

GTOG: From production to recycling: a circular economy for the European gypsum Industry with the demolition and recycling Industry



EUROPEAN HANDBOOK ON BEST PRACTICES IN AUDIT PRIOR TO DECONSTRUCTION OF BUILDINGS

Start date of the project: 2013/01/01

Duration: 36 months

LIFE PROGRAMME: LIFE11 ENV/BE/001039



Identifier:	DB2: European handbook on best practices in audit prior to deconstruction of buildings
Number of the associated action:	B1
Date:	March 2015
Class:	Deliverable
Responsible partner:	Recovering
Distribution:	PU: public
Title:	European handbook on best practices in audit prior to deconstruction of buildings

Contact Information

Lead Contact	Eurogypsum - Christine Marlet
Phone Number	+32 2 227 11 30
Email	info@eurogypsum.org

Document Contact	Recovering – Silvia Nougazol
Deliverable	DB2: European handbook on best practices in audit prior to deconstruction of buildings
Phone Number	+33 6 12 67 17 38
Email	snougazol@recovering.fr
Participants	Recovering, Occamat, UPM

GtoG Project Management Bureau

Name	Title	Phone	Email
Christine Marlet	Project Director	+32 2 227 11 30	info@eurogypsum.org
Luigi Della Sala	Project Manager	+32 2 227 11 62	project@eurogypsum.org
Thierry Pichon	ERMC Chair/President of the GtoG SC		Thierry.Pichon@siniat.com

Document history

Version	Date	Author(s)
00	02/03/2015	Jean-Yves Burgy and Silvia Nougazol Draft 1
01	10/03/2015	Silvia Nougazol (from the comments made by the peer review)
02	31/03/2015	Silvia Nougazol (from the comments made by the Steering Committee)

Table of contents

Foreword.....	6
1. Requirements prior to waste audits.....	7
2. Recommendations to carry out the audit	7
2.1. GENERAL RECOMMENDATIONS TO CARRY OUT A WASTE AUDIT.....	7
2.2. EXAMPLE OF MISTAKES TO AVOID.....	7
3. Methodology for carrying out the waste audit.....	10
3.1. DETAILED REPORTING	10
3.2. SUMMARY BY BUILDING AND BY FLOOR	16
3.3. SUMMARY BY TYPE OF OUTLET AND POTENTIAL RECOVERING RATES CALCULATION	17
4. Report of the audit.....	20
4.1. REPORTING OF THE DATA SPECIFIC TO THE PROJECT.....	20
4.2. OTHER INFORMATION USEFUL TO CORRECTLY USE THE AUDIT.....	21
Appendices.....	22
DEFINITION OF THE TERM “WASTE”:	22
LIST OF WASTE	22
INFORMATION ON THE DIFFERENT TYPES OF WASTE	23
Inert waste	23
Non inert non hazardous wastes	23
Hazardous wastes	25
SUMMARY TABLE OF THE OUTLETS FOR EACH WASTE	26

Foreword

In this document, “waste audit” refers to a qualitative and quantitative assessment of:

- the waste that will be produced from the deconstruction or the strip out of the building;
- residual waste that do not constitute the buildings;
- and waste coming from the use and the sit-in of the buildings (furniture, stored products, ...).

As it is developed in the DA1 report delivered in the scope of the GtoG project, waste audits prior to the deconstruction and/or the strip out of certain buildings are mandatory only in certain countries.

In the DA1 the following recommendations for a legislation facilitating the recycling/recovering route of gypsum-based waste from the jobsites have been made:

“So as to mitigate the adverse effects of a bad waste management, no gypsum based wastes should be mixed with any type of wastes more especially with biodegradable waste. To avoid this, an audit of gypsum based waste materials prior to demolition should be mandatory for:

- *any type of demolition including light or heavy refurbishment operation (for example it is not required in France with the exception of buildings which will be totally demolished),*
- *all operation above a certain surface or a certain budget (the threshold has to be determined according the type of the building-residential or non residential). The actual thresholds in different Member States (MS) seem to be too high to develop the approach on a large scale.*

The precise quantity, quality and recyclability should be reported”.

