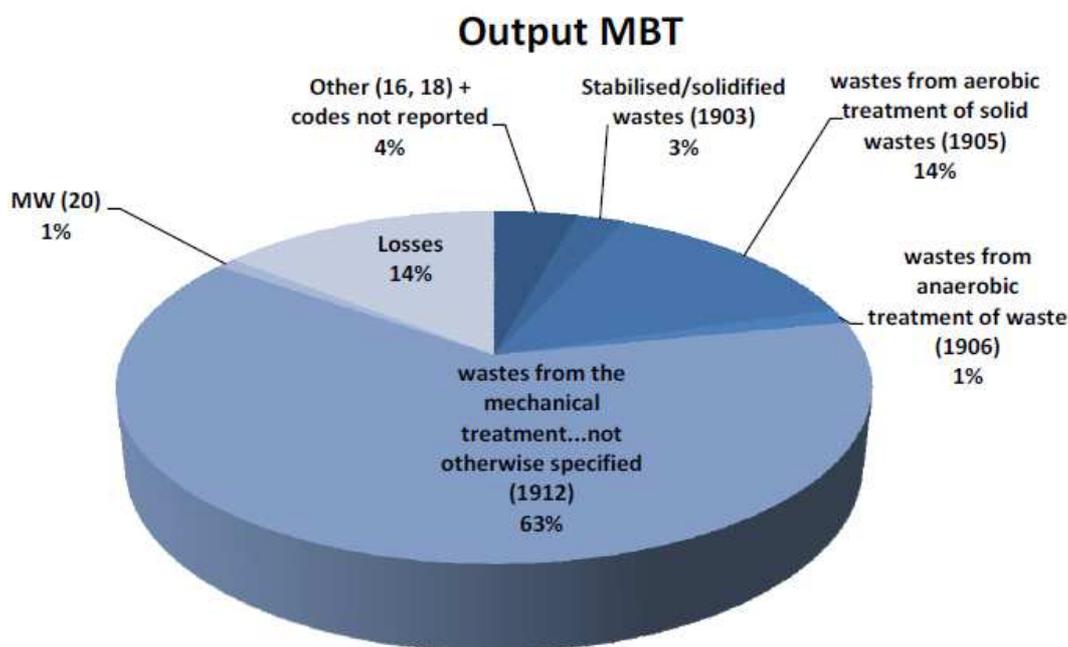


Fig. 6: Typical output from MBTs by waste types

## 5.3 Industrial waste

Options will be source segregation, sorting the waste elsewhere processing the waste elsewhere using the types of treatment described above.

### 5.3.1. Inert wastes

Inert waste is insoluble mineral matter that is uncontaminated by, for example, organic matter, soluble salts, combustible material or biodegradable matter. In most cases, inert wastes will already be suitable for recycling as aggregate or fill material, or for recovery at a site that does not need a disposal permit. Treatments for inert waste generally involve physical sorting or conditioning processes that render the inert waste suitable for use. A waste may be inert and not suitable for use even following such a treatment. In such cases, treatment is not technically feasible and the waste may be landfilled without further treatment.

### 5.3.2. Contaminated soils

#### Soil washing

Soil washing has become an important method for cleaning up contaminated land, in order to treat contaminated waste in-situ. Soil washing requires a reasonably permeable soil with a fines percentage normally below about 30%. Large material is screened out using a suitable mesh size.



The primary aim is to wash the granular fraction of the material through a water-wash solids scrubbing unit. Organic materials are removed, the clean larger particle sizes (gravels and sands) are washed, allowed to settle, separated and removed. Further sieving may be applied, and the result is that the washed clean sands and gravels are now non-hazardous and can be returned to the land.

The remaining silts and clay materials containing the contaminants are further treated, normally by coagulation and flocculation to achieve settlement in a lagoon, and the resulting sludge must then be dewatered to become a solid again. Sludge presses, hydrocyclones and/or centrifuges are used for dewatering and a substantially reduced volume of sludge “cake” remains, for which there is normally no option but to send it to landfill, or possibly in some circumstances to solidify in concrete, or incinerate.

Most of the water used is recycled, but some will require treatment and/or tankage to suitable disposal at an industrial effluent treatment facility.

#### Bio-Piles

“Biopiling” is another option, where the contaminant is biological. A bio-pile is a bioremediation technology in which excavated soils are mixed with soil amendments, formed into compost piles, and enclosed for treatment. The basic bio-pile system includes a treatment bed, an aeration system, an irrigation/nutrient system and a leachate collection system. Moisture, heat, nutrients, oxygen, and pH are controlled to enhance biodegradation. An irrigation/nutrient system is buried under the soil to pass air and nutrients through the soil. Soil piles can be up to 20 feet high. They may be covered with plastic to control runoff, evaporation, and volatilization, as well as to promote solar heating. If volatile organic compounds (VOCs) in the soil volatilize into the air stream, the air leaving the soil may be treated to remove or destroy the VOCs before they are discharged into the atmosphere. Treatment time is typically 3 to 6 months, after which the excavated material is either returned to its original location or disposed.

#### 5.3.3. Mixed construction and demolition waste

Construction waste typically contains materials such as bricks, concrete, plasterboard, timber, plastic film, packaging and surplus materials. It may contain site clearance waste such as soil and vegetation. Demolition waste may also include the contents of buildings and the residues from the provision of services.

Mixed waste can either be separated or the waste stream treated as a whole. The latter will not usually be appropriate because of the high content of material such as bricks and concrete, and the low content of readily combustible or biodegradable material.

Construction & demolition wastes, if coming from a selective demolition should be sent to recovery operations. However, in cases where such an option is not feasible for reasonably justified technical reasons, it may be considered disposal in landfills without further treatment.



#### 5.3.4. Sewage sludge

Sewage is waste water for the purposes of the Waste Framework Directive and therefore not under 'Waste Directive'. However, where residual sludge arising from the treatment of waste water is destined for disposal to landfill, it is Waste Directive and must be treated. Treatment of that sludge, for example by settlement or thickening, is treatment of a waste so the resulting thickened sludge can be considered to be treated waste. Any liquid waste arising from the process cannot be accepted in landfill. The dewatering of sludge is treatment provided the characteristics of the waste are changed.

According to the Italian Guidelines, for the purpose of landfilling, the dehydration treatment of a waste having a dry content of less than 25% is always made necessary.

In the case of biodegradable waste, only dehydration can not be considered sufficient. If, after dehydration, the reject has a DRI value greater than  $1.000 \text{ mg O}_2 \cdot \text{kgSV}^{-1} \cdot \text{h}^{-1}$ , such refusal shall be subject to appropriate treatment to reduce its biodegradability or alter its chemical-physical characteristics.

#### 5.3.5. Municipal solid waste incinerator (MSWI) air pollution control (APC) residues

MSWI APC residues, including fly ash, are classified as hazardous waste and must be landfilled at landfills for hazardous waste or landfills for non-hazardous waste receiving stable, non-reactive hazardous waste. Treatment methods include the extraction of soluble salts combined with chemical stabilisation and possibly recycling of the stabilised remnant to the incinerator grate in order to destroy persistent organic pollutants (e.g. PCDDs/PCDFs). Thermal treatment of APC residues at high temperatures (melting, glassification) may also be effective, but is very energy-consuming and requires re-capture of new APC residues. Stabilisation/solidification using hydraulic binders requires relatively large amounts of binders (cement and/or other pozzolans) and may eventually result in mechanical instability if soluble salts are not removed prior to stabilisation.

#### 5.3.6. Shredder residues

The available treatment methods for shredder residue include mechanical separation, thermal treatment (incineration, co-incineration, gasification and pyrolysis) and combinations of mechanical separation and thermal treatment. Most of the treatment methods have been developed for the purpose of increasing the recovery of materials and energy from the shredder residues, not specifically to improve the environmental properties of the treated shredder residue.



### 5.3.7. MSWI bottom ash

The recovery of ferrous and non-ferrous metals as well as crushing and sifting and storage/ageing/carbonisation are parts of the state-of-the-art treatment of MSWI bottom ash. Chlorides may be removed by washing in the quench tank. The choice of the optimal treatment method for bottom ash depends on availability of landfill sites, national policy and criteria for landfilling and reuse in construction works. Often the selection of best available technique requires a multi-criteria assessment that considers a very wide range of drivers (e.g. water consumption and release, energy consumption, etc) in order to arrive at a balanced overall solution. The dry bottom ash treatment is most widely used and generally results in a bottom ash aggregate that can be used for engineering purposes, depending on the national criteria for reuse.



## 6. Waste treatment plants to comply with WAC: permitting instructions for the mixing of the waste

### 6.1. Introduction

BREF Documents provide general requirements for different treatment plants categories management.

In most treatment facilities, mixing different waste streams (equalization) is often a common procedure applied before carrying out the specific treatment (for example addition of chemicals) before landfilling in order to comply with waste acceptance criteria (WAC).

Article 5, point 4 of LFD 1999/31/CE establishes that *“The dilution of mixture of waste solely in order to meet the waste acceptance criteria is prohibited”*.

The effectiveness of the applied treatment activity is normally assessed on the basis of the analytical results which have to comply with WAC. It should be verified that the positive results have been principally achieved by the chemical/biological/physical pollutant removing/transformation process and not by the dilution effect obtained by mixing different waste streams.

To this goal, some general mixing procedures have to be introduced in waste treatment plant permitting, which have to be checked later in the inspections.

### 6.2. General requirements

Generally, the technically preferable choice is to apply a treatment to a specific waste stream, because the pollutants to be removed or transformed are well known and the reagents and the amount of them or the specific treatment process could be established.

This choice is often economically unfeasible when small quantities of different waste has to be treated at the same time. In this case a procedure to establish which kind of waste could be premixed before treatment has to be established.

Attention has to be put to the following 2 steps:

- 1. The basic characterization of the waste:** general and analytical information have to be collected in order to answer to the following questions:
  - a. Which are the critical pollutants that have to be treated?
  - b. Which is the purpose of the treatment (removing, immobilization, chemical transformation)?



c. Which are the reagents (chemicals) that have to be used?

2. **The mixing procedure:** in order to evaluate a correct mixing of different waste streams before the treatment, some questions have to be answered:

- a. Are the critical pollutants the same?
- b. If the critical pollutants are different, is the same treatment technology/process suitable for all the waste?
- c. If the critical pollutants are different, is the same chemical suitable to remove/immobilize/transform the different critical pollutants?

To ensure that the final result of compliance is achieved by the effectiveness of the treatment, it has to be avoided that:

- Waste which already comply with WAC are added in the mixture.
- Waste which need a different treatment or different reagents should be treated separately.

### 6.3. A case study: a stabilisation/immobilization plant

An example of the application of the general requirements explained in § 6.2 could be a stabilization/immobilization treatment. The main objectives of this treatment could be at least three:

- 1) **Stabilisation:** as defined in the Decision 955/2014 means the “*processes which change the hazardouness of the constituents in the waste and transform hazardous waste into non-hazardous waste*”: this objective is addressed to change the hazardous properties of the waste by removing them (partially or completely). It could be achieved by removing the pollutant or by transforming the last in a non hazardous compound.
- 2) **Immobilisation:** means a treatment which aims to treat waste which doesn't comply with leaching test by transforming the leachable elements or anions into insoluble compounds or immobilizing it using an hydraulic binder.
- 3) **Solidification:** as defined in the Decision 955/2014 means processes which only change the physical state of the waste by using additives like cement without changing the chemical properties of the waste. The purpose is to better manage waste like sludge (too wet) or ashes (too dry and often too dusty).

The most appropriate additive (like chemicals) should be chosen suitable for the treatment purpose of a specific waste stream and then stated if a different waste could be mixed before the treatment (same chemicals/same objective).



For example, two non hazardous wastes, the first containing a high concentration of leachable Zinc and the second one a high concentration of leachable Nickel could be mixed and after then immobilized by adding lime in order to increase the pH value and obtain insoluble hydroxides.

If the first waste is instead labeled as hazardous due to the total content of Zinc (for example ZnO – HP14), an additional objective is to stabilize the waste, which is achieved in the same way, transforming the zinc oxide in an hydroxide. In this case the mixing is allowed because different objectives are obtained through the same process and the same additives.

Another topic is the European Waste Code (EWC) labeling the output waste of this processes. The following diagram shows a proposal for this goal:

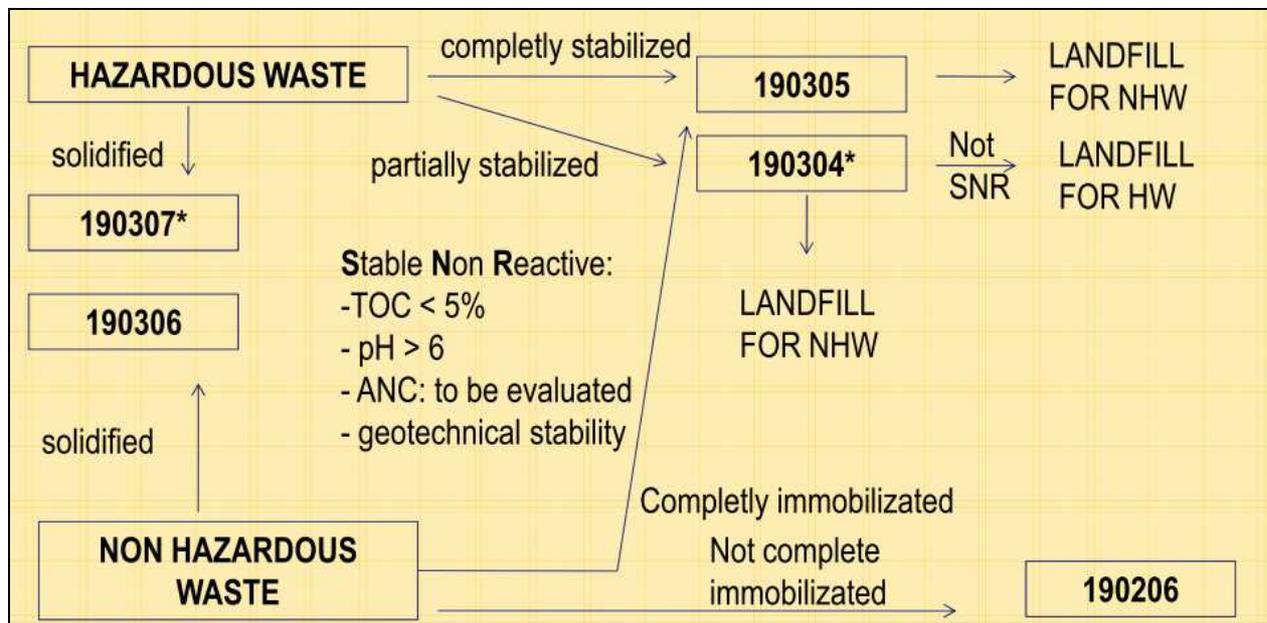


Fig. 7: Proposal to assign the EWC after the treatment



## 7. Stable non reactive waste: a common methodology to evaluate Acid neutralization capacity (ANC) for hazardous wastes.

### 7.1. Introduction

European WAC (Decision CE/33/2003) provides additional parameters to assess hazardous wastes to be landfilled, in case of a stable non reactive hazardous waste to be disposed in a landfill for non hazardous waste and of hazardous waste to be disposed in a landfill for hazardous waste. These parameters are TOC (total organic carbon), pH and ANC.

European WAC reported a definition of stable non reactive waste too, in connection with the long term behavior of waste leachate. A specific limit or evaluation value is not defined and only the sentence “to be assessed” is reported in the WAC.

ANC is a “multi-parameter”, i.e. it is a curve with several values of acid concentration [ $\text{mol H}^+/\text{kg dm}^3$ ] added to achieve different pH steps in the range between 2 and 12 measured by CEN/TS 14429 (the last review is of 2015) or CEN/TS 14997 standard methods.

