حكومة دبي
GOVERNMENT OF DUBAI

بلدية دبي
DUBAI MUNICIPALITY

Technical Guidelines No 5.
Waste Classification

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List of Abbreviations

BOO	-	*Build, Own, Operate*
C & I	-	*Commercial and Industrial*
C & D	-	*Construction and Demolition*
CIWMB	-	*California Integrated Waste Management Board*
DECC	-	*Department of Environment and Climate Change*
EA	-	*Environment Agency*
EC	-	*European Community/ European Council*
EU	-	*European Union*
EPA	-	*Environmental Protection Agency*
EWC	-	*European Waste Catalogue*
DM	-	*Dubai Municipality*
DoC	-	*Duty of Care*
IPCC	-	*Intergovernmental Panel on Climate Change*
ISWM	-	*Integrated Solid Waste Management*

ISWMP	-	*Integrated Solid Waste Management Plan*
JAHWTF	-	*Jebel Ali Hazardous Waste Treatment Facility*
LoW	-	*List of Wastes*
MSW	-	*Municipal Solid Waste*
STP	-	*Sewage Treatment Plant*
Tpa	-	*tonnes per annum*
Tpd	-	*tonnes per day*
USEPA	-	*United State Environment Protection Agency*
UNEP	-	*United Nations Environment Program*
WEEE	-	*Waste Electronic and Electrical Equipment*
WMD	-	*Waste Management Department*
WMMP	-	*Waste Management Master Plan*

1.0 INTRODUCTION

Dubai Municipality's core vision of creating an excellent city that provides the essence of success and comfort of sustainable living is to ensure a clean and sustainable environment in the Emirate of Dubai. To achieve this vision, the Waste Management Department (WMD) is confronted with the two-pronged objectives, i.e., the efficient and cost-effective implementation of the Waste Management Master Plan (WMMP) and at the same time maintaining cleanliness in all the areas of the Emirate. Thus, the prime mandate of the Department is to manage all the wastes generated in the Emirate's, i.e., from collection, transport, storage and treatment and disposal in an environmentally friendly and socially sustainable manner using the resource effectively and efficiently in the most economical means available (Mott & MacDonald 2012).

One-of-the-requisites from the recently completed SIPSW-MP commonly referred to as the Waste Management Master Plan (WMMP) is the "Duty of Care" (DoC). DoC requires that waste should be classified according to the international waste classification standard. The main purpose of which, is to "to help those involved in the management and treatment of waste for disposal to ensure the environmental and human health risks associated with it are managed appropriately", thus, attaining these objectives needs a technical guideline. It is therefore, on this context that this technical guideline is being prepared for.

This guideline discusses the steps and procedures in waste classification system (excluding hazardous waste) using the European Waste Catalogue (EWC) and the California Integrated Waste Management Board (CIWMB) 2008 Expanded and Standard List of Material Types. Other references were also utilized, such as, the waste classification guides from USEPA, DECC, UNEP, etc. It is composed of 7chapters, namely: 1) Introduction, 2) Objectives, 3) Scope and Limitation, 4) Current waste classification and composition, 5) Source and type of solid waste, 6) Waste classification procedure, and 7) Dubai's waste classification guide.

Chapter 1 introduces the subject matter which is the waste classification per se, while Chapter 2 sets the direction that this guide wants to achieve. Chapter 3 discusses the scope and limits of this guideline; Chapter 4 discusses the existing waste classification and composition which is composed of seven categories; Chapter 5 discusses the sources and type of solid waste; Chapter 6 discusses the procedure in waste classification and finally, Chapter 7 illustrates the waste classification guide for the Emirates of Dubai.

2.0 OBJECTIVES

The intended and prospective users of this guideline are expected to:

a) classify domestic/municipal solid waste (MSW) in accordance with the international classification system;

b) serve as guide for all those involved in the management and treatment of waste for disposal, as well as waste generators and waste traders in classifying their wastes;

c) serve as guide for tracking dangerous/hazardous goods as well as their storage and transport;

d) assist future researchers who want to pursue further studies on waste management.

3.0 SCOPE AND LIMITATION

This technical guideline only cover's municipal solid waste otherwise known as the domestic waste which includes household hazardous waste. It does not cover hazardous wastes, such as, medical wastes, radioactive wastes and all other hazardous wastes from other sources.

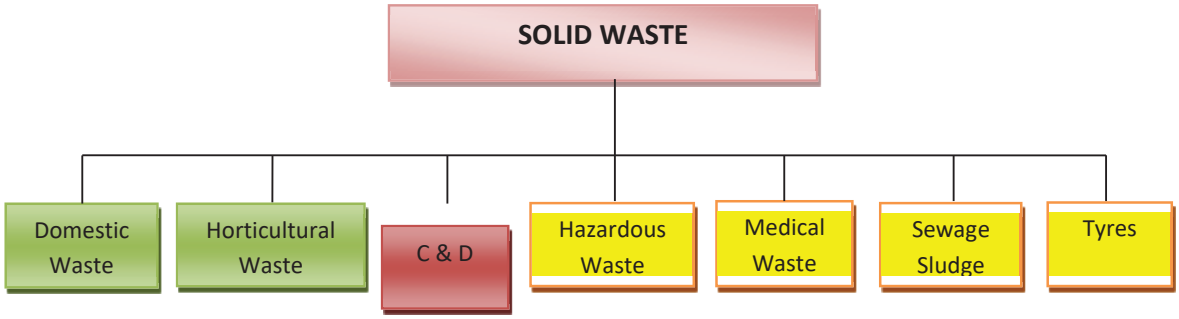
4.0 CURRENT WASTE CLASSIFICATION AND COMPOSITION

Dubai Municipality's solid waste generation are classified into seven (7) types or categories as shown on Figure 1 below, while the detailed waste descriptions are presented in Table 1.The first column list the waste categories, the second column list the sources of wastes while the third column shows the specific waste components and some examples. Domestic waste have ten (10) components which are the existing waste compositions of the MSW in the Emirate (see Figure 1: and Table 1: below for the details).

At present, there is no waste characterization done for the hazardous and medical wastes which shall determine its waste compositions. Classifying these wastes needs a waste characterization study and waste material testing

which is beyond the scope of this guideline. Details of the waste classification system used in these guidelines are discussed in Chapter 6. A flowchart showing the existing waste types and components is also shown in Figure 3, p.15 Solid waste classification flow.

Figure 1: Existing solid waste classification



(Source: WMD, DM cited in Mott MacDonald 2012)

Table 1: Existing waste type, waste source, waste component and some examples		
Domestic Waste	***Residential*** • Households (single and multi-family units) • Apartments • Villas/Colonies ***Commercial*** • Retail and wholesale • Shopping malls • Hotels • All other business establishments ***Institutional*** • Government offices • Schools, universities • Mosques, other churches	• Organics • Paper & cardboard • Metal • Plastic • Glass • Wood • Textile • Sand & stones • Others • Uncounted
Construction & Demolition Waste	Construction sites, road repair/renovation sites, broken pavement, demolition companies	Wood/timber, carpets, textiles, rubber, glass, plastics, metals, ceramics, soil, stones, boulders, concrete, bricks