Thus, even when it is no mandatory, it is highly recommended to carry out a qualitative and quantitative assessment of the wastes that will be generated. Moreover, there are also several additional reasons to implement this assessment:

- it allows the project owner or the project manager to make relevant and adapted instructions regarding waste management in the specifications towards the construction and demolition companies,
- it permits waste management planning (number and size of the skips, number of roundtrips needed, outlets, ...),
- it permits to minimize the risks (risks due to the possible presence of hazardous waste)
- it permits to foresee and, then, plan ahead the costs linked to waste management.

It is advised to carry out the audit prior to the procurements relative to the works and prior to the acceptance of the preliminary estimations.

To this scope, this document aims at standardizing waste audits and ensuring that they are comprehensive of all possible elements.

Some recommendations are also suggested on the basis of the experience feedback coming from the project partners.

1. Requirements prior to waste audits

According to the regulation in a given country, it is mandatory to carry out a diagnostic specific to certain hazardous materials. It concerns asbestos in all the countries covered by the GtoG projects. It can also concern lead paint in certain countries. The mandatory diagnosis specific to these types of materials depends on the date of construction of the building: it generally concerns the buildings that have been built prior to the ban of use of asbestos and lead paint.

The reports stemming from the diagnosis on hazardous materials must be given to the person that will carry out the waste audit. Not only the results of these diagnoses can have a huge impact of the waste audit, but they are also essential for security reasons.

Indeed it is recommended to proceed with a demolition material audit whenever feasible, in order to avoid mistakes regarding the nature of the materials and the quantity assessment. As a result, the person in charge of the audit must be aware of the presence of asbestos and other hazardous materials.

2. Recommendations to carry out the audit

2.1. GENERAL RECOMMENDATIONS TO CARRY OUT A WASTE AUDIT

In order to carry out a waste audit as reliable as possible, it is indispensable to make a visual reconnaissance. The person in charge of the audit must go on the site of the project to identify the different systems and constitutive materials.

The visit on the site of the project also aims at taking measures of the systems to assess the quantities.

It is recommended to take picture and put it in the audit report so as the person that will use it can easily understand to what the words used in the report refer.

Besides this, it is essential to carry out a “destructive” audit whenever possible, to avoid uncertainty on the type and quantity of materials. It can consist in a drilling, or simply in pulling out a wall paper to check the material covered by it.

Nevertheless, it happens that it is not possible to carry out a “destructive” audit; this is the case of carrying out a materials audit while the building has still occupants, for instance.

2.2. EXAMPLE OF MISTAKES TO AVOID

Regarding gypsum-based materials, some mistakes due to visual similarities with other materials happen frequently.

Below are listed some typical mistakes.

Mistakes regarding plaster tiles constituting a hanging ceiling:

Looking from a certain distance, plaster tiles can be mistaken for mineral tiles as shown in the following examples:



Picture on the left: hanging ceiling made of plaster tiles. Source: French demolition company Pinault&Gapaix



Picture on the right: hanging ceiling made of mineral tiles. Source: French demolition company Occamat

It can be necessary to remove manually a tile to look more closely. The pictures below show the two faces (visible face looking like plaster tile and non visible face) of a mineral tile:



Picture on the left: visible face of a mineral tile (face visible from the floor)



Picture on the right: invisible face of a mineral tile

Source of both pictures: French demolition company Occamat

Mistakes between plasterboard partition and particle board partition:

Both types of partitions mentioned above are often covered by wallpaper. It is recommended to pull out a part of the wall paper to drill the partition in order to be sure of the type of material.