ANC is a parameter often used in the soil sciences to assess the buffering capacities of a soil to overcome to acid rains (Sverdrup, Sweden). It was utilized from dutch researchers (ECN, Hans van der Sloot, Van Zoemenen etc.) to assess the behavior of wastes inside the landfill body, particularly to evaluate the wastes buffer capacity against the acid leachate in order to limit the metals leaching from the waste to the bottom of the landfill. Danish researchers (Thomas Astrup, Ole Hjelmar for example) studied this “multi-parameter” particularly in the case of bottom and fly ashes to be disposed. Thomas Astrup (Technical University of Denmark) made several researches, discriminating between a “static” and a “dynamic” ANC. The first one belongs to above cited CEN/TS methods and evaluates the present buffer capacity of waste, the second one belongs to a little different test and evaluates the long term behavior of waste leachate, specifically the tendency of the waste to maintain the own pH value against acid/basic leachate.

In the northern countries most of the waste is incinerated before landfilling and therefore the principal wastes to be disposed are bottom and fly ashes, bioashes etc (see, Hjelmar et al., 2009 Treatment methods for waste to be landfilled, Norden). The chemical characteristics of this kind of waste are well known and then ANC is evaluated before landfill construction. In other countries different industrial hazardous waste categories are landfilled without a pre-burning step, eventually with chemical-physical pretreatments. Consequently, it is not possible to evaluate ANC within the project permitting procedure. The local EPA needs to apply a specific methodology in order to assess this parameter during on site inspection.

There aren't any specific methodologies to evaluate ANC yet. The Norden Council published an interesting technical report with a general approach to the problem. Flanders landfill rule



(Vlarem) states that the buffer capacity (ANC) has to maintain the leachate values according with the rain infiltration rate in the landfill body. England EPA (*Guidance for waste destined for disposal in landfill. Interpretation of the waste acceptance requirements of the landfill, 2005*) suggested to evaluate ANC at three pH steps, i.e. at the waste natural pH value, at the leachate pH value and at pH = 6.

The problem is to define criteria to evaluate ANC in basic characterisation and compliance testing in landfill.

Veneto Region EPA (ARPAV) – Regional Observatory of Wastes (Italy) studied this item between 2012 and 2016 and proposed to the Italian Institute for Environmental Research and National EPA (ISPRA) a specific evaluation methodology, based on literature investigation and experimental tests. The latter were applied to different hazardous waste categories applied to three landfills and by Veneto Region EPA laboratory.

## 7.2. Proposal of a common methodology to evaluate ANC test results.

The main conclusions of the report developed by Veneto Region EPA (ARPAV) about ANC assessment were the following:

- a) The first step is the evaluation of the “**static ANC**”, i.e., obtained from CEN/TS 14429/2006 or 14997/2007 methods. Special attention has to be put to the value of ANC at pH value of 4.5 (**ANC<sub>4.5</sub>**). This value, on the analogy of total alkalinity measured in water samples (at a pH level of 4.5), has to be considered as the maximum buffering capacity of the waste before landfilling and includes the buffering capacities of hydroxides, carbonates, high reactive silicates and other compounds. This value could be compared with the maximum buffering capacity of calcite mineral (i.e. 20 mol H<sup>+</sup>/kg). The data of waste buffering capacities founded in literature and experimental data, until now collected, are below this value. High ANC<sub>4.5</sub> values indicates a high buffering capacity and then a high resistance to change the own pH value (natural pH) again the effect of more acid leachate elution. This means also that the leaching test results at the own pH won't significantly change with time due to the effect of leachate acidification: the waste could be defined as stable non reactive complying the definition set out from Decision 33/2013.
- b) The second step is to evaluate “**dynamic ANC**”. This one could be used to better investigate waste with a low static ANC. It could be done applying the test proposed by Prof. Astrup et. al (Technical University of Denmark). This test evaluate the weathering of waste ANC with time. Astrup proposed a simple model to evaluate long term waste pH evolution due to the weathering of minerals involved in neutralization capacity. The result of the test is a graph with the pH of the waste vs time. If the pH value in the long term doesn't diverge from the own pH value it could be assumed that the waste is stable non reactive in compliance with definition of Decision 33/2003, i.e. the “ *the leaching behaviour of the waste will not change*”



*adversely in the long-term*". The long term pH value could be compared with the typical leachate pH value (7-8) of an inorganic landfill and with the maximum pH value (6) accepted for stable non reactive hazardous waste.

- c) A leaching test (using CEN/TS 14429/2006 or 14997/2007 methods) at the critical pH value (6), achieved in the long term as results from Astrup test, could finally establish if the leaching behaviour changes at such pH different from the own pH. In fact it could be possible that specific pollutants (as heavy metals) are included in an amorphous structure and don't leach from the matrix.

A methodology to evaluate ANC could be the following:

- 1) Evaluation of **static ANC<sub>4.5</sub>** (obtained from CEN/TS 14429/2006 or 14997/2007 methods). If the value is greater than 3,5 mol H<sup>+</sup>/kg dm the hazardous waste could be considered as stable non reactive. This value is proposed by Wahlströmet *al.*, 2009 as a high neutralization capacity in relationship with literature values. The result obtained by Veneto Region EPA study show ANC<sub>4.5</sub> values in the range 0,1 – 14,2 mol H<sup>+</sup>/kg.s.s, so the value of 3,5 mol H<sup>+</sup>/kg ss was considered as a minimum acceptable value;
- 2) If the static ANC<sub>4.5</sub> is below 3,5 mol H<sup>+</sup>/kg dm, the **dynamic ANC** (Astrup test) has to be carried out and if the result of the simplified model shows that the pH value in the long term (5.000 years as suggested by Astrup) is greater than 6 the waste could be assessed as stable non reactive;
- 3) If the result of Astrup test is negative (a pH below 6 is achieved in the long term) a leaching test at a pH value of 6 has to be carried out and the results has to comply with WAC.



## 8. MSW treatment before landfilling: suggestions for a proper inspection

### 8.1. Preparation on the inspection

Preliminary desk inspection consists of gathering and analyzing the available documents.

#### Basic data of the MBT operator:

- Name of the facility
- Responsible person of the operator

#### Validation of the Environmental Permit (EP):

- Type of waste allowed to be pre-treated (in our case 20 03 01 mixed municipal waste)
- Capacity of the pre-treatment

#### Previous inspection information:

- Written record/minutes – results from previous inspection
- Warning measures and deadlines for the implementation of measures
- Inspection decision - measures and deadlines
- Previous offense and penalties

#### Reporting documents:

- Records/evidences/ Diary installation's operator (for the last 6 months/year)
- Records sheets of shipment/batch/load (for the last 6 months/year)
- Annual reports
  - relevant content - compliance with the EP or national legislation,
  - an overview of mass flow: mass flow cross-checking 20 03 01 from collector to a processor and the subsequent handling of the pre-treated waste.
- Monitoring reports (monitoring provided according to the national legislation /EP: date, monitoring performed by the authorized person/institution, relevant content of the report, relevant parameters/analyses, limit values, frequency of the sampling and analyses, accreditation of the sampling and analyses-standards-methods, time keeping of the reports)
  - emission in to the water



- emission to the air
- odour, noise

## 8.2. On site inspection

### 8.2.1. Basic information on pre-treatment

- What kind of treatment is performed of the mixed municipal waste (MBT, composting, ecc)?
- Disposal/Recovery operation
- Does MBT plant process with other waste (packaging, bulky ...)? If so, how waste streams are separated from each other when they come to same installation?

### 8.2.2. Visual inspection

- Transportation vehicle of waste shipments/batch/load and waste acceptance location:
  - Presence and use of the truck platform/acceptance location of the waste
  - Transportation of waste in open/close truck containers
  - Impermeable ground for the infiltration of pollutants/ permeable (uncured)
  - Noticeably pollution of soil/ground
  - Waste are Scattered/Dispersed
  - Odour
  - Visual inspection of waste
  - Responsible person for acceptance of waste in action
- Waste storage/area/location/building/facility and mechanical biological facility
  - External/internal storage
  - Storage area for transported waste or pre-treated waste
  - Impermeable ground for the infiltration of pollutants/ permeable (uncured)
  - Storage time
  - Noticeably pollution of soil/ground
  - Odour
  - Visual inspection of waste
  - Responsible person for storage of waste in action
  - External/internal mechanical pre-treatment
  - External/internal biological pre-treatment
  - Responsible person for pre-treatment of waste in action



### 8.2.3. Mechanical pre-treatment

A. How are mixed municipal waste checked on arrival to the area of acceptance of mechanical pre-treatment / entry in the processing:

- Visual (Appearance of the waste)
- Weighing (Waste mass)
- Origin/source of the mixed municipal waste
  - Households
  - Production, business, public services,
  - Small, middle, large company?

B. Data of the composition of mixed municipal waste (MMW):

- Waste collector performed
- Waste operator of pre-treatment performed
- Authority performed (state, land, municipality,...in case of public services?)
  - Density size population sampled
  - Number of samples taken and period
  - Samples taken by an authorised person/institution (check accreditation or certificate)
  - Period that sample/analyses shall be kept according to legislation.

C. The composition of mixed municipal waste compared with the composition of output of pre-treated waste.

D. Mechanical pre-treatment operations/technology.

Mechanical treatment of municipal waste comprises procedures as sieving, separation and automatic, where necessary, as well as manual, sorting of mixed waste by the elimination of waste suitable for recycling, as well as processes such as crushing, compression, pelletization, grinding or homogenisation, necessary for the preparation in this the resulting waste for further processing or disposal in accordance with the waste hierarchy.

- Waste results after mechanical pre-treatment:
  - waste suitable for recycling (from a subgroup of 15 01 and 20 01 in the list of waste), in particular waste paper, metal, plastic and glass packaging waste, WEEE and waste



batteries and accumulators (quantity / mass of recyclable waste/share of the MMW flow);

- combustible waste not suitable for recycling (from a subset of 19 12 from the list of waste), for processing into solid fuel or for incineration or co-incineration plant/thermal treatment of waste-waste to energy (mass of combustible waste/share of the MMW flow);
  - hazardous waste (from a subgroup of 15 01 and 20 01 in the list of waste) – (mass of hazardous waste/share of the MMW flow);
  - waste that cannot be disposed of in a landfill in accordance with the regulations governing landfills/Directive of landfills (mass of waste, which is prohibited dispose of in a landfill);
  - a mixture of wastes other than those mentioned in the previous indents, if it is necessary due to the requirements of the procedure further biological treatment (mass of other waste, which is not suitable for the biological treatment).
- Control of the further waste shipments which have been eliminated from the mechanical pre-treatment
  - Check the operator and EP for further processing of the waste (final treatment). In a case of transboundary shipment of waste-documentation annex VII or notification according of the TFS legislation
  - Records of waste output of mechanical pre-treatment
  - Records sheets of shipment/batch/load of output waste of mechanical pre-treatment

#### 8.2.4. Biological treatment

- Record quantity / mass of residual waste/share of the MMW after pre-treatment
- EWC code of the waste which entered the biological pre-treatment
- What type of biological treatment is carried out:
  - Anaerobic
  - Aerobic
  - Biostabilisation (biodrying-usually before burning)
- Landfill of residual pre-treated waste (code 19 05 and 19 06)
- Do you report the quantity of landfilled waste, which can be weighed or do you subtract moisture in waste?
- Landfill for non-hazardous waste (landfill of municipal waste)



- Criteria for waste acceptance at landfills for non hazardous waste (municipal waste) for pre-treated of mixed municipal waste:
  - calorific value does not exceed 6000 kJ / kg of dry matter
  - content of the TOC does not exceed 18 percent of the weight of dry treated municipal waste
  - ability to receive the oxygen, expressed in AT4, does not exceed the limit value of 10 mg O<sub>2</sub> / g of dry matter of biodegradable waste.
  
- Analyses of waste acceptance criteria for MMW provide according to the national legislation /EP:
  - Samples taken by an authorized person/institution (check accreditation or certificate)
  - Number of samples taken and period (frequency of the sampling and analyses)
  - Period that sample/analyses shall be kept according to legislation is:
  - Date of sampling
  - Relevant content of the report
  - Relevant parameters/analyses and check the limit values
  - Check the accreditation of the sampling and analyses-standards-methods

#### 8.2.5. Transportation of the pre-treated mixed municipal waste to the landfill

- Documentation of pre-treated MMW transportation to the landfill
- Check the waste shipments
- Check the landfill operator and EP for further processing of the waste. (In a case of transboundary shipment of waste - notification according of the TFS legislation)
- Validation of the Environmental Permit (EP):
  - Type of waste allowed to be landfilled (in our case pre-treated 20 03 01 mixed municipal waste)
  - Free capacity of the landfill
- Records of waste output of MB pre-treatment
- Records sheets of shipment/batch/load of output waste of MB pre-treatment
- The operator of the MB pre-treatment is the same / different from the operator of a landfill?
- Annual report



#### 8.2.6. Control of the effects of pretreatment of mixed municipal waste on the environment

- Monitoring reports (monitoring provide according to the national legislation /EP: date, monitoring performed by the authorized person/institution, relevant content of the report, relevant parameters/analyses, limit values, frequency of the sampling and analyses, accreditation of the sampling and analyses-standards-methods, time keeping of the reports).
  - emission in to the water
  - emission to the air
  - odour
  - noise
  
- How operator ensure the implementation of measures to prevent pollution from light materials, which carries the wind, odors, PM10 and mud.
- How operator ensure the implementation of measures to prevent access of birds, rodents, insects and other pests in the area of the installation:
  - mechanical protection
  - deratting, disinfection, disinfestation



## 9. Industrial waste treatment before landfilling: suggestions for a proper inspection

Industrial waste definition may vary in Member States. Any waste taken to a landfill which is not coded with a 19 code are not coming from a waste treatment facility.

### 9.1. Section 1 : Industrial Wastes not coded as a chapter 19 waste

First point to look for is waste which has not originated in a waste facility i.e non 19 coded wastes<sup>1</sup>.

- What wastes coded with an EWC other than chapter 19 codes are accepted at the site?
- Waste is inert ?
- Is the waste asbestos? (pre-treatment not possible)
- Is there a declaration or statement about pre-treatment?
- Does the basic characterization include a declaration that pre-treatment was not necessary and why?
- What reason is given for no pre-treatment?
- Is this an acceptable reason<sup>2</sup>?
- Does visual check correspond with statement? Eg. Is there evidence of recyclables remaining in waste?
- Waste where source separation has occurred – does the residual go through any treatment?
- WAC or additional criteria are evaluated in order to assess the need of a treatment?
- Is the waste classified as stable non reactive?

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<sup>1</sup>19 codes – Waste from Waste Management Facilities, off site waste water treatment plants and the preparation of water intended for human consumption and water for industrial use.

<sup>2</sup>Acceptable reason for no pre-treatment – treatment would not reduce its quantity or the hazards which it poses to human health or the environment.