Picture on the left: particle board partition that has been drilled. Source: Recycling Assitance, Belgium

Picture on the right: particle board on which a part of wall paper has been pulled out. Source: French demolition company Occamat

Mistakes regarding the materials that constitute a gypsum-based system:

Even when a plasterboard partition has been identified as such, a drilling or another technique is recommended to check how the system has been built, as shown on the two examples below:



Picture on the left: Double plasterboard system against a wall that has been drilled. Source: Recycling Assitance, Belgium

Picture on the right: Simple plasterboard system with mineral glass wool that has been partially destroyed by foot. Source: French demolition company Occamat

Mistakes between plaster blocks and autoclaved aerated concrete (AAC):

AAC is sometimes mistaken with plaster blocks because of the similar aspect of the two materials.

Mistakes between plaster blocks and plaster lining on bricks

Likewise plaster blocks sometimes look similar to bricks covered by plaster lining.

3. Methodology for carrying out the waste audit

The methodology for carrying out the waste audit can be divided into the different phases below:

- **Collection of the available documents** linked to the project and useful for the waste audit. In particular, the asbestos and lead assessments – previously carried out by specialized diagnosticians – reports have to be given by the project manager. Plus, the different overall and detailed maps will facilitate the location of the different wastes.
- **Listing of the different structures and the different materials that constitute the structures. A visual identification** must be done onsite.
- **Assessment of the quantity** of each structure. Recommendations regarding possible precautions to take during the deconstruction phase or the waste management phase must also be done.
- **Assessment of the quantity by material.**
- **Research of the local outlets for each type of waste.**
- **Calculation of the recovering and elimination rates.**

An approach to carry out the different steps mentioned above is suggested in the following parts.

3.1. DETAILED REPORTING

It is advised to make an inventory of the materials or systems found for each building and for each level of the building, with a proper “waste approach” which means wondering if the different materials that constitute a given system will be technically and economically separable so as to assess whether they have to be sent to different types of outlet or not. As a result, for some systems or materials it can be relevant, even essential, to make recommendations towards the demolisher regarding the precautions to take during the deconstruction phase. This will allow a better recovery of the materials that constitute the system.

The following tables are suggested as a basis to recap wastes found during the waste audit visit prior to the selective demolition phase. **They have to be filled in for each building and for each level of the building.**

As mentioned before, the inventory also concerns residual wastes that do not constitute the buildings and waste coming from the use and the sit-in of the buildings (furniture, stored products ...).

BUILDING :
Level :
Other information :

SHELL								
Type of material	Waste code	Location	Quantity	Unit	Possible outlets ¹	Recommended outlet ²	Precautions to take during the deconstruction phase ³	Pictures
Paving								
Block of concrete								
Post								
...								
...								

ELEMENTS THAT COMPLETE THE SHELL / FINISHINGS								
Type of material	Waste code	Location	Quantity	Unit	Possible outlets	Recommended outlet	Precautions to take during the deconstruction phase	Pictures
WALLS								
Glass wool								

¹ Material recovery, energy recovery, storage in a hazardous waste landfill...

² The recommended outlet must be identified taking into account the hierarchy of waste treatment and the potential possibilities in the proximity of the jobsite

³ Ex: do not leave the frame on the plasterboards, be careful to remove the power plugs, ...

Rockwool								
Plasterboards type 1 (specify)								
Plasterboards type 2 (specify)								
Frames to sustain the wall								
Entire windows (if not dismantled on site)								
Frames of the windows								
Glass of the windows								
...								
PARTITIONING								
Plasterboards type 1 (specify) ⁴								
Plasterboards type 2 (specify)								
Plaster blocks								
Laminates								
Frames								
Glass boards								
Wood boards								
...								

⁴ Different types of plasterboards may be present on the jobsite. As for their different specifications in terms of thickness and composition, these plasterboards need to be identified one by one.

CEILING / FALSE CEILING								
Mineral wool ceiling (specify)								
Plaster ceiling type 1 (specify)								
Plaster ceiling type 2 (specify)								
...								
WOODWORK								
"Full" door								
Outside shutters								
Stairs								
...								
...								
METAL CONSTRUCTION ⁵								
"Full" door								
Outside shutters								
Stairs								
...								
SEALING AND ROOF								
Tiles								
Wood frame								
...								
FLOORING AND WALL COATING								
Carpet tile								

⁵ For each waste, specify the type of metal : copper, aluminium, steel...

PVC flooring								
...								
HEATING / VENTILATION / AIR CONDITIONING								
Heating								
Air vent								
...								
ELECTRICAL EQUIPMENT								
Two-way switch								
Power points								
Lights								
Skirting board made with plastic								
...								
PLUMBING AND TOILETS								
Washbasin								
Urinal								
Toilet								
Sink								
...								
FIRE SAFETY								
FHS (Fire hose station)								
Fire extinguisher								
Fire detecting system								
...								
OTHER / EQUIPMENTS								
Furniture								
...								

...								
...								

3.2. SUMMARY BY BUILDING AND BY FLOOR

Once the previous tables have been filled in, it is useful to summarize the information so as to have an overview of the different wastes that will have to be managed for each floor and each building. This should facilitate the organization of the logistic on site (grouping together of the different wastes, ...).

The previous table was organized by construction units. In each type of construction unit, there were different types of wastes (inert, non inert non hazardous and hazardous wastes). **This table groups together the different wastes by type, whatever the construction unit they belong to.** But the source of the tonnages must match to the previous table and must be explicit.

Building	Level	Material to evacuate	Construction units concerned	Quantity/weight	Unit	Recommended outlet
Building ...	Ground floor, Level 1, Level 2...	Concrete				
		Tiles				
		...				
		TOTAL OF INERT WASTES				
		Glasswool				
		Rockwool				
		Plastic type 1 (specify)				
		Plastic type 2 (specify)				
		Metal type 1 (specify)				
		Metal type 2 (specify)				
		Wood non treated or treated with non hazardous matter				
		Plasterboards type 1 (specify)				
		Plasterboards type 2 (specify)				
		Laminates				
		Non hazardous WEEE (Waste Electrical and Electronic Equipment)				
		...				
		...				
		TOTAL OF NON INERT NON HAZARDOUS WASTE				
		Material with asbestos (specify)				

	Paint, varnish or glue wastes containing hazardous matter (or materials contaminated...)				
	Neon lighting				
	Air-conditioning system containing CFC (Chlorofluorocarbures)				
	Mercury fire detection				
	...				
	TOTAL OF HAZARDOUS WASTES				

3.3. SUMMARY BY TYPE OF OUTLET AND POTENTIAL RECOVERING RATES CALCULATION

The previous table allows an organization of the tonnages of the different wastes by type of outlet.

It permits to assess the following rates provided that the deconstruction process is well realized and that all different types of recyclable wastes are well segregated and stored on site prior to collection and treatment:

- Rate of reuse,
- Rate of recycling,
- Rate of backfilling,
- Rate of energy recovery,
- Rate of elimination.

Total wastes		XXXXX	T
Material/ Waste	Quantity	Unit	Comments
Reuse			
Soil			
Pallets			
Furniture			
...			
Total tonnage of material reused			
Percentage of material reused			
Recycling			
Concrete			

Plaster			
Wood, type A			
Wood, type B			
Green wastes			
Metals			
PVC			
Plastic packaging			
Hard plastics			
Polystyrene			
Papers, cardboards			
Hazardous waste			
WEEE			
...			
Total tonnage of wastes recycled			
Percentage of wastes recycled			
Backfilling			
Rubble			
...			
...			
Total tonnage of wastes banked up			
Percentage of wastes banked up			
Energy recovery			
Wood, type A ⁶			
Wood, type B ⁷			
Wood, type C			
Solvents			
...			
Total tonnage of wastes which will undergo an energy recovery			
Percentage of wastes which will undergo an energy recovery			
Elimination			
Mineral wool			
Carpet tiles			