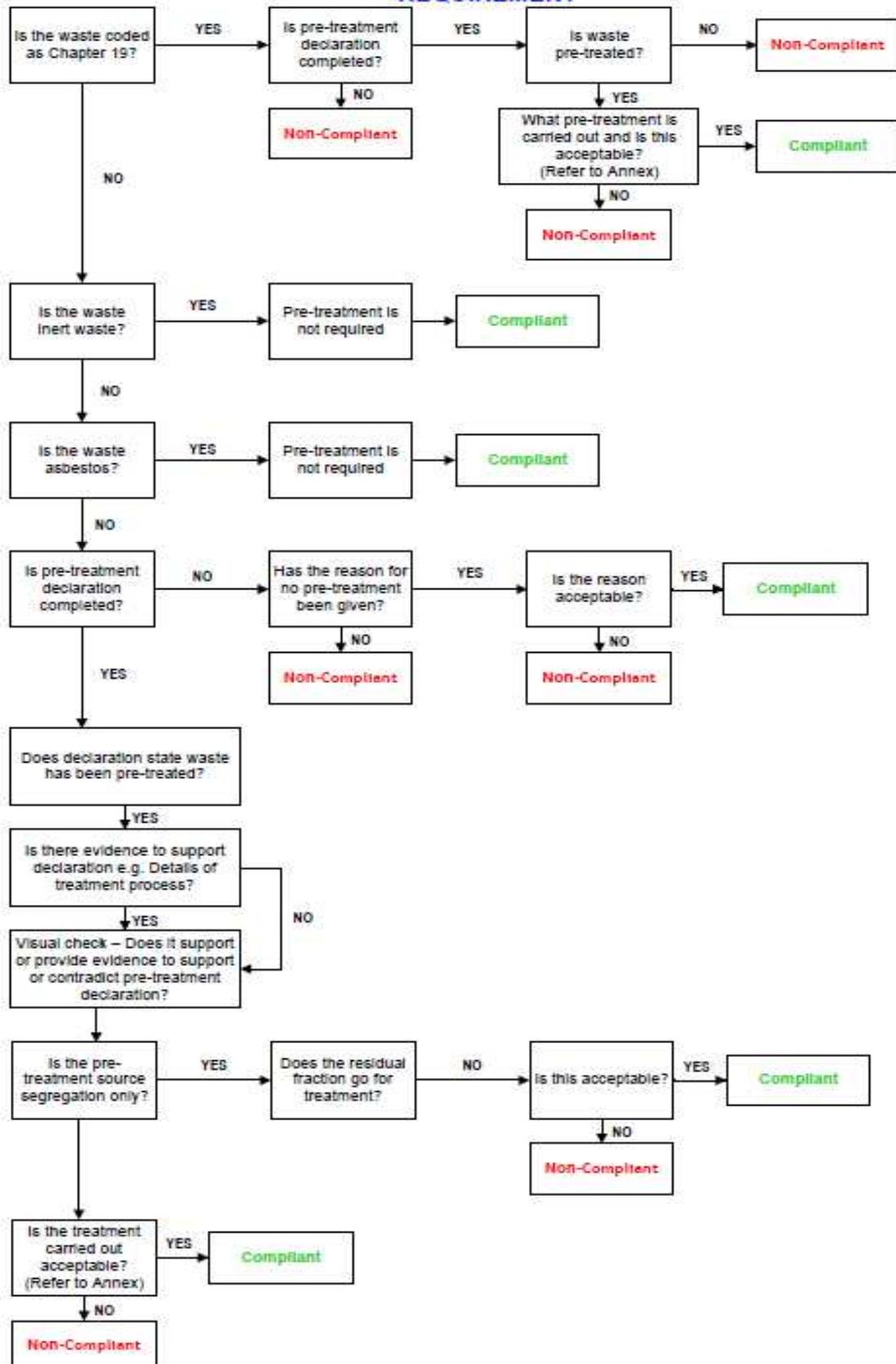
## 9.2. Section 2 : Industrial Wastes coded as a chapter 19 waste

- Check waste description or declaration for statement about pre-treatment.
- Declaration states waste is pre-treated?
- What pre-treatment is carried out and is there evidence to support ?
- Request the permit number reference for the site waste originates in – check permit for this site to see what treatment processes they are authorised for. Any concerns raised may lead to inspection of facility where the waste originates.
- Does visual check correspond with statement? Eg. Is there evidence of recyclables remaining in waste?
- Waste where source separation has occurred – does the residual go through any treatment?
- Is this pre-treatment appropriate? Check annex - pre-treatment appropriate?
- WAC or additional criteria are evaluated in order to assess the need of a treatment or the effectiveness of the treatment?
- Stable non reactive waste: check compliance with WAC and ANC values.
- Did the pretreatment included a mixing operation? Check the authorization to mix different wastes; check if the ban of diluting the waste has been respected.
- Check if standard recipes to blend wastes and additives are set.

The following two Flow charts describe decision tools to assess compliance with treatment requirements:

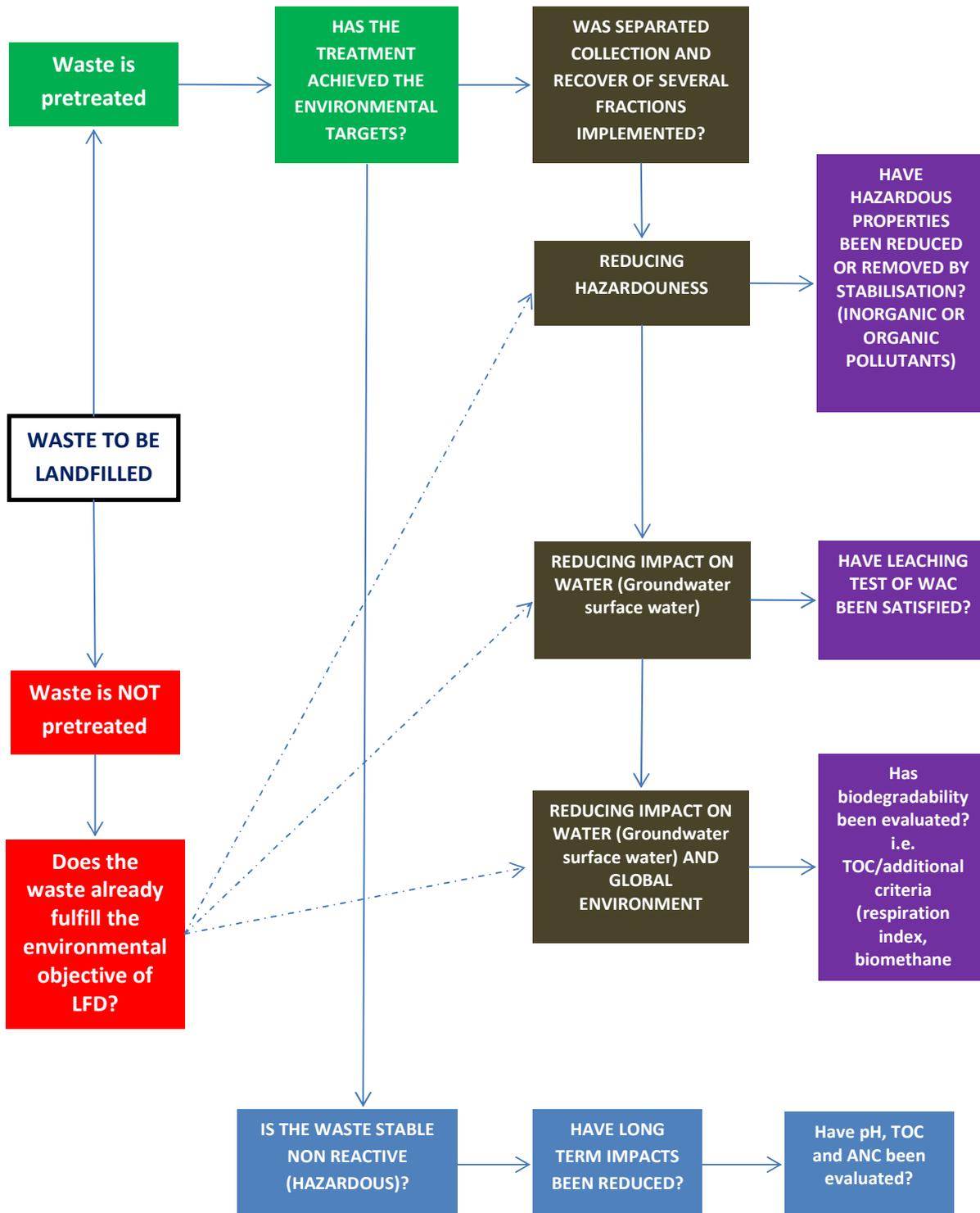


## INDUSTRIAL WASTE – ASSESSING COMPLIANCE WITH LANDFILL PRE-TREATMENT REQUIREMENT





Assessing pretreatment of waste: compliance to article 2 of Directive 1999/31/EC on the landfill of waste





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# Annexes

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## Annex I: Eurostat/OECD Definition of municipal waste

### Wording from the Definition-Section of the Joint Questionnaire

**Municipal waste** includes household waste and similar waste.

It also includes:

- bulky waste (e.g. white goods, old furniture, mattresses), and
- yard waste, leaves, grass clippings, street sweepings, the content of litter containers, and market cleansing waste,

if managed as waste.

It includes waste originating from:

- households,
- commerce and trade, small businesses, office buildings and institutions (schools, hospitals, government buildings).

It also includes:

- waste from selected municipal services i.e. waste from park and garden maintenance, waste from street cleaning services (street sweepings, the content of litter containers, market cleansing waste),

if managed as waste.

It includes waste from these sources collected:

- door-to-door through traditional collection (mixed household waste), and
- fractions collected separately for recovery operations (through door-to-door collection and/or through voluntary deposits).

For the purpose of this questionnaire municipal waste refers to waste defined as above, collected by or on behalf of municipalities.

The definition also includes waste from the same sources and similar in nature and composition which:

- are collected directly by the private sector (business or private non-profit institutions) not on behalf of municipalities (mainly separate collection for recovery purposes),
- originate from rural areas not served by a regular waste service, even if they are disposed by the generator.

The definition excludes:

- waste from municipal sewage network and treatment,
- municipal construction and demolition waste.



## Annex II: Existing Guidelines

MEMBER STATE	INSTITUTION	TITLE
<b>IRELAND</b>	EPA	Municipal Solid Waste – Pre-treatment & Residuals Management. An EPA Technical Guidance Document
<a href="https://www.epa.ie/pubs/advice/waste/municipalwaste/EPA_MS_W_Pre-Treatment_Guide_final%20Amended.pdf">https://www.epa.ie/pubs/advice/waste/municipalwaste/EPA_MS_W_Pre-Treatment_Guide_final%20Amended.pdf</a>		
<b>EU</b>	EUROPEAN COMMISSION EUROSTAT Directorate E: Sectoral and regional statistics Unit E-2: Environmental statistics and accounts; sustainable development	Guidance on municipal waste data collection - September 2016
<a href="http://ec.europa.eu/eurostat/documents/342366/351811/Guidance+on+municipal+waste+reporting/0710f1a4-6b68-4d48-ac4c-75901bc0644b">http://ec.europa.eu/eurostat/documents/342366/351811/Guidance+on+municipal+waste+reporting/0710f1a4-6b68-4d48-ac4c-75901bc0644b</a>		
<b>Denmark Faroe Islands FinlandIceland Norway Sweden</b>	Nordic Council of Ministers	Treatment methods for waste to be landfilled
<a href="http://www.keepeek.com/Digital-Asset-Management/oecd/environment/treatment-methods-for-waste-to-be-landfilled_tn2009-583#.Wg4eytLT6po#page58">http://www.keepeek.com/Digital-Asset-Management/oecd/environment/treatment-methods-for-waste-to-be-landfilled_tn2009-583#.Wg4eytLT6po#page58</a>		
<b>UK (ENGLAND)</b>	Environment Agency	Treatment of waste for landfill
<a href="https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/321200/Treatment_of_waste_for_landfill.pdf">https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/321200/Treatment_of_waste_for_landfill.pdf</a>		
<b>ITALY</b>	ISPRA/ARPA	Technical criteria for determining when treatment is not necessary for the disposal of waste at landfills
<a href="http://www.isprambiente.gov.it/it/pubblicazioni/manuali-e-linee-guida/criteri-tecnici-per-stabilire-quando-il-trattamento-non-e2019-necessario-ai-fini-dello-smaltimento-dei-rifiuti-in-discardica-ai-sensi-dell2019art.-48-della-l.28-dicembre-2015-n.221">http://www.isprambiente.gov.it/it/pubblicazioni/manuali-e-linee-guida/criteri-tecnici-per-stabilire-quando-il-trattamento-non-e2019-necessario-ai-fini-dello-smaltimento-dei-rifiuti-in-discardica-ai-sensi-dell2019art.-48-della-l.28-dicembre-2015-n.221</a>		



## Annex III: Survey to assess the implementation by EU Member States of provisions of Article 2 of Directive 1999/31/EC on the landfill of waste: results

### Treatment of waste before landfilling: Legislation

#### **Council Directive 1999/31/EC - Article 2 Definitions**

(h) "treatment" means the physical, thermal, chemical or biological processes, including sorting, that change the characteristics of the waste in order to reduce its volume or hazardous nature, facilitate its handling or enhance recovery;

#### **Article 6: Waste to be accepted in the different classes of landfill**

b) only waste that has been subject to treatment is landfilled. This provision may not apply to inert waste for which treatment is not technically feasible, nor to any other waste for which such treatment does not contribute to the objectives of this Directive, as set out in Article 1, by reducing the quantity of the waste or the hazards to human health or the environment.

#### **Malagrotta judgement (European Court of Justice of 15 October 2014 in case C-323/13)**

The European Court of Justice (ECJ) has recently ruled that the Malagrotta landfill (Rome – Italy) is in violation of EU landfill and waste management legislation. In the final judgement 4 principles about treatment of waste before landfilling, are confirmed and explicated:



- 1) All waste is pre-treated: pursuant to Article 6(a) of the Landfill Directive, all waste capable of undergoing pre-treatment must be pre-treated before it is placed in a landfill.
- 2) Most appropriate pre-treatment option is applied: Member States are not free to choose any pre-treatment whatsoever, but must search and implement the most appropriate pretreatment option in order to reduce as far as possible negative impacts on the environment and human health.
- 3) Adequate selection of waste streams: pre-treatment must at a minimum include an adequate selection of the different waste streams/fractions.
- 4) Stabilisation of the organic fraction: pre-treatment must at a minimum include the stabilisation of the organic fraction of waste.



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Italy	Sardinian Regional Environmental Protection Agency (ARPAS)	ROMANO RUGGERI	rruggeri@arpa.sardegna.it
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Portugal	Portuguese Environment Protection Agency	CRISTIANA GOMES	cristiana.gomes@apambiente.pt
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Spain	Xunta de Galicia. Regional Ministry of Environment and Spatial Planning	IÑAKI BERGARETXE	inaki.bergaretxe.urdanpilleta@xunta.gal
Turkey	Ministry of Environmental and Urbanization	SENAY ARSLAN	senay.aslan@csb.gov.tr



## TRANSPPOSITION

QUESTION 1	IS THE ARTICLE 6 OF THE COUNCIL DIRECTIVE 1999/31/EC TRANSPOSED IN YOUR NATIONAL LEGISLATION? IF THE ANSWER IS YES, PLEASE REPORT THE TRANSLATION OF THE TRANSPOSITION OF ART. 6 IN THE NATIONAL LAW
<b>Italy</b>	YES: The waste can be dumped in landfills after treatment. This provision does not apply: a) to inert waste for which treatment is not technically feasible; b) waste for which such treatment does not contribute to the achievement of the purposes of art. 1, reducing the amount of waste or the risks to human health and the environment, and is not essential for the purposes of the limits fixed by law.
<b>Latvia</b>	YES: Cabinet Regulation No. 1032, Adopted 27 December 2011 "Regulations Regarding the Construction of Landfill Sites, the Management, Closure and Re-cultivation of Landfill Sites and Waste Dumps" Point 33. In landfill sites it shall be permitted to dispose of only such waste which has been treated and prepared for disposal, except such inert waste the treatment of which is not technically possible, or such waste the treatment of which will not decrease the amount thereof or the possible hazard to human life, health and the environment.
<b>Netherlands</b>	YES: Transposition is found, amongst others, in the Landfilling Decree (Stortbesluit) and in Decree Landfill sites and Landfilling Prohibition (Besluitstortplaatsenenstortverbodenafvalstoffen)
<b>Northern Ireland (UK)</b>	YES: The Landfill Regulations (NI) 2003 and amendments The Landfill (Amendment) Regulations (NI) 2004 The Landfill (Amendment) Regulations (NI) 2007
<b>Portugal</b>	YES: Article 5 1 - Only waste that meets the following requirements, cumulatively, may be landfilled: (A) has been subject to treatment (B) Respect the acceptance criteria defined on this Decree-Law, for the respective landfill class. 2 - Are exempted from (A) the inert waste whose treatment is not technically feasible or the waste whose treatment has been proved not to contribute to the goals established on the article 3
	YES: Decree-Law No. 183/2009, of 10 August, Article 5 1 - Only waste that meets the following requirements, cumulatively, may be landfilled: (A) has been subject to treatment (B) Respect the acceptance criteria defined on this Decree-Law, for the respective landfill class. 2 - Are exempted from (A) the inert waste whose treatment is not



QUESTION 1	IS THE ARTICLE 6 OF THE COUNCIL DIRECTIVE 1999/31/EC TRANSPOSED IN YOUR NATIONAL LEGISLATION? IF THE ANSWER IS YES, PLEASE REPORT THE TRANSLATION OF THE TRANSPOSITION OF ART. 6 IN THE NATIONAL LAW
	technically feasible or the waste whose treatment has been proved not to contribute to the goals established on the article 3.
<b>Romania</b>	<p>YES: The article 6 of the Council Directive 1999/31/EC is transposed in our national legislation through Government Decision no.349 from April 2005 concerning waste storage. Translation of Government Decision no.349 from April 2005 concerning waste storage: Art 7 point (4). It is prohibited the mixing of waste in order to meet the criteria for acceptance at a certain class of landfill. Art t point (5) Waste storage as mentioned in paragraph 1 and 2 is permitted only if the waste are previously subjected to certain treatment feasible technically and which will contribute to fulfilling the objectives set out in this Government Decision. Art 8. Technical measures and operational requirements for waste storage in order to prevent or reduce as far as possible negative effects on the environment and human health resulting from the waste storage during the entire duration of the operation of landfill, are contained in the standard technical waste storage. Art 7 point(1) In hazardous waste landfills is allowed only hazardous waste storage, which meet the criteria laid down in the annex 3 of Decision no 349/2005. Art t point (2) In non hazardous waste landfills is allowed the storage of the following waste: a) municipally waste; b) non- hazardous waste of any other origin, which satisfy the criteria for the acceptance of waste at landfills for non-hazardous waste established according to annex 3. c) Stable, non-reactive hazardous waste, such as solidified, vitrified, which leaching have an equivalent behaviour with those provided in subparagraph(b) and satisfy the relevant criteria for acceptance laid down according to annex 3; these hazardous waste shall not be stored in spaces intended for biodegradable non-hazardous waste. Art 3. In landfills of inert waste is allowed only inert waste storage.</p>
<b>Scotland (UK)</b>	<p>YES: Regulation 12(1) of the Landfill (Scotland)Regulations 2003 requires that: “12.(1) The operator of a landfill shall ensure that the landfill is only used for landfilling waste which is subject to prior treatment unless- (a) it is inert waste for which treatment is not technically feasible; or (b) it is waste other than inert waste and treatment would not reduce its quantity or the hazards which it poses to human health or the environment.”</p>



QUESTION 1	IS THE ARTICLE 6 OF THE COUNCIL DIRECTIVE 1999/31/EC TRANSPOSED IN YOUR NATIONAL LEGISLATION? IF THE ANSWER IS YES, PLEASE REPORT THE TRANSLATION OF THE TRANSPOSITION OF ART. 6 IN THE NATIONAL LAW
Slovak Republic	<p>YES: Yeas in general: This is the unofficial translation of the provisions the Decree/Ordinance/Notice n. „372/2015 Z.z. on the landfilling“: §6 sec. 3 The waste maybe accepted at the landfill according to the type and category pursuant to Waste catalogue in the way, that it will not have negative impact on environment and on human health. § 6 sec. 5 On the landfill for non-hazardous waste may be accepted only: a) Waste classified pursuant to the Waste catalogue according to the criteria laid down in the special regulation. 14) Limit values of substances in the waste shall not exceed the limit values of the indicators for the class of landfill for non-hazardous waste, which are stated in the Annex 1 b) Stable, nonreactive hazardous waste, which limit values of substances in the waste shall not exceed the limit values of indicators for the class of landfill for non-hazardous waste, which are stated in the Annex 1. They shall not dispose of along with biodegradable waste, which is non-hazardous. c) Municipal waste with the exception of separated hazardous components. § 6 sec. 6 a) On the landfill for hazardous waste may be accepted only hazardous waste classified pursuant to the Waste catalogue in the category hazardous waste and waste, which contains one or more hazardous substances and meets at least one of the criterion for the assessment of the hazardous properties according to the § 28 sec. 8 of the Act. Limit values of substances in the waste shall not exceed the limit values of the indicators for the class of landfill for hazardous waste, which are stated in the Annex 1 § 6 sec. 8 Only waste that has been subject to treatment is landfilled. with the exception of the waste which treatment is not technically feasible nor to any other waste for which such treatment does not ensure lowering the quantity of waste and does not prevent harm to the human health and environment. The inert waste may be landfilled without pre-treatment, when the treatment is not technically feasible. 14) Council decision 2003/33/ES</p>
Slovenia	<p><b>YES:</b> Decree on waste landfill Article 5, paragraph 2: Only waste that has been subject to treatment is landfilled. Article 5, paragraph 3: This provision may not apply to inert waste for which treatment is not technically feasible, nor to any other waste for which such treatment does not contribute to the objectives of this Decree, as set out in Article 1, by reducing the quantity of the waste or the hazards to human health or the environment; Article 7: Criteria for the different class of landfills and Annexes 2 and 3. (1) At a landfill for hazardous waste must be</p>



QUESTION 1	IS THE ARTICLE 6 OF THE COUNCIL DIRECTIVE 1999/31/EC TRANSPOSED IN YOUR NATIONAL LEGISLATION? IF THE ANSWER IS YES, PLEASE REPORT THE TRANSLATION OF THE TRANSPOSITION OF ART. 6 IN THE NATIONAL LAW
	<p>disposed of: - hazardous waste that fulfils the requirements for hazardous waste set out in Annex 2, which is an integral part of this Regulation, - inert waste, which meet the requirements for inert waste listed in Annex 2 of this Regulation, - non-hazardous waste, which the content of biodegradable material is not more than five percent of the mass of waste. (4) At a landfill for non-hazardous waste must be disposed of: - non-hazardous waste, which meet the requirements for non-hazardous waste set out in Annex 2 of this Regulation, - non-hazardous waste with a high content of biodegradable material, which generated as residues from processing according to the process R3 of the regulations governing the waste (hereinafter referred to as non-hazardous waste with a high content of biodegradable material), with the properties parameter of the item 5. 2 thereof , - stable and non-reactive hazardous waste, which fulfil the requirements for non-hazardous waste set out in Annex 2 of this regulation, storage boxes, where there is no municipal waste or hazardous waste containing biodegradable substances greater than five percent of the mass of waste, and - waste containing firmly bound asbestos if they fulfil the requirements set out in Annex 2 of this Regulation. (5) At a landfill for municipal waste in addition to waste from the preceding paragraph be disposed of: - municipal waste that meet the requirements for municipal waste listed in Annex 2 of this Regulation, - mixed municipal waste with the characteristics mentioned in the first paragraph of Article 9 of this Regulation. (6) At a landfill for inert waste must be disposed of: - inert waste, which fulfil the requirements for inert waste listed in Annex 2 of this Regulation, - waste set out in Annex 3, which is an integral part of this Regulation.</p>
<b>Spain (La Rioja)</b>	<p>Royal Decree 1481/2001, of December 27, which regulates the disposal of waste in landfill. Article 6. Residues that may be admitted in the different landfill classes. 1. Only waste that has been subject to treatment is landfilled. This provision may not apply to inert waste for which treatment is not technically feasible nor to any other waste for which such treatment does not contribute to the objectives as set out in Article 1, by reducing the quantity of the waste or the hazards to human health or the environment.</p>
<b>Spain (Galicia)</b>	<p>YES: Regulation of the Landfill</p>



<b>QUESTION 1</b>	<b>IS THE ARTICLE 6 OF THE COUNCIL DIRECTIVE 1999/31/EC TRANSPOSED IN YOUR NATIONAL LEGISLATION? IF THE ANSWER IS YES, PLEASE REPORT THE TRANSLATION OF THE TRANSPOSITION OF ART. 6 IN THE NATIONAL LAW</b>
<b>Turkey</b>	YES: BY-LAW ON LANDFILLING OF WASTES (Official Gazette, 26.03.2010/27533) SECOND CHAPTER General Principles on Landfill Facilities Classification of landfill facilities ARTICLE 5 – (1) Landfill facilities shall be classified as follows: a) I. class landfill facility: the facility having the infrastructure required for the storage of hazardous waste. b) II. class landfill facility: the facility having the infrastructure required for the storage of municipal waste and non-hazardous waste. c) III. class landfill facility: the facility having the infrastructure required for the storage of inert waste

<b>QUESTION 2</b>	<b>ARE THE 4 ABOVE MENTIONED PRINCIPLES ESTABLISHED BY THE MALAGROTTA JUDGMENT, REFLECTED IN THE LEGAL ORDER (RULEBOOK, GUIDELINES ETC.) OF YOUR COUNTRY? IF THE ANSWER IS YES, PLEASE REPORT DETAILS OF THE TOOLS ISSUED BY THE MEMBER STATE.</b>
<b>Italy</b>	YES: ISPRA (national Environmental Agency) has issued a guideline that contains the technical criteria to be applied to determine when the treatment of waste prior to disposal in landfill is not necessary.
<b>Latvia</b>	NO
<b>Netherlands</b>	YES: Specific legislation includes: Decree Landfill sites and Landfilling Prohibition (Besluit stortplaatsen en stortverboden afvalstoffen); Environmental Management Law (Wet milieubeheer); National Waste Management Plan (Landelijk afvalbeheer plan)
<b>Netherlands</b>	
<b>Northern Ireland (UK)</b>	YES: Regulatory framework- The Landfill Regulations (NI) 2003 and amendments The Landfill Allowance Scheme - for the reduction of biodegradable waste going to landfill. Food Waste Regulations (NI) 2005 Local Authority Waste Management Plans - under the Waste Management and Contaminated Land Order 1997. The revised Waste Management Strategy for NI.



<b>QUESTION 2</b>	<b>ARE THE 4 ABOVE MENTIONED PRINCIPLES ESTABLISHED BY THE MALAGROTTA JUDGMENT, REFLECTED IN THE LEGAL ORDER (RULEBOOK, GUIDELINES ETC.) OF YOUR COUNTRY? IF THE ANSWER IS YES, PLEASE REPORT DETAILS OF THE TOOLS ISSUED BY THE MEMBER STATE.</b>
<b>Portugal</b>	NO
<b>Romania</b>	NO: the principles established by the Malagrotta judgment are transposed in our national legislation : Government Decision No 349 from April 2005 concerning waste storage; Order no. 95 from February 2005 regarding Waste Acceptance Criteria and preliminary waste acceptance procedures to storage and National list of waste accepted in each landfill. Technical Normative No.757/2004 regarding waste storage; Order nr. 1274/2005 regarding the release of environment approval at the cessation of activities of waste disposal respectively storage and incineration.
<b>Scotland (UK)</b>	NO
<b>Slovak Republic</b>	The new „ACT n. 79/2015 on waste and on amendments to certain acts“ , which has entered into legal effect by 1. January 2016, governs: - Extended producer responsibility for producer of batteries and accumulators, producer of packaging, producer of vehicles, producer of pneumatic tyres, or producer of non-packaging products, which will form part of municipal waste (plastic, paper, glass, multilayer combined paperboard-based materials) - The municipality is obliged to ensure the implementation and performance of separate collection of biodegradable waste from gardens and parks, including waste from cemeteries - The municipality is obliged to ensure the implementation and performance of separate collection of municipal waste - paper, plastic, metal and glass
<b>Slovenia</b>	YES: Decree on waste Decree on waste landfill Decree on activities and installations causing large-scale environmental pollution
<b>Spain (La Rioja)</b>	YES: Orden AAA/661/2013, de 18 de abril, por la que se modifican los anexos I, II y III del Real Decreto 1481/2001, de 27 de diciembre, por el que se regula la eliminación de residuos mediante depósito en vertedero. ANEXO II.- Procedimientos y criterios de admisión de residuos en vertedero. 1. Procedimiento de admisión de residuos en los vertederos 1.1 Caracterización básica. c) Descripción del tratamiento previo aplicado, de conformidad con lo dispuesto en el apartado 1 del artículo 6 del presente real decreto, o una declaración de las razones por



QUESTION 2	ARE THE 4 ABOVE MENTIONED PRINCIPLES ESTABLISHED BY THE MALAGROTTA JUDGMENT, REFLECTED IN THE LEGAL ORDER (RULEBOOK, GUIDELINES ETC.) OF YOUR COUNTRY? IF THE ANSWER IS YES, PLEASE REPORT DETAILS OF THE TOOLS ISSUED BY THE MEMBER STATE.
	lasqueesetratamiento se considera técnicamenteinviabile o innecesario por losmotivoscitados en elcitadoartículo.
Spain (Galicia)	YES
Turkey	<p>YES: Issued in National By-Law on Landfilling of Waste, Article (10) Waste to be accepted to landfill facilities according to classification ARTICLE 10 – (1) Waste shall not be accepted to landfill facilities without being pretreated, except for the waste of which treatment is not technically feasible, in line with the objectives of this By-law, and the inert waste whose technical processing and evaluation are impossible (2) The criteria, sampling and analysis methods listed in Annex-1 shall be applied in order to determine the class of landfill to which the waste will be disposed, as for waste acceptance to the landfill facilities. (3) Only the hazardous waste complying with the criteria presented Annex- 2 for I. class landfill facilities shall be accepted to I. class landfill facilities. (4) Following types of waste shall be stored in II. class landfill facilities: a) Municipal waste, b) Non-hazardous waste having various sources and being in compliance with the criteria presented Annex- 2 for II. class landfill facilities, c) nonreactive and persistent waste such as solidified and vitrified waste having the same characteristics and behaviours with the non-hazardous waste presented in paragraph (b), and being in compliance with the criteria presented Annex- 2 for II. class landfill facilities, ç) nonreactive and persistent such as solidified and vitrified waste presented in paragraph (c) shall be stored in a separate cell or sub-cell in a way that it will not mix with the other waste. (5) Only inert waste shall be landfilled in III. class landfill facilities.</p>