⁶ Agricultural or forest vegetable waste and cork waste

⁷ Vegetable waste coming from the industrial sector, fibrous vegetable waste coming from paper production, wood waste except those ones that could contain heavy metals or halogenated organic compounds

Hazardous wastes			
...			
Total tonnage of wastes eliminated			
Percentage of wastes eliminated			

Recapitulative table of the rates:

Rate of reuse	%
Rate of recycling	%
Rate of backfilling	%
Rate of energy recovery	%
Rate of elimination	%

Comment: if, for different reasons (lack of room on site, logistical difficulties,...), the segregation of the different wastes on site is not possible, the tonnage of mixed non inert non hazardous wastes might be sent to a sorting facility. In that case the different rates must be assessed from the information given by the sorting facility regarding:

- The composition of the skips,
- The performance expected in terms of sorting,
- The performance expected in terms of recycling and other recovering rates.

Public rates calculation methodologies are available in certain countries.

After having filled in the different tables as suggested in the previous sub-parts, the report of the audit can be made by the person in charge of the audit.

4. Report of the audit

It seems essential to include two main types of information in the report of the audit:

- The data specific to the deconstruction, heavy or light strip project,
 - Information that is useful to the client, the project manager or any other stakeholder of the project for using efficiently the audit report and for having the opportunity to apply it to any other project).
- Some of this useful information is enclosed in this manual. Some other is specific to a given country (regulation for instance) and must be gathered by the auditor.

4.1. REPORTING OF THE DATA SPECIFIC TO THE PROJECT

Below a suggested organization for the content of the report is presented:

- General presentation of the project
This part includes:
 - the general information about the project owner,
 - a presentation of the building(s) concerned by the works: general presentation, location of the site, information regarding the former use of the buildings, detailed presentation of the buildings concerned by the works.

It is recommended to include pictures of the site and a plan with a caption if available.
- Description of the project with detailed information about the type of works, the buildings or part of the buildings that will be preserved, ...
- Consolidation of the data collected during the audit. It could concern at least:
 - A concise description of the methodology that has been followed to carry out the waste audit.
 - A listing of the documents linked to the project that were available and that have been taken into account. It concerns in particular asbestos and lead assessment reports provided by the project manager.
 - The three different types of tables presented previously in the document:
 - The detailed reporting with an approach per building and per level of the building,
 - The summary by building and by floor,
 - The summary by type of outlet.
- Listing of the local outlets: it is recommended that the diagnostician lists the waste management companies or final outlets (if feasible) located close to the jobsite so as to limit the distance of transportation, specifying their services. Whenever it is possible, the recovery rates and/or elimination rate of the transfer stations have to be collected.

- Assessment of the reachable recovering rates (by type of recovering outlets) and elimination rate.

4.2. OTHER INFORMATION USEFUL TO CORRECTLY USE THE AUDIT

Furthermore as said before, it seems essential to make the project owner or the project manager aware of the following information:

- Legislative framework of waste management:
 - A summary of the main regulatory measures regarding waste management. The measures mentioned should amongst others remind the main obligations of the demolishers regarding demolition and waste management. In particular, the following themes should be tackled:
 - Responsibility of the different stakeholders whose measures that concern the demolition company,
 - Waste management,
 - Regulation linked to waste traceability.
 - The list of waste that can be concerned by the waste audit and information on the different types of construction and demolition wastes.
- For each type of waste, a summary table of the possible material or energy recovery applications and of the possible elimination outlets.
- Planning of the waste logistics on site. Planning at an early stage will facilitate the organisation on site and the choice of the outlet. It is highly recommended to ask the diagnostician to not only identify the different waste stream but also to anticipate the routes for the waste. Otherwise, waste management onsite should be planned by the demolition company or another company but with the help of the diagnostician.
The waste management plan onsite must at least consist of the following parts:
 - Number of skips onsite and type of waste sorted in each skip, with **at least** the 3 following skips:
 - o Skip for inert waste,
 - o Skip for non inert non hazardous waste,
 - o Skip for hazardous waste,
 - Skips rotation frequency,
 - Storage organization plan onsite (temporary storage inside the different floors, storage of the skip of inert wastes outside, ...),
 - Evacuation plan (skips to evacuate as a priority, scheduled period for evacuation, ...),
 - Person in charge of the following up of waste management onsite and of waste traceability until the final outlet whenever it is possible.