QUESTION 3	IF THE ANSWER TO QUESTION 2 IS YES, PLEASE REPORT THE ADDITIONAL (GOING FURTHER THAN WHAT IS REQUIRED BY EU LAW) REQUIREMENTS THAT YOUR COUNTRY HAS IN PLACE TO COMPLY WITH THE FOLLOWING CONCLUSIONS OF MALAGROTTA JUDGEMENT:
Italy	<ul style="list-style-type: none"> <li>▪ <b>All waste is pre-treated:</b> The ISPRA guideline sets the following corner stones: 1) A list of EWC that are banned to be landfilled; 2) Municipal waste coming out from separate collection (EWC 20 01) and biodegradable was (EWC 20 02) must undergo a recycling process; 3) Mixed municipal waste (EWC 20 03 01) DO NOT require a pretreatment if it has been achieved the objective of reducing the biodegradable fraction of urban waste in landfills, it has been achieved a rate of separate collection of at least 65%, and dynamic respirometric index DRI is lower than 1.000 mg O<sub>2</sub> kg VS-1 h<sup>-1</sup></li> <li>▪ <b>Most appropriate pre-treatment option is applied:</b> Waste sludge: dehydration treatment; Putrescible waste produced from waste treatment plants, and water treatment plants: biological stabilization if dynamic respirometric index (DRI) is higher than 1.000 mg O<sub>2</sub> kg VS-1 h<sup>-1</sup>; Organic matrix wastes: biological stabilization if TOC &gt; 5%; Stable non reactive waste: criteria refer to threshold values for TOC, pH, Dry substance%, geotechnical tests, acid neutralization capacity; Asbestos waste: criteria refer to treatment included in the Waste treatment BREF</li> <li>▪ <b>Adequate selection of waste streams:</b> Separate collection of valuable (recycling or recovery) fractions should be performed</li> <li>▪ <b>Stabilisation of the organic fraction:</b> A biodegradable waste with a dynamic respirometric index (DRI) higher than 1.000 mg O<sub>2</sub> kg VS-1 h<sup>-1</sup> must be biologically stabilized.</li> </ul>
Latvia	--
Netherlands	<ul style="list-style-type: none"> <li>▪ <b>All waste is pre-treated:</b> all waste is pre-treated, not only the waste that goes to landfills</li> <li>▪ <b>Most appropriate pre-treatment option is applied:</b> Sorting before pre-treatment must be applied.</li> <li>▪ <b>Adequate selection of waste streams:</b> Only specific waste streams may be landfilled.</li> <li>▪ <b>Stabilisation of the organic fraction:</b> organic fraction is low, organic waste that can be used in any other way is removed and not landfilled</li> </ul>
Northern Ireland (UK)	<ul style="list-style-type: none"> <li>▪ <b>All waste is pre-treated:</b> Required through regulations</li> <li>▪ <b>Most appropriate pre-treatment option is applied:</b> Guidance</li> <li>▪ <b>Adequate selection of waste streams:</b> Guidance</li> </ul>



QUESTION 3	IF THE ANSWER TO QUESTION 2 IS YES, PLEASE REPORT THE ADDITIONAL (GOING FURTHER THAN WHAT IS REQUIRED BY EU LAW) REQUIREMENTS THAT YOUR COUNTRY HAS IN PLACE TO COMPLY WITH THE FOLLOWING CONCLUSIONS OF MALAGROTTA JUDGEMENT:
	<ul style="list-style-type: none"> <li>▪ <b>Stabilisation of the organic fraction:</b> Regulations in place to reduce biodegradable waste going to landfill and Food Waste Regulations - require separate collection of food waste.</li> </ul>
Portugal	--
Romania	<ul style="list-style-type: none"> <li>▪ <b>All waste is pre-treated:</b> Waste are collected separately with the exception of municipally waste, respectively: Biodegradable waste, waste derived from construction, bulky waste(furniture), recyclable waste(metal, glass, plastic, paper) .</li> <li>▪ <b>Most appropriate pre-treatment option is applied:</b> This categories of waste are collected separately or at the transfer station( in our district we have 5) or in the landfill , before storage age.</li> <li>▪ <b>Adequate selection of waste streams:</b> Recyclable waste( metal, glass, plastic, paper), are sorted within the sorting stations existing in the landfill. Part of the waste is valued being taught to accredited societies, and the part that cannot be valued is, either sent to recovery through co-incineration ants, either eliminated in the landfill. Bulky waste and waste derived from construction are dismantled, crumbled and then stored.</li> <li>▪ <b>Stabilisation of the organic fraction:</b> Biodegradable waste suffers a pre-treatment in order to achieve compost. Till now, it's got a bad quality compost, that were used as coating material. Has reduced organic component and humidity. Municipally waste do not suffers treatment. In the future, we want to purchase un equipment for mechanical biological treatment of municipally waste. Than organic fraction it will be more reduce.</li> </ul>
Scotland (UK)	--
Slovak Republic	<ul style="list-style-type: none"> <li>▪ <b>Adequate selection of waste streams:</b> spent batteries and accumulators, waste packaging and waste from non-packaging (plastic, paper, glass, multilayer combined paperboard-based materials), end-of-life vehicles, waste pneumatic tyres, waste oil (including edible oils and fats), biodegradable waste from gardens and parks, including waste from cemeteries, kitchen and canteen waste</li> <li>▪ <b>Stabilisation of the organic fraction:</b> The new „ACT n. 79/2015 on waste and on amendments to certain acts“ , which has entered into legal effect by 1. January 2016, prohibits the landifilling of biodegradable municipal waste from gardens and parks, including biodegradable cemetery waste and biodegradable kitchen and</li> </ul>



QUESTION 3	IF THE ANSWER TO QUESTION 2 IS YES, PLEASE REPORT THE ADDITIONAL (GOING FURTHER THAN WHAT IS REQUIRED BY EU LAW) REQUIREMENTS THAT YOUR COUNTRY HAS IN PLACE TO COMPLY WITH THE FOLLOWING CONCLUSIONS OF MALAGROTTA JUDGEMENT:
	canteen waste. There were built some biogas plants in Slovakia.
Slovenia	<ul style="list-style-type: none"> <li>▪ <b>All waste is pre-treated:</b> more strict landfill criteria for mixed MSW</li> <li>▪ <b>Most appropriate pre-treatment option is applied:</b> MBT</li> <li>▪ <b>Stabilisation of the organic fraction:</b> Decree on biodegradable kitchen waste and garden waste management, a preliminary measure for the separate collection of bio-waste in the whole country, resulting in a reduction of waste in streams for disposal</li> </ul>
Spain (La Rioja)	<ul style="list-style-type: none"> <li>▪ <b>All waste is pre-treated:</b> Waste acceptance procedures. The characterization process includes the description of the pretreatment process applied before the waste is placed in a landfill.</li> <li>▪ <b>Most appropriate pre-treatment option is applied:</b> Environmental Ministry web page provides information about different treatments. <a href="http://www.mapama.gob.es/es/calidad-y-evaluacion-ambiental/temas/prevencion-y-gestion-residuos/flujos/domesticos/gestion/sistema-tratamiento/">http://www.mapama.gob.es/es/calidad-y-evaluacion-ambiental/temas/prevencion-y-gestion-residuos/flujos/domesticos/gestion/sistema-tratamiento/</a></li> <li>▪ <b>Adequate selection of waste streams:</b> Different waste streams/fractions are collected separately. Municipal waste, mainly organic waste is collected by the municipalities, industrial waste is collected by waste management operators. Furthermore, most of the landfills are for specific streams of waste: organic waste, inorganic waste...</li> <li>▪ <b>Stabilisation of the organic fraction:</b> A guidelines about collecting and stabilisation of the organic fraction is published. <a href="http://www.mapama.gob.es/es/calidad-y-evaluacion-ambiental/publicaciones/guia_mo_def_tcm7-285227.pdf">http://www.mapama.gob.es/es/calidad-y-evaluacion-ambiental/publicaciones/guia_mo_def_tcm7-285227.pdf</a></li> </ul>
Spain (Galicia)	--
Turkey	<ul style="list-style-type: none"> <li>▪ <b>All waste is pre-treated:</b> No additional, Article 10 of National By-Law on Landfilling of Waste,</li> <li>▪ <b>Most appropriate pre-treatment option is applied:</b> For MW, MBT is used</li> <li>▪ <b>Adequate selection of waste streams:</b> No additional, separation at source etc.</li> <li>▪ <b>Stabilisation of the organic fraction:</b> No additional application.</li> </ul>



## TREATMENT AND PRE-TREATMENT

QUESTION 4	IS PRE-TREATMENT IN YOUR COUNTRY CARRIED OUT BEFORE WASTE IS LANDFILLED, ACCORDING TO THE REQUIREMENTS OF MALAGROTTA JUDGEMENT (SELECTION OF WASTE STREAMS, STABILISATION OF ORGANIC WASTE, MOST APPROPRIATE PRE-TREATMENT OPTION)?
<b>Italy</b>	NO: The new ISPRA Guideline sets more stringent restrictions, therefore environmental permits should be amended. Treatment (stabilization) and selection of waste streams is quite well performed for the municipal waste.
<b>Latvia</b>	YES
<b>Netherlands</b>	YES
<b>Northern Ireland (UK)</b>	YES
<b>Portugal</b>	YES
<b>Romania</b>	YES: As mentioned above, at point 3 from Transposition.
<b>Scotland (UK)</b>	YES
<b>Slovak Republic</b>	Treatment and pre-treatment is carried out with industrial waste, but generally not with mixed municipal waste. The mixed municipal waste, which is landfilled, is the remnant after the separation of components of municipality waste (paper, plastic, metal and glass). Nowadays is the capacity of this pre-treatment plant around of 160 000 t mixed municipal waste. In 2016 only in a few cases was the mixed municipal waste pre-treated - 52 000 t from approximately 1,6 mil. t of municipal waste. We effectively recovered industrial waste – for example mixed plastics from industry, fly ash, bottom ash, oil and liquid industrial waste.
<b>Slovenia</b>	YES



<b>Spain (La Rioja)</b>	YES
<b>Spain (Galicia)</b>	YES
<b>Turkey</b>	YES

<b>QUESTION 5</b>	<b>WHICH CRITERIA ARE SET BY YOUR COUNTRY TO CONSIDER MUNICIPAL SOLID WASTE (MSW) IS PRE-TREATED BEFORE LANDFILLING?</b>
<b>Italy</b>	Separate collection of MSW must be performed. Separated waste streams have to be recycled. Mixed municipal waste is considered as "treated" if: 1) It has been achieved the objective of reducing biodegradable fraction of urban waste in landfills; 2) it has been achieved a percentage of recycling at least equal to 65%; 3) Dynamic respirometric index is lower than 1,000 mg O <sub>2</sub> * kgSV-1 * H-1
<b>Latvia</b>	The main criteria for MSW pre-treat is selection of waste streams - hazardous or non-hazardous; separate in streams by properties of waste (plastic, paper, glass, metal)
<b>Netherlands</b>	Landfilling of Municipal Solid Waste is prohibited. Exceptions can be made in case of emergencies and are considered on a case by case basis by the competent authorities.
<b>Northern Ireland (UK)</b>	Guidance documentation is provided to landfill operators. The guidance 'Treatment of Waste for Landfill' outlines a 3 point test which should be applied to assess compliance with the definition of treatment. The 3 points are: 1. Process applied - determine whether one or more physical, thermal, chemical or biological process is involved. 2. It must change the characteristics of the waste; and 3. It must do so in order to: a. reduce its volume; or b. reduce its hazardous nature; or c. facilitate its handling; or d. enhance its recovery.
<b>Portugal</b>	There are no defined criteria to consider that Municipal Solid Waste is pre-treated before being landfilled. However, there is a selective collection of the main streams of hazardous waste in municipal waste, including mineral oils, batteries, and WEEE, covering the entire national territory. The packaging and paperboard flows are also collected, so the undifferentiated waste that is going directly to landfill has already been subjected to this



QUESTION 5	WHICH CRITERIA ARE SET BY YOUR COUNTRY TO CONSIDER MUNICIPAL SOLID WASTE (MSW) IS PRE-TREATED BEFORE LANDFILLING?
	screening (pre-treatment).
<b>Romania</b>	The criteria set by may country to consider MSW pretreated before landfilling is to increase the amount of recyclable materials. and to reduce the municipally waste, and also, to reduce the organic fraction.
<b>Scotland (UK)</b>	Waste (Scotland) Regulations 2012 These regulations implement a number of actions of the Zero Waste Plan and the Waste Framework Directive. They set the foundation for a significant improvement in the management of municipal waste in Scotland. A phased approach to rolling out the key measures in the regulations has been adopted to ensure that there is sufficient time for businesses, particularly small businesses, to adopt new recycling services. The Waste (Scotland) Regulations 2012External Link icon were passed by the Scottish Parliament on 9 May 2012. The regulations make the following provisions: Businesses to present metal, plastic, glass, paper and card for separate collection from 01 January 2014 Food businesses (except in rural areas) which produce over 50kg of food waste per week to present that food waste for separate collection from 01 January 2014 Food businesses (except in rural areas) which produce over 5kg of food waste per week to present that food waste for separate collection from 01 January 2016 Local Authorities to provide a minimum recycling service to householders Waste contractors to provide collection and treatment services which deliver high quality recycling A ban on the mixing of segregated recyclate where such mixing would hamper further recycling A ban on any metal, plastic, glass, paper and card collected separately for recycling from going to incineration or landfill from 01 January 2014 All new incinerators must ensure that metals and dense plastics have been removed from residual municipal waste prior to incineration A ban on biodegradable municipal waste going to landfill from 01 January 2021 The regulations will have a significant effect on industry practices and infrastructure provision in Scotland, particularly for those involved in the management of municipal waste.
<b>Slovak Republic</b>	There are not special criteria for municipal solid waste as pre-treated waste. The „ACT n. 79/2015 on waste and on amendments to certain acts“ firstly attempts to lower the amount of municipal solid waste by using the extended producer responsibility and by supporting of separate collection of components of municipality waste.
<b>Slovenia</b>	Article 9: (2) Mixed municipal waste must be processed in the Centre for municipal waste management in



QUESTION 5	WHICH CRITERIA ARE SET BY YOUR COUNTRY TO CONSIDER MUNICIPAL SOLID WASTE (MSW) IS PRE-TREATED BEFORE LANDFILLING?
	<p>accordance with this Regulation. Centre for municipal waste management should be regulated in accordance with Annex 1, which is an integral part of this Regulation. (3) In the centre of the preceding paragraph is mixed municipal waste is treated in accordance with the procedures described as D8 and D9 of the regulation governing waste. (4) After the treatment of mixed municipal waste may be waste is generated in order of priority set out in item 2 of Annex 1 of this Regulation. The residue is mixed municipal waste after processing in accordance with the preceding paragraph shall be marked with a classification number 20 03 01 with waste classification list. (5) The manager of the centre for municipal waste must have an environmental permit in accordance with the law governing the protection of the environment. (6) The operator referred to in the preceding paragraph must: 1. regularly receive mixed municipal waste and must be stored until their processing, 2. The process mixed municipal waste, 3. regularly submit excluded non-hazardous fractions suitable for recycling, for further processing in accordance with the regulations governing waste management, 4 of separated fractions to provide such treatment as per dangerous faction laid down in the regulations governing waste management, 5. regularly submit sorted combustible fraction suitable for energy recovery in incineration or co-incineration plant in accordance with the regulations governing waste incineration, 6. residue of mixed municipal waste from the working regularly broadcast operator landfill for municipal waste and 7 prior to the award of waste from the previous point to provide an estimate of waste in accordance with Article 12 of this Regulation. Article 9: (1) At a landfill of municipal waste is allowed to disposal of municipal waste, which have been treated in accordance with Article 6 of this regulation and its fuel value does not exceed 6000 kJ / kg of dry matter content of the TOC does not exceed 18 percent of the weight of dry treated municipal waste and the ability to make the oxygen, expressed in AT4, does not exceed the limit value of 10 mg O<sub>2</sub> / g of dry matter of biodegradable waste. Annex 1: The minimum standard for centre for municipal waste management 2. Treatment of mixed municipal waste in the centre for municipal waste management (1) After the processing of mixed municipal waste (code 20 03 01) can be generated Waste in the following order of priority: 1. packaging waste from a subset of 15 01 2. arcuate fractions of the sub-20 01 3. The waste from the mechanical processing of waste from a subset of 19 12 with the classification number of 19 12 04 (rubber) 19 12 09 (minerals) and 19 12 121 (A mixture of waste from mechanical-biological processes which are</p>



QUESTION 5	WHICH CRITERIA ARE SET BY YOUR COUNTRY TO CONSIDER MUNICIPAL SOLID WASTE (MSW) IS PRE-TREATED BEFORE LANDFILLING?
	suitable for processing into solid fuel), 4. mixed municipal EWC: 20 03 01 (residue after treatment).
Spain (La Rioja)	Spain, Region La Rioja. Selection and classification of materials and biological treatment biomethanization before landfilling.
Spain (Galicia)	Only pre-treated waste can be landfilling.
Turkey	pretreatments provide organic fraction reduction separation at source

QUESTION 6	WHICH KIND OF TREATMENT IS THE MSW ACTUALLY SUBJECTED TO BEFORE LANDFILLING (MECHANICAL-BIOLOGICAL-... TREATMENT)? WHICH IS THE OVERALL SITUATION IN THE MS CONCERNING TREATMENT PLANTS OF MSW?
Italy	Usually the mixed municipal waste undergoes a mechanical treatment; the undersize containing biodegradable substances is biologically treated and the outcome is a stabilized waste used for daily cover in landfills. In Sardinia we do not have a lack of pretreatment plants that do not allow the region to satisfy the Malagrotta requirements.
Latvia	Before landfilling MSW goes through mechanical sorting line, where different class of waste is separated from all MSW stream. Materials which can be re used or recycled goes to appropriate manufacturer or trader. Biological substances can be collected and used for producing bioenergy. Mechanical sorting lines are the main technique for MSW in our country
Netherlands	Not applicable: MSW may not be landfilled.
Northern Ireland (UK)	Mechanical-biological-Treatment. Collection of waste streams separately and recycling one or more of the separated components. eg metal, paper and cardboard, food waste, plastics, glass. Reduction of volume.
Portugal	In Portugal, there are the following units of MSW treatment (2015): - Mechanical treatment, 4 units - Mechanical-biological treatment, 17 units - Organic recovery, 5 units Taking into account the total amount of MSW produced



QUESTION 6	WHICH KIND OF TREATMENT IS THE MSW ACTUALLY SUBJECTED TO BEFORE LANDFILLING (MECHANICAL-BIOLOGICAL-... TREATMENT)? WHICH IS THE OVERALL SITUATION IN THE MS CONCERNING TREATMENT PLANTS OF MSW?
	<p>in 2015, the overall situation is the following: - 23% were subjected to mechanical-biological treatment - 10% were subjected to mechanical treatment - 10 % were subjected do material recovery - a small % (2%) went to organic recovery</p>
<p><b>Romania</b></p>	<p>In our district, MSW do not suffers mechanical-biological treatment. In the future we want to purchase an equipment for mechanical-biological treatment. In the landfill there is a wastewater treatment plant who treat leachate resulting from the landfill. Result two component : purified water, from which, one part is used as technological water, one part is delivered in emissary, and the mud which is reintroduced in the landfill.</p>
<p><b>Scotland (UK)</b></p>	<p>There are two types of Material Recycling Facilities (MRFs): Clean MRF – accepts recyclable commingled materials that have already been separated at source from municipal solid waste generated by either residential or commercial sources. Dirty MRF – accepts a mixed solid waste stream and then proceeds to separate out designated recyclable materials through a combination of manual and mechanical sorting. The salvaged recycle may undergo further processing required to meet technical specifications established by end-markets. The balance of the mixed waste stream may be sent to a further processing facility such as an MBT to extract the biodegradable fraction before the residual element is send for disposal to landfill. Key issues Products from a mixed waste processing facility, such as a dirty MRF, are limited to: contaminated organic outputs known as 'Compost-like Outputs' (CLO), of limited value a refuse derived fuel (RDF) and selected materials for recycling RDF may be utilised in an energy from waste facility that is compliant with the Waste Incineration Directive (2000/76/EC). The quantity &amp; quality of recyclates recovered from a dirty MRF is much reduced compared to that which may be extracted from source separated material fed into a clean MRF facility. Outputs from the MRF process may either be: baled &amp; sent to a UK processor baled &amp; exported Material that is destined for export must comply with the Transfrontier Shipment of Waste regulations. MRF operators can influence quality of material via: load inspection and feedback to local authorities, which makes identification of low-performing areas possible; random sampling; improved baling - tightly bound bales usually offer the best value and are preferred by reprocessors. To support zero waste objectives a Code of Practice is being developed by Scottish Government that</p>



QUESTION 6	WHICH KIND OF TREATMENT IS THE MSW ACTUALLY SUBJECTED TO BEFORE LANDFILLING (MECHANICAL-BIOLOGICAL-... TREATMENT)? WHICH IS THE OVERALL SITUATION IN THE MS CONCERNING TREATMENT PLANTS OF MSW?
	may / may not provide statutory guidance on the operation and quality of output materials from a MRF facility. This operator code of practice should ensure quality material fit for national and international markets without further processing.
<b>Slovak Republic</b>	We have 4 cement plants in Slovakia, where is useful to burn „solid alternative waste“, which is sorted out from mixed municipal waste. Therefore there are facilities where the mixed municipal waste is sorted out to metal fraction, lightweight fraction and heavy fraction. The shredded lightweight fraction (plastic, textile, paper....) is suitable to use as a fuel in the cement plant. Nowadays is the capacity of this pre-treatment plant around of 160 000 t mixed municipal waste.
<b>Slovenia</b>	Mechanical biological treatment 9 MBT plants with the capacity of 387.500 tons, 314.000 tons MSW generated in 2014
<b>Spain (La Rioja)</b>	Spain, Region La Rioja Mechanical and biomethanization treatment. I don't have information about overall situation in the MS
<b>Spain (Galicia)</b>	Both, mechanical and biological treatment is subjected before landfilling.
<b>Turkey</b>	MBT (Mechanic separation, composting, biological drying, biomethanisation) %11 of recycled by this method.

QUESTION 7	WHICH OTHER WASTE STREAMS HAVE BEEN CONSIDERED TO SET CRITERIA IN ORDER TO DEFINE WHEN THE WASTE CAN BE CONSIDERED AS PRE-TREATED? PLEASE, INDICATE THE CRITERIA USED.
<b>Italy</b>	1) Sludge waste 2) Biodegradable waste coming from waste treatment plants, waste water treatment plants and water purification 3) Stable non reactive waste 4) Packaging waste containing hazardous substances 5) Asbestos waste Criteria are listed in a previous answer



QUESTION 7	WHICH OTHER WASTE STREAMS HAVE BEEN CONSIDERED TO SET CRITERIA IN ORDER TO DEFINE WHEN THE WASTE CAN BE CONSIDERED AS PRE-TREATED? PLEASE, INDICATE THE CRITERIA USED.
Latvia	--
Netherlands	All waste is separated, preferably at the source, sometimes at waste-separating plants. Separation leads to waste streams that permit subsequent use at a level that is as high as possible.
Northern Ireland (UK)	Collection of waste streams separately and recycling one or more of the separated components. eg metal, paper and cardboard, food waste, plastics, glass
Portugal	There are no defined criteria to ensure that waste is pre-treated before being landfilled.
Romania	None
Scotland (UK)	--
Slovak Republic	<p>§ 13 of the ACT n. 79/2015 on waste and on amendments to certain acts „Prohibitions It shall be prohibited to dispose of, by landfilling 5. waste with a content of harmful substances exceeding the limit values of concentration of harmful substances under Annex 5, „ Annex 5 to Act No 79/2015 „LIMIT VALUES FOR THE CONCENTRATION OF HARMFUL SUBSTANCES IN WASTE Indicator Limit value in mg/kg dry 1 Total polycyclic aromatic hydrocarbons (PAH) 100 2 Total polychlorinated biphenyls (PCBs) 50 3 Extractable organic halogen compounds (extract) 100 4 Easily released cyanides 10 000 5 Total hydrocarbons (mineral oil) (hexane extract) 50 000 6 Benzene, toluene, xylene 5 000 7 Phenols 10 000 8 Mercaptans 1 000 9 Mercury 3 000 10 Arsenic1) 5 000 11 Lead1) 10 000 12 Cadmium 5 000 13 Nickel1) 5 000 14 Soluble substance content (20 C)2) 300 000 „</p>
Slovenia	<p>Annex 2: Requirements be complied with by waste for the disposal of a landfill site (seven pages) Annex 3: Waste that may be disposed of at a landfill for inert waste Annex 2: Requirements for hazardous waste which is disposed of in a landfill for hazardous waste 1.1 The values of of the leachate of hazardous waste at L / S = 10 l / kg and shall not exceed the following maximum values: arsenic As mg / kg dry matter 25 barium Ba mg / kg s. s. 300 cadmium Cd mg / kg s. s. 5 total chromium Cr mg / kg s. s. 70 copper Cu mg / kg s. s. 100 Mercury Hg mg / kg s. s. 2 molybdenum Mo mg / kg s. s. 30 nickel Ni mg / kg s. s. 40 lead Pb mg / kg s. s. 50 antimony Sb mg / kg s. s. 5 selenium Se mg / kg s. s. 7 zinc Zn mg/kg d.m. 200 chlorides Cl mg / kg s. s. 25,000 fluorides F mg / kg s. s. 500 sulphates SO4 mg / kg s. s. 50,000 Dissolved organic carbon - DOC * C mg / kg s. s. 1,000 of the total dissolved matter ** * If the measured value of the parameter exceeds the threshold value of the leachate from the table for its own the pH value of the eluate may be an analysis between 7.5 and 8.0, wherein it is necessary to use a</p>



QUESTION 7	WHICH OTHER WASTE STREAMS HAVE BEEN CONSIDERED TO SET CRITERIA IN ORDER TO DEFINE WHEN THE WASTE CAN BE CONSIDERED AS PRE-TREATED? PLEASE, INDICATE THE CRITERIA USED.
	<p>measuring method described in Standard BS-CEN / TS 14429 or other equivalent. ** The content of total dissolved solids in the eluate may be used instead of the content of sulphates and chlorides in the leachate. 1.2 The parameter values of pollution for hazardous waste shall not exceed the following limits pollution parameters: combustion loss * % By weight of the. d.m. 10% Total organic carbon - TOC * C % By weight of the. d.m 6% ** / *** ANC - the ability to neutralize acid assessment is needed ** The value of the parameter of pollution can be exceeded if the DOC does not exceed the value of the parameter of the leachate from the previous point. *** If this value is not achieved, the Ministry of the environmental permit recognize the higher limit value, provided that the value of the DOC of 1000 mg / kg is reached at L / S = 10 l / kg for its own the value of the pH of the material or at a pH value between 7.5 and 8.0. The criteria for stable non-reactive waste are describe in the question 5. In Annex II, the criteria for leachate and parameters of certain types of waste are set out for: 3 Requirements for municipal waste to be deposited in a landfill for non-hazardous waste 3.1 The parameter values of pollution of municipal waste 4 Requirements for non-hazardous waste to be disposed in a landfill for non-hazardous waste 4.1 The parameter values non-hazardous waste leachate 4.2. The parameter of pollution values for non-hazardous waste 5 Requirements for non-hazardous waste with a high content of biodegradable material, which generated as residues from processing according to the procedure R3 is in accordance with regulations governing the handling of waste (Recycling / Reclamation of organic substances which are not used as solvents, including composting and other processes biological transformation), and they are deposited in a landfill as non-hazardous 5.1 The parameter leachate values of waste with a high content of biodegradable material 5.2 The values of the pollution parameters for non-hazardous waste with a high content of biodegradable material 6 The requirements for inert waste to be deposited in a landfill for inert waste 6.1 The parameter leachate values of inert waste 6.2 The values of pollution for inert waste</p>
<b>Spain (La Rioja)</b>	Sewage sludge from urban water, humidity less than 65% by weight.
<b>Spain (Galicia)</b>	--
<b>Turkey</b>	*Medical wastes should be pretreated by sterilisation and criteria are defined in National By-Law on Medical waste control. * criteria for hazardous, non hazardous and inert wastes are defined in Annex II of National By-Law on Landfilling of Waste



QUESTION 8	WHICH TREATMENTS ARE REQUIRED TO CONSIDER A WASTE TO BE STABLE NON-REACTIVE? WHICH CRITERIA ARE SET TO BE ACCEPTED IN NON-HAZARDOUS LANDFILLS?
<b>Italy</b>	Stable non reactive waste shall be landfilled in non-hazardous landfill if: a) leaching test performed according to the methods for monolithic and granular waste laid with UNI 10802, produces an eluate that complies with the concentrations established in the law; b) have a concentration in the total organic carbon (TOC) of not more than 5%; c) have the pH not less than 6 and the concentration of dry matter not less than 25%; d) that waste should not be disposed of in landfills for non-hazardous waste biodegradable. d-bis) subjected to appropriate geotechnical tests demonstrate sufficient physical stability and ability to load. For this evaluation you can relate to WAC Agency's criteria for acceptance UK Environmental Protection; d-ter) shall be submitted to the acid neutralizing capacity, using leaching tests using the methods CEN / TS 14429 and CEN / TS 14997.
<b>Latvia</b>	Additional analysis to assess measurements of waste dangerousness. Waste declaration of conformity to Cabinet Regulation No. 1032, "Regulations Regarding the Construction of Landfill Sites, the Management, Closure and Re-cultivation of Landfill Sites and Waste Dumps" Annex 6.
<b>Netherlands</b>	By separating waste, ultimately some residue will be created that can not be re-used in any other way and must be disposed on a landfill.
<b>Northern Ireland (UK)</b>	Only asbestos is accepted as a stable non-reactive waste at landfill in Northern Ireland. However, the Landfill Regulations set out criteria for granular stable non-reactive hazardous waste. If the waste is hazardous, an assessment against a Waste Acceptance Criteria must be completed before it can be disposed of at a landfill for hazardous waste.
<b>Portugal</b>	A hazardous waste is considered stable and non-reactive when is subjected to a stabilization or solidification treatment. After being treated this waste can be accepted in a non-hazardous waste landfill if it respects the acceptance criteria defined on the national law for the non-hazardous waste landfills that are permitted to accept in the same cell non-hazardous waste and stable, non-reactive hazardous waste.
<b>Romania</b>	In the landfill, it is not accepted mixed waste. The collected waste are directed on stream. In the landfill, is not accepted waste with humidity higher than 65%. According Government Decision no.349 from April 2005



QUESTION 8	WHICH TREATMENTS ARE REQUIRED TO CONSIDER A WASTE TO BE STABLE NON-REACTIVE? WHICH CRITERIA ARE SET TO BE ACCEPTED IN NON-HAZARDOUS LANDFILLS?
	<p>concerning waste storage, Art 7 point (4). It is prohibited the mixing of waste in order to meet the criteria for acceptance at a certain class of landfill. Art 7 point (5) Waste storage as mentioned in paragraph 1 and 2 is permitted only if the waste are previously subjected to certain treatment feasible technically and which will contribute to fulfilling the objectives set out in this Government Decision. In non hazardous landfills is allowed the storage of the following waste: a) municipally waste; b) non- hazardous waste of any other origin, which satisfy the criteria for the acceptance of waste at landfills for non-hazardous waste established according to annex 3. c) Stable, non-reactive hazardous waste, such as solidified, vitrified, which leaching have an equivalent behaviour with those provided in subparagraph(b) and satisfy the relevant criteria for acceptance laid down according to annex 3; these hazardous waste shall not be stored in spaces intended for biodegradable non-hazardous waste.</p>
Scotland (UK)	<p>Stable, non-reactive hazardous wastes could potentially include a range of monolithic solidified wastes (wastes in large blocky forms such as those that have been mixed with cement or PFA) or granular solid wastes produced by a variety of treatment plants (such as filter cakes and treated fly ash), however, blanket classification of such waste types and the processes through which they have been treated is not possible and each waste stream will require to be individually assessed and a risk assessment conducted in light of the assessment and the intended landfill destination. The criteria detailed in Appendix 1 of this paper will be used as the reference upon which determinations may be made and conclusions reached on determining whether wastes are stable and non reactive hazardous wastes and whether they may be accepted at non hazardous landfills. In the Annex to the Decision, limit values are laid down for hazardous and non-hazardous waste, which is landfilled in the same cell with stable, non-reactive hazardous waste. See Appendix 1 at the end of this document. Appendix 1 Criteria for hazardous waste acceptable at landfills for non-hazardous waste pursuant to Article 6(c)(iii): Stable, non-reactive means that the leaching behaviour of the waste will not change adversely in the long-term, under landfill design conditions or foreseeable accidents: • in the waste alone (for example, by biodegradation), • under the impact of long-term ambient conditions (for example, water, air, temperature, mechanical constraints), • by the impact of other wastes (including waste products such as leachate and gas). The full waste acceptance criteria for stable non-reactive hazardous wastes set out leaching and other limit values that will render these wastes acceptable for disposal at landfills for non-hazardous waste. Tables 1 and 2 below, set the limit values applicable to granular stable, non-reactive hazardous waste and to the granular nonhazardous wastes disposed with them. They are taken from Council Decision 2003/33/EC. The values in Table 1 apply to a liquid to solid ratio of 10 litres/kilogram using the 2 stage CEN leaching test EN 12457/3. Granular wastes include all wastes that are not monolithic. Table 1: Leaching Limit Values for Granular, Stable, Non-reactive Hazardous Wastes (may be subject to change) Components Liquid/Solid = 10 l/kg mg/kg dry substance As 2 Ba 100 Cd 1.0 Cr (total) 10 Cu 50 Hg 0.2 Mo 10 Ni 10 Pb 10 Sb 0.7 Se 0.5 Zn 50 Chloride 15,000 Fluoride 150 Sulphate 20,000 Dissolved Organic Carbon* 800 Total Dissolved Solids** 60,000 * If the waste does not meet these values for dissolved organic carbon (DOC) at its own pH, it may be tested at L/S = 10 l/kg and pH of 7.5 to 8.0. If the result of this The</p>