Appendices

DEFINITION OF THE TERM “WASTE”:

“Waste’ means any substance or object which the holder discards or intends or is required to discard” (*Directive 2008/98/EC – Article 3 – Definition*).

The materials that constitute the wastes can represent a danger more or less relevant to environment and health.

LIST OF WASTE

The Commission Decision 2000/532/EC, amended by the Council Decision 2001/573/EC as regard the list of waste, establishes a list of waste, which are defined by six-digit code. The different types of wastes are divided into 20 chapters. The numbers of these chapters are the first two-digit numbers of the waste code.

Chapter 17 groups together “Construction and demolition wastes (including road construction)”, but some waste that can be found on a jobsite can be linked to other chapters. The list of the chapter 17 is reminded below:

17 CONSTRUCTION AND DEMOLITION WASTES (INCLUDING ROAD CONSTRUCTION)

17 01 Concrete, bricks, tiles, ceramics, and gypsum-based materials

17 01 01 Concrete

17 01 02 Bricks

17 01 03 Tiles and ceramics

17 01 04 Gypsum-based construction materials

17 01 05 Asbestos-based construction materials

17 02 Wood, glass and plastic

17 02 01 Wood

17 02 02 Glass

17 02 03 Plastic

17 03 Asphalt, tar and tarred products

17 03 01 Asphalt containing tar

17 03 02 Asphalt not containing tar

17 03 03 Tar and tar products

17 04 Metals (including their alloys)

17 04 01 Copper, bronze, brass

17 04 02 Aluminium

17 04 03 Lead

17 04 04 Zinc

17 04 05 Iron and steel

17 04 06 Tin

17 04 07 Mixed metals

17 04 08 Cables

17 05 Soil and dredging spoil

17 05 03* Soil and stones containing dangerous substances

17 05 04 Soil and stones other than those mentioned in 17 05 03

17 05 05* Dredging spoil containing dangerous substances
 17 05 06 Dredging spoil other than those mentioned in 17 05 05

17 06 Insulation materials

17 06 01* Insulation materials containing asbestos
 17 06 02 Other insulation materials

17 07 Mixed construction and demolition waste

17 07 02* Mixed construction and demolition waste or separated fractions containing dangerous substances
 17 07 03 Mixed construction and demolition waste other than those mentioned in 17 07 02

All Code with a star character (*) must be considered as hazardous wastes and must be treated accordingly.

This list may be not sufficient as some parts may be presents in the building such as furniture or fire safety equipment. It is strongly recommended to follow the table.

INFORMATION ON THE DIFFERENT TYPES OF WASTE

Inert waste

Definition:

“‘inert waste’ means waste that does not undergo any significant physical, chemical or biological transformations. Inert waste will not dissolve, burn or otherwise physically react, biodegrade or adversely affect other matter with which it comes into contact in a way likely to give rise to environmental pollution or harm human health. The total leachability and pollutant content of the waste and the ecotoxicity of the leachate must be insignificant, and in particular not endanger the quality of surface water and/or groundwater”. [Council directive 1999/31/EC – Article 2]

Inert wastes containing plaster-based wastes have to be separated from the other rubble. The only one condition to evacuate this type of waste mixed with rubbles is that the final outlet has all the required characteristics in terms of waterproofing and separation of possible biodegradable wastes.

Examples:

Clean concrete and rubble, natural stones, soil and pebbles non polluted, etc.

Non inert non hazardous wastes

Mixed non hazardous waste

Definition:

They have the same physical and chemical characteristics that household waste and then can be treated by the same processes.

Examples:

Flooring and facing, etc.

Packaging waste

Definition:

“‘Packaging’ shall mean all products made of any materials of any nature to be used for the containment, protection, handling, delivery and presentation of goods, from raw materials to processed goods, from the producer to the user or the consumer”. [*Council Directive 94/62/EC – Article 3 – Definitions*].

Packaging wastes are subjected to a specific regulation. The Council Directive 94/62/EC of 20 December 1994 sets recycling and recovery targets on packaging and packaging waste.

Examples:

Glass, plastics, metals, cardboard and paper

Metals

Scrap merchants give a good trade-in price for metals (ferrous or non ferrous).

Note that all types of metals are not admitted everywhere.

Examples:

Metallic frame, copper wire, etc.

Careful: polluted or mixed metals (with mineral wool) may not be recyclable and sent in non inert non hazardous waste landfills.

Wood

According to the quantity onsite and to the surface of the jobsite, some technical systems (crusher,...) can be set onsite so as to optimize waste transportation towards recovery facilities. Wood waste can also be directly sent in crushing facilities.

Wood waste can be divided into three different categories:

- Untreated clean wood. Example: wood pallet, ...
- Wood treated without any hazardous matter. Example: windows frame, furniture, ...
- Wood treated with hazardous matter. Example: Railway sleepers, ...

Plaster

Examples: Plasterboards, plaster blocks, offcuts, ...

PVC

Construction is the main field of application of stiff PVC. PVC is cheap and easy to use. Thanks to its structure and its composition, PVC can be easily mechanically recycled.

Two different types of PVC can be distinguished in construction: stiff PVC and soft one.

Stiff PVC

Examples: water pipes, pipes for electric cords, gutter, window profiles, shutter and blind ...

Soft PVC

Thanks to its qualities as an excellent electric insulator, PVC is used a lot to make electric cords. There are a lot of other applications for soft PVC: flooring, tubes,...

An appropriate sorting is key to optimize PVC wastes recycling.

Hazardous wastes

General hazardous wastes

Definition:

‘Hazardous waste’ means waste which displays one or more of the hazardous properties listed in Annex III of Directive 2008/98/EC”. *[Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives]*

“Hazardous waste” refers to waste that could generate pollution and that must be subjected to specific precautions for their disposal.

They are collected in closed and watertight containers, adapted to the type and the quantity of the waste to evacuate.

As it was said before:

- An inert waste contaminated by a non inert non hazardous waste becomes a non inert non hazardous waste.
- An inert waste or a non inert non hazardous waste contaminated by a hazardous waste becomes a hazardous waste.

Plus, note that mixing of hazardous substances is banned in order to prevent risks for the environment and human health.

Examples: Can of paint, glue,...

Asbestos

Wastes containing asbestos are subjected to specific controls and legislation. It can be organic waste, liquid or solid mineral wastes.

Examples: Flocking, heat insulation, asbestos-cement, vinyl asbestos tile, etc.

Remark: asbestos assessment is mandatory prior to the start of the works. The report of this assessment must be given by the project manager to the demolition company.

Refrigerant

Refrigerant are listed according to their chemical composition:

- Chlorofluorocarbures (CFC) are constituted of carbon, chlorine and fluorine. Their life cycle is stable (between 50 and 250 years);
- Hydrochlorofluorocarbones (HCFC) are hydrogenated CFC. They are less stable than the latter ;
- Hydrofluorocarbones (HFC) do not constituted of chlorine.

CFC have been used for a long time as refrigerant in refrigerating and air conditioning systems. They have also been used as cleaning solvent (for electronic equipments), as rising agent for foam-making and, to a lesser extent, as aerosol propellant agents.

CFC and HCFC extraction from air-conditioning and refrigerating systems has to be pursued by a professional in possession of a specific authorization.

SUMMARY TABLE OF THE OUTLETS FOR EACH WASTE

The summary table below recaps the possible outlets for the different types of wastes. Note that this table needs to be adapted and enhanced according to the country.

Note also that the list of waste is not exhaustive. According to the type of building (office, home, hospital ...) C&D wastes can be different.

Category	Type of waste	Possible material or energy recovery applications	Possible elimination outlets
INERT WASTE	Concrete	Crushing for recycling as artificial aggregate to make concrete again, to use as backfilling material (whom backfilling of quarries) or to make pavements.	Landfilling in an Inert Waste Landfill (IWL)
	Bricks, tiles, etc. (mixed)	Reuse or crushing for recycling (same applications than recycled concrete)	IWL
	Demolition rubble (without plaster)	Reuse or crushing for recycling (same applications than recycled concrete)	IWL
	Glass without other waste	Crushing for recycling (glass wool, ...)	IWL
NON INERT NON HAZARDOUS WASTE	Wood (non treated or with a treatment with non hazardous matter)	- Non treated wood: material recovery in composts. - Non treated and slightly treated wood (with non hazardous matter): reuse or crushing for recycling in the composite panels manufacturing. Crushing and energy recovery in boiler or cement kiln for examples.	Landfilling in a Non inert non hazardous waste landfill (NINHWL) or Incineration (Waste incineration plant)
	Metals (ferrous or not)	Reuse or recycling as the same metal again or as alloy in the metal industry.	NINHWL
	Plastics	- PVC: mechanical or chemical material recovery for the same application (windows profiles for example) or for other applications (mixed with other components for flooring manufacturing for example). Note that classical energy recovery in	NINHWL or incineration (Waste incineration plant)

		not recommended regarding the high chlorine concentration). - EPS (Expanded PolyStyrene): recycling in EPS manufacturing. Energy recovery in cement kiln for example. - Other plastics: according to the type of plastic, mechanical or chemical recycling to make plastics again. Energy recovering in boiler, cement kiln, ...	
	Packaging (cardboard, paper, glass, ...)	Reuse or recycling in glass industry, paper industry, ... to make packaging again or in other applications according to the material	NINHWL or incineration (Waste incineration plant)
	Glass linked with other materials (putty, window frame, ...)	Dismantling and material recovery as aggregate in road construction or building construction.	NINHWL
	Plaster-based wastes	Recycling in a plasterboard plant or use for agricultural spreading. Energy recovery in cement facilities for example.	NINHWL with dedicated cells
	Other non inert non hazardous waste mixed (non polluted)	Sorting facility (or transfer station)	NINHWL or incineration (Waste incineration plant)
HAZARDOUS WASTE	Lead paint	No existing facility	Landfilling in an Hazardous waste landfill (HWL), incineration in specific unit, physical or chemical treatment
	Wood treated with hazardous matter	Energy recovery in specific plants	HWL
	Equipment containing pyralene (PCB, PCT)	Reuse or material recovery of the equipment not polluted and elimination of the pyralene	HWL
	Waste containing asbestos		Asbestos linked with inert waste: NHWL, HWL or inerting <i>[Adapt to the</i>

			<i>country]</i>
			Asbestos non linked with inert waste: HWL or inerting <i>[Adapt to the country]</i>
	Lamps and HID light bulbs		HWL

Note:

A load of inert waste, contaminated by non inert non hazardous waste becomes a load of non inert non hazardous waste. If the pollution is not too extensive, the loads could be sorted out afterwards.

Likewise, a load containing inert waste or a load containing non inert non hazardous waste contaminated by a hazardous waste becomes a load of hazardous waste.