QUESTION 8	WHICH TREATMENTS ARE REQUIRED TO CONSIDER A WASTE TO BE STABLE NON-REACTIVE? WHICH CRITERIA ARE SET TO BE ACCEPTED IN NON-HAZARDOUS LANDFILLS?
	<p>Disposal in Landfills for Non-Hazardous Waste Of Stable, Non-Reactive Hazardous Wastes Interim Guidance Note. Version 1: June 2004 Page 4 of 4 determination does not exceed 800 mg/kg , the waste may be considered as complying with the acceptance criteria for DOC. ** The values for total dissolved solids can be used as an alternative criterion to the individual values for chloride and sulphate. Table 2: Other Criteria for Granular, Stable, Non-reactive Hazardous Wastes Parameter Value Total Organic Carbon 5%* PH Minimum 6 Acid Neutralisation Capacity Must be evaluated Physical stability ** * If this value is not achieved, a higher value may be admitted by SEPA, provided that the dissolved organic carbon (DOC) value of 800 mg/kg is achieved at L/S 10 at its own pH or at a pH of 7.5 to 8.0 ** The wastes must have sufficient inherent strength and be placed in such a manner to ensure no threat to the stability or integrity of the landfill or management systems (e.g. separation barriers, structures, etc.)</p>
Slovak Republic	Stabilisation processes (soil which contains oil substances), solidification of hazardous waste industrial sludges).
Slovenia	<p>Annex II: 2 Requirements for stabilized and non-reactive hazardous waste that can be disposed of at a landfill for non-hazardous waste for disposal only in fields where there are no municipal waste or other hazardous waste containing biodegradable carbon in excess of five percent of the mass of waste 2.1 Stabilized and non-reactive hazardous waste must be processed in such a way that the volume of leaching and of the eluate properties under conditions that are at the landfill, long-term does not change due to: - properties of waste as a biological degradability, - external influences at the landfill, such as water, air, temperature and mechanical stress, and - the effects of other waste at the landfill, including their products such as leachate and landfill gases. 2.2 The parameter values of the leachate were stabilized and non-reactive hazardous waste at L / S = 10 l / kg and does not exceed the following maximum values of the parameters of the eluate: arsenic As mg / kg d.m. 2 barium Ba mg / kg s. s. 100 cadmium Cd mg / kg s. s. 1 total chromium Cr mg / kg s. s. 10 copper Cu mg / kg s. s. 50 Mercury Hg mg / kg s. s. 0.2 molybdenum Mo mg / kg s. s. 10 nickel Ni mg / kg s. s. 10 lead Pb mg / kg s. s. 10 antimony Sb mg / kg s. s. 0.7 selenium Se mg / kg s. s. 0.5 zinc Zn mg / kg s. s. 50 chlorides Cl mg / kg s. s. 15,000 fluorides F mg / kg s. s. 150 sulphates SO4 mg / kg s. s. 20,000 Dissolved organic carbon - DOC * C mg / kg s. s. 800 of the total dissolved matter ** - mg / kg s. s. 60,000 * If the measured value of the parameter of the leachate exceed the limit value from the table for its own the value of the pH of the eluates may be subjected to analysis at pH between 7.5 and 8.0, 'wherein it is necessary to use a measuring method describes and Standard BS-CEN / TS 14429 or second, the equivalent. ** The content of total dissolved solids and the leachate may be used instead of the content of sulphates and chlorides. 2.3 The parameter values of pollution stabilized and non-reactive hazardous waste shall not exceed the following limits pollution parameters: Total organic carbon - TOC C % By weight of the dry matter 5% * / ** pH more than 6 ANC - the ability to neutralize acid assessment is needed * The measured value of the parameter of pollution may exceed the limit value parameter table from of pollution, if the DOC does not exceed the threshold parameter of the leachate from the previous point. ** If this value is not achieved, the Ministry of the environmental permit recognize the higher limit value, provided that the value of the DOC 800 mg / kg is reached at L / S = 10 l / kg for its own the value of the pH of the material or at a pH value of 7, 5 and 8.0. 2.4 Waste containing asbestos In the case of disposal of construction and demolition waste containing asbestos, and a solid bonded asbestos waste it is necessary to ensure that: - waste not containing other dangerous substances as</p>



QUESTION 8	WHICH TREATMENTS ARE REQUIRED TO CONSIDER A WASTE TO BE STABLE NON-REACTIVE? WHICH CRITERIA ARE SET TO BE ACCEPTED IN NON-HAZARDOUS LANDFILLS?
	<p>a solid bound asbestos, - are deposited only construction waste containing solid asbestos, and other strongly bound asbestos waste, - the waste is deposited in special storage boxes separately from other waste, - the area of waste deposited daily covering and before each compaction, to avoid the release of asbestos fibers into the environment, - the waste is not packed, sprayed with water during the disposal, - sealing surface of the body waste disposal area containing asbestos, to prevent the release of asbestos fibers into the environment, - not carry out any work that cause the spread of asbestos fibers into the environment, and - after closure of the landfill with waste disposal area containing asbestos, to prevent any use of landfill areas that have harmful effects on human health. For disposal of construction waste containing asbestos, and a solid bound asbestos waste it is necessary to ensure that after closure of the landfill keep waste disposal plan, stating that the waste deposited there, containing asbestos.</p>
<b>Spain (La Rioja)</b>	All landfills in La Rioja are for non-dangerous waste. Stabilized hazardous waste are not accepted.
<b>Spain (Galicia)</b>	--
<b>Turkey</b>	Again defined in Annex II of National By-Law on Landfilling of Waste.(Part is given in the attachment of e-mail.)



<b>QUESTION 9</b>	<b>WHICH PRESCRIPTIONS ARE SET IN IPPC PERMITS TO ENSURE TREATMENT WILL COMPLY WITH MALAGROTTA RULES? PROVIDE SOME EXAMPLES.</b>
<b>Italy</b>	A general prescription requiring a treatment before landfilling is usually set. No detailed indications are usually set in the permit.
<b>Latvia</b>	All landfill sites in our country have permit of category A polluting activities. And all conditions were set by our national legislation due to Directives of European Council.
<b>Netherlands</b>	There are prohibitions written in the permit not to accept untreated waste for landfilling. There are prohibitions to accept waste that can be treated in an other way (at a higher level) than landfilling. There is reference to legislation regulating waste management.
<b>Northern Ireland (UK)</b>	Landfill permit contain the following condition: Waste shall only be accepted for disposal if: ... (l) they are wastes which have been subject to prior treatment, except for inert waste for which treatment is not technically feasible or treatment would not reduce its quantity or the hazards which it poses to human health or the environment.
<b>Portugal</b>	There are no prescriptions settled in IPPC permits to ensure that waste is pre-treated under the Malagrotta rules.
<b>Romania</b>	No prescriptions are set in the permit, it is specified only the stream, as mentioned above.
<b>Scotland (UK)</b>	Waste shall not be deposited in the Site Landfill unless it has been subjected to treatment prior to disposal, except in the following cases:- (a) Where the Waste is Inert Waste for which Treatment is not technically feasible; or (b) Where the Waste is Waste other than Inert Waste and Treatment would not reduce its quantity or the hazards which it poses to human health or the environment.
<b>Slovak Republic</b>	The IPPC permits respect the provision § 13 of the „ACT n. 79/2015 on waste and on amendments to certain acts“ : „§ 13 Prohibitions It shall be prohibited to dispose of, by landfilling 1. liquid waste, 2. waste which, when landfilled, is explosive, corrosive, acidifying, highly flammable or flammable, 3. healthcare and veterinary care waste, the catalogue number of which prior to processing is listed in Annex 8; processing of and the consequent change in the catalogue number of such waste shall have no effect on the prohibition of landfilling thereof, 4. waste pneumatic tyres, except tyres used as construction material in the construction of a landfill, bicycle tyres



	<p>and tyres with an outer diameter greater than 1 400 mm, 5. waste with a content of harmful substances exceeding the limit values of concentration of harmful substances under Annex 5, 6. separated biodegradable kitchen and canteen waste, 7. separated components of municipal waste to which extended producer responsibility applies with the exception of waste which cannot be recovered after final sorting, 8. biodegradable municipal waste from gardens and parks, including biodegradable cemetery waste with the exception of waste which cannot be recovered after final sorting, f) dilute or mix waste „ Furthermore we prohibited to disposal of landfilling for example: waste pursuant to the Waste catalogue, which has to be recovered: - 02 01 03 – plant-tissue waste - 03 01 01 - waste bark and cork - 16 02 14 – discarded equipment other than those mentioned in 16 02 09 to 16 02 13 - 16 02 16 – components removed from discarded equipment other then those mentioned in 16 02 15 - 20 01 01 - paper and cardboard - 20 01 02 - glass - 20 01 38 – wood other than that mentioned in 20 01 37 - 20 01 39 – plastics The allowed sludges for disposal of must have the content 60-70% of dry matter.</p>
<b>Slovenia</b>	All the requirements of the relevant regulations shall specify in the IPPC/IED permits. Permits are extremely comprehensive and summarize the requirements of the majority of the legislation.
<b>Spain (La Rioja)</b>	Landfills have to stablish acceptance criteria for each waste.
<b>Turkey</b>	--



## INSPECTIONS

QUESTION 10	WHICH AUTHORITIES CARRY OUT INSPECTIONS AT LANDFILL SITES AND PRE-TREATMENT FACILITIES?
<b>Italy</b>	The Environmental regional protection Agency on behalf of the Provincial or Regional government. Landfills and pre treatment plant are usually inspected once every 3 years.
<b>Latvia</b>	The State Environmental Service
<b>Netherlands</b>	Environmental agencies carry out inspections on behalf of provinces. Waterboard agencies, control of surface water and leachate. Inspections are carried out 1 - 4 times per year.
<b>Northern Ireland (UK)</b>	The Northern Ireland Environment Agency - Pollution Inspectors
<b>Portugal</b>	Inspection of agriculture, the sea, the environment and spatial planning
<b>Romania</b>	Inspections at landfill in our country are performed by following authorities: Environmental Protection Agency; Perform inspections only if occur changes relating to initial data National Environmental Guard;- Usually perform inspections, twice a year, with the exception of complaints, or accidental pollution, and also if occur changes relating to initial data which led to the issuance of the permit Management System of Water; once a year,with the exception of complaints, or accidental pollution, and also if occur changes relating to initial data which led to the issuance of the permit. County Council of each county, who is the owner of the landfill: 5-6 times a year.
<b>Scotland (UK)</b>	Scottish Environment Protection Agency
<b>Slovak Republic</b>	Slovak Environmental Inspectorate (IPPC Section, Waste Section, Water protection Section, Air protection Section) District Office, Department of environmental care
<b>Slovenia</b>	Inspectorate of the Republic of Slovenia for the Environment and Spatial Planning, body within the Ministry of the



QUESTION 10	WHICH AUTHORITIES CARRY OUT INSPECTIONS AT LANDFILL SITES AND PRE-TREATMENT FACILITIES?
	environment and Spatial planning Explanation following answer 2: Inspectors carried out inspections at least once per year according to IED plan. Inspectorate carried out inspection repeatedly in case of complaints or if the specific campaigns are organized for the control of certain part of legislation
<b>Spain (La Rioja)</b>	Each region carries out inspections. In Spain, Region La Rioja, Environmental Quality Department carry out inspections at landfill sites, there are 4 landfills sites. Landfills sites are inspected once a year.
<b>Spain (Galicia)</b>	Ministry of environment and spatial planning, Inspection for environment and nature.
<b>Turkey</b>	Ministry of Environment an Urbanization and Provincial Directorates.

QUESTION 11	HOW OFTEN ARE INSPECTIONS AT LANDFILL SITES AND PRE-TREATMENT FACILITIES CARRIED OUT IN YOUR COUNTRY?
<b>Italy</b>	1
<b>Latvia</b>	95
<b>Netherlands</b>	--
<b>Northern Ireland (UK)</b>	8
<b>Portugal</b>	--
<b>Romania</b>	9
<b>Scotland (UK)</b>	100
<b>Slovak Republic</b>	Answer to the Question 2.: Slovak environmental Inspectorate, IPPC section carries out the inspections at least 1 time a year when the operation belongs to the operation with the highest risk and 1 time during the three years when the operation belongs to the operation with the lowest risk.



QUESTION 11	HOW OFTEN ARE INSPECTIONS AT LANDFILL SITES AND PRE-TREATMENT FACILITIES CARRIED OUT IN YOUR COUNTRY?
Slovenia	1
Spain (La Rioja)	0
Spain (Galicia)	4
Turkey	0

QUESTION 12	HOW DO INSPECTORS CURRENTLY CHECK THAT WASTE HAS BEEN PRE-TREATED ACCORDING TO MALAGROTTA REQUIREMENTS BEFORE IT IS LANDFILLED? IN PARTICULAR, DO THEY CHECK AT THE LANDFILL AND/OR AT THE PRE-TREATMENT FACILITY?
Italy	The inspection performed at the landfill site usually aims at checking the correspondence of the EWC landfilled with the one authorized in the permit. The up-stream of the waste is not usually checked.
Latvia	Inspector check landfill on the spot. At inspection inspector check all installations in plant for proper functioning; look through waste accounting data, compare waste flow compliance due to permit; check monitoring data, if something look suspicious inspector can poses to make additional analysis
Netherlands	Registrations can be checked both in a national data-base and on site. Both methods are practiced.
Northern Ireland (UK)	During inspections inspector observe waste deposits. Landfills must have waste acceptance procedures, as part of their site management plan, in place and should include a check as to whether a waste has been treated: checks should include some or all of the following: -initial discussions with the waste producer or contractor about the nature of the waste and any contractual arrangements regarding its treatment; -checking the paperwork accompanying the load (including the declaration on treatment which is suggested good practice); -initial visual inspection of waste; -inspection when loads are deposited; -periodic 'audit' of the producer's arrangements for treatment.



QUESTION 12	HOW DO INSPECTORS CURRENTLY CHECK THAT WASTE HAS BEEN PRE-TREATED ACCORDING TO MALAGROTTA REQUIREMENTS BEFORE IT IS LANDFILLED? IN PARTICULAR, DO THEY CHECK AT THE LANDFILL AND/OR AT THE PRE-TREATMENT FACILITY?
Portugal	--
Romania	Inspectors do a visual inspection. They also check analysis reports which the site operator must be carried out in accordance with national legislation and with the provisions of the permit. They check datasheet of the waste. They also check the documents accompanying the transport of waste.
Scotland (UK)	By examination of waste and accompanying paperwork at landfill site.
Slovak Republic	Inspectors currently check the landfills and pre-treatment facilities according to the IPPC permission (pursuant to the new „Act 79/2015 on waste and on amendments“ the Inspectors check provisions mentioned in the previous point 3.6. as well as the prohibited waste mentioned in the previous point 3.6.).
Slovenia	Both.
Spain (La Rioja)	In Spain, Region La Rioja, check that waste has been pre-treated at the pre-treatment facility. There is one pretreatment facility in La Rioja.
Spain (Galicia)	They check records of incoming and outgoing shipments of waste. They check evaluation of waste.
Turkey	--

QUESTION 13	DO THEY HAVE A SPECIFIC CHECKLIST FOR PRE-TREATED WASTE?
Italy	NO



<b>Latvia</b>	NO
<b>Netherlands</b>	NO
<b>Northern Ireland (UK)</b>	NO
<b>Portugal</b>	--
<b>Romania</b>	NO
<b>Scotland (UK)</b>	NO
<b>Slovak Republic</b>	NO
<b>Slovenia</b>	NO
<b>Spain (La Rioja)</b>	NO
<b>Spain (Galicia)</b>	NO
<b>Turkey</b>	no



## CONTROL MEASURES

Member States shall take the necessary measures to ensure that the production, collection and transportation of hazardous waste, as well as its storage and treatment, are carried out in conditions providing protection for the environment and human health in order to comply with the EU regulations, including action to ensure traceability from production to final destination and control of hazardous waste in order to meet the requirements.

QUESTION 14	WHAT CONTROL MEASURES ARE IMPLEMENTED TO MEET THE ABOVE MENTIONED REQUIREMENTS?
<b>Italy</b>	A traceability system of the hazardous waste has been set up in Italy (SISTR)
<b>Latvia</b>	To ensure that the production, collection, transportation, storage and treatment of hazardous waste, are carried out properly, all actions must be done according to legislation (our national legislation, Directives and Regulations of EU). Waste carriers, traders register at information system (IS) of hazardous waste accounting. All information from point to point about waste flow must be registered on IS. All hazardous waste acceptance and storage points, must be properly equipped to ensure requirements of environmental protection due to permit.
<b>Netherlands</b>	National registrations of disposal, transport and acceptance of waste are checked. Hard copy documents can be inspected on site. Refused waste has to be recorded, the documents on which can be inspected. Landfilling facilities have to document the content of cells in the landfill, assuring traceability of waste. Waste containing asbestos or suspected to contain asbestos is subject to specific treatment that is included in the permit.
<b>Northern Ireland (UK)</b>	All waste facilities must hold appropriate authorisations and conditions therein will apply for the storage and any treatment operations of the waste to ensure protection for the environment and human health. The movement of hazardous waste is controlled under the Hazardous Waste Regulations (NI) 2005 by a consignment note process - an effective system of control for wastes to make sure that they are soundly managed from their point of production to their final destination for disposal or recovery.
<b>Portugal</b>	Waste Transportation Guides which is a document that needs to keep up with the waste transportation and is a



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	<p>guarantee that the waste producer/ waste holder has sent their wastes to an establishment or undertaking which carries out waste treatment operations. Waste producers or waste holders and everyone who's participate in the management of hazardous waste has to be register in a specific electronic platform, called SILIAmb, and also, they have to communicate, every year, through this platform the hazardous waste produced or managed by themselves, in the previous year. Hazardous waste management facilities are obligated to have a permit to treat hazardous waste in which are defined all the requirements about hazardous waste management defined in national law that such operators must comply with.</p>
<b>Romania</b>	<p>In our country, National Environmental Guard, perform inspections at waste producers, waste carries, waste collectors, recovery waste agents and also at landfills in conditions providing protection for the environment and human health in order to comply with the EU regulations.</p>
<b>Scotland (UK)</b>	<p>The revised WFD states that classification of hazardous (special) waste is to be based, amongst other things, on chemicals legislation: The Classification, Labelling and Packaging of Substances and Mixtures Regulation 1272/2008 (CLP) Additionally, the list of wastes in commission decision (Decision 2000/532/EC) (79k) provides for: the list of wastes, more commonly known as the European Waste Catalogue (EWC), the rules for using the EWC and the criteria used to determine if a waste on the EWC is hazardous. NEW Legislative changes concerning the list of waste and hazardousness properties (applicable from 1 June 2015): Commission Decision (EU) No 2014/955/EU of 18 December 2014 amending Decision 2000/532/EC on the list of waste pursuant to Directive 2008/98/EC of the European Parliament and of the Council Text with EEA relevance (OJ L 370, 30.12.2014, p. 44–86 ) Commission Regulation (EU) No 1357/2014 of 18 December 2014 replacing Annex III to Directive 2008/98/EC of the European Parliament and of the Council on waste and repealing certain Directives (OJ L 365, 19.12.2014, p. 89–96) Guidance on assessment and classification of hazardous wastes, the technical guidance document Technical Guidance WM3 - Waste Classification: Guidance on the classification and assessment of waste. Please note that the above changes were transposed into national legislation on the 8th of June with the implementation of the Waste (Meaning of Hazardous Waste and European Waste Catalogue) (Miscellaneous Amendments) (Scotland) Regulations 2015 Where it would be detrimental to their business to do otherwise, any producers or operators able to classify their waste under the new system are free to do so, from the 1st of June. There will be varying implementation dates</p>



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	<p>throughout the UK and until such times as the changes have been fully implemented by an individual country SEPA will accept movements of waste into Scotland, from that country, under both the old classification system (as explained in Technical Guidance WM2) and new classification system (as explained in Technical Guidance WM3). This allows Scottish Businesses to accept waste movements from the rest of the UK without any additional burdens arising from those countries adopting the new system before or after Scotland. All special (hazardous) waste produced in Scotland must be consigned using a SEPA issued consignment note or code regardless of its final destination within the UK. When exporting special (hazardous) waste to England, Wales or Northern Ireland for treatment, disposal or recovery, the consignee who receives the waste is required to send a copy of the completed deposit note to SEPA.</p>
<p><b>Slovak Republic</b></p>	<p>1/A § 97 sec. 1/ Act 79 /2015 on waste and on amendments to certain acts: „ The waste management administrative authority issues permits for: g) the gathering of hazardous waste at the producer’s location in annual volumes exceeding 1 tonne of hazardous waste,“ 1/B§ 26 sec. 1/ Act 79 /2015 on waste and on amendments to certain acts „(1) Anyone who has entered into a contract with a carrier which has as its object the transport of hazardous waste or undertakes the transport of hazardous waste using his or her own means of transport (hereinafter the “hazardous waste consignor”) shall a) ensure that hazardous waste is transported in compliance with this Act and, if a permit is required for the transport of hazardous waste under § 97(1f), in compliance with this permit, (the permit is required when the total annual volume exceeds 1 tonne of hazardous waste) b) use for the transport of hazardous waste only such means of transport that conform to the provisions of international agreements on the transport of dangerous goods; if not undertaken by himself or herself, ensure that the transport is undertaken by a carrier authorised under specific regulations.“ 1/C § 97 sec. 1/ Act 79 /2015 on waste and on amendments to certain acts: „ The waste management administrative authority issues permits for a) the operation of a waste disposal installation ..... c) operation of waste recovery installations..... d) operation of waste collection installations .....“</p>
<p><b>Slovenia</b></p>	<p>Supervision of producers, collectors, transporters, transboundary shipments of waste, persons who waste treated. And strict procedure to achieve environmental requirements for issuing permits and notification of transboundary</p>



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	shipments.
<b>Spain (La Rioja)</b>	Waste Control Documents. Each transport (lorries, trains) with waste has to carry during the transportation a waste control document.
<b>Spain (Galicia)</b>	Inspector check prescriptions which are in environmental permit. If it is not as it has to be, inspector order to put in order the elimination of deficiencies and irregularities. The deadline is set. After that inspector carry out control. He or she also detects violations and impose a fine.
<b>Turkey</b>	There is a by-law for hazardous wastes. *Waste management by-law(classification, temporary storage, liability insurance, national waste transformation form(NWTF), etc.) *Cominique for waste shipment by road

QUESTION 15	HOW IS THE INFORMATION MADE AVAILABLE TO THE COMPETENT AUTHORITIES?
<b>Italy</b>	--
<b>Latvia</b>	The State Environmental Service get information from IS or can poses information about waste flow from carrier, trader or the person who accept waste.
<b>Netherlands</b>	The national digital data-base of waste data is available to the authorities. Other documents can be inspected on site.
<b>Northern Ireland (UK)</b>	Consignment notes (hazardous waste transfer documentation) must be retained by the produce, the carrier and the end destination and be available for inspection. Under the Hazardous Waste Competent authorities are pre-notified on any movements of hazardous waste
<b>Portugal</b>	The Portuguese law establishes that the waste transportation guide has to be kept available to authorities during 5 years. The hazardous waste produced or managed in Portugal is available in the SILIAmb platform, as a result of the producer's/holder's and operator's yearly reports.



QUESTION 15	HOW IS THE INFORMATION MADE AVAILABLE TO THE COMPETENT AUTHORITIES?
<b>Romania</b>	Usually, in the permit are required reports regarding waste management , such as: amount of waste, total shipments of waste per year. These data are checked by National Environmental Guard Commissioners during inspections.
<b>Scotland (UK)</b>	See above
<b>Slovak Republic</b>	2/A – the gathering of hazardous waste inspect the administrative authority, which issues the permit (district environmental office) 2/B § 26 sec. 1/ Act 79 /2015 on waste and on amendments to certain acts (2) The hazardous waste consignor and the person to whom the hazardous waste is consigned (hereinafter the “hazardous waste consignee”) shall report the required information from the records under a) to the district office competent according to the place where the hazardous waste is loaded and the place where it is unloaded; if the permit for the transport of hazardous waste has been granted by the district office in the regional capital, this information shall also be reported to this office, (the transport means physically check the environmental Inspectorate and customs officers)“ 3/B The operation of waste disposal, recovery and collection installations inspect the competent district authority and the Inspectorate.
<b>Slovenia</b>	Decree on waste Article 56 (Information System on Waste Management) (2) The information system provides the users an electronic support for the implementation and certification of the record sheets in accordance with Article 26 (records sheets content) of this Regulation and reporting in accordance with Articles 29 (report of waste generated and waste management), 37 (report of waste collectors) and 45 (report of waste treatment) of this Regulation. (3) The information system contains for each original waste producer, collector and performer information on the treatment: 1. Waste Shipments 2. waste generation and waste management and 3. The type, location and capacity of collection centers and waste treatment plants. (4) Access to the data in the information system have the ministry, the authorities responsible for monitoring in accordance with Article 60 of this Regulation, and the authority responsible for statistics. (5) The information referred to in the third paragraph of this article applies Ministry to ensure the traceability of shipments of waste, monitoring the generation, collection and treatment of waste, particularly in terms of achieving the objectives set out in the first paragraph of Article 13 of this Regulation, the control of waste management under this Regulation and compliance with reporting



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	obligations in accordance with the fifth paragraph of Article 13 of this Regulation and Article 59 of this Regulation.
<b>Spain (La Rioja)</b>	In case of industrial dangerous waste, a electronic copy of the waste control document is sent to the competent authorities. In case of industrial non-dangerous waste, we use paper documents.
<b>Spain (Galicia)</b>	The inspector obtains information directly, an electronic system for recording is set up. Inspector also check out the annual report for landfill.
<b>Turkey</b>	By National waste transportation form, web based electronical system to follow waste shipment called "mobile waste shipment tracking system", waste declaration system(web based electronical system) etc.



## Any other comments

QUESTION 16	WHAT DO YOU THINK SHOULD BE EXPLORED DURING THE IMPEL LANDFILL PROJECT CONCERNING PRE-TREATMENT AND LANDFILL INSPECTIONS? WHICH OUTCOME DO YOU SUGGEST TO ACHIEVE?
<b>Italy</b>	1) An overall view of the differences in MS in the application of the Malagrotta rules 2) A guideline with criteria to define the kind of pre treatment needed for different waste streams 3) A checklist for inspectors about pre treatment
<b>Latvia</b>	See the best practise of waste management in different countries. The main outcome - united access for waste management in EU member states.
<b>Netherlands</b>	The relationship between national regulation and implementation of the regulation.
<b>Northern Ireland (UK)</b>	How compliance with pre-treatment is measured during physical inspection on site. How far does this need to go.
<b>Portugal</b>	In our opinion it was important to define specific treatments that should be assumed as the appropriate pre-treatment option in order to reduce as far as possible negative impacts on the environment and human health to different kinds of waste (hazardous, non-hazardous and inert waste) before landfilling and also define the exempted pre-treatment cases for inert waste.
<b>Romania</b>	I thing that we should view which treatment are required to consider a waste to be stable non-reactive? Also, which criteria are set in non - hazardous landfills, which prescriptions are set in IPPC permits to ensure treatment will comply with Malagrotta rules.
<b>Scotland (UK)</b>	Guidance on issues surrounding stabilization of organic fraction.
<b>Slovak Republic</b>	1/ What is the situation with pre-treatment in the Member states? Which legislative instruments and other measures do the Member states use to improve compliance with Malagrotta requirements? 2/ The most important thing in waste management is to support and require compliance with Waste management system



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	hierarchy. We need to require it from everybody – producers, municipalities, inhabitants, companies, natural and legal persons. We need to decrease the amount of municipal waste which has to be pre-treated. It is possible only by properly sorting the municipal waste. 3/ To ensure, that the operator of a landfill has a sufficient special-purpose financial reserve to close, reclaim and monitor the landfill after its closure.
Slovenia	--
Spain (La Rioja)	Waste that don't require pre-treatment. List, characteristics Pre-treatment options for each waste stream. Requirements of landfilling for different waste streams like plaster, stabilized hazardous waste, sludge, hazardous waste. Landfill management, minimum requirements for operators
Spain (Galicia)	It should be explored whether the Member States use similar ways of pre-treatment before landfilling, if monitoring is carried out everywhere in accordance with Directive 1999/31/EC.
Turkey	--

QUESTION 17	WHAT DO YOU THINK SHOULD BE DONE TO IMPROVE COMPLIANCE WITH MALAGROTTA REQUIREMENTS?
Italy	Set up pre treatment plants Compliance promotion and enforcement Follow the up-stream of the waste (go to the producer)
Latvia	--
Netherlands	The issue should be put on the national political agendas, in order to enhance compliance of national legislation with the Malagrotta requirements and alternatively to underpin the necessity to live up to the rules.
Northern Ireland (UK)	Specific guidance as to what is appropriate pre-treatment. 'Appropriate' is a term open to interpretation.
Portugal	Define criteria to ensure that waste are pre-treated; Made inspection campaigns to verify if the waste are being treated before landfilling; Provide legal sanctions for non-compliance with the obligation to treat waste before



QUESTION 17	WHAT DO YOU THINK SHOULD BE DONE TO IMPROVE COMPLIANCE WITH MALAGROTTA REQUIREMENTS?
	landfilling under the Malagrotta requirements.
<b>Romania</b>	In our county , technology needs to be improved to perform pre-treatment and treatment before storage.
<b>Scotland (UK)</b>	See above
<b>Slovak Republic</b>	In Slovakia, for example. an increase in the landfill tax
<b>Slovenia</b>	--
<b>Spain (La Rioja)</b>	--
<b>Spain (Galicia)</b>	In our country operate just 11 landfills and compliance with Malagrotta requirements in improved.
<b>Turkey</b>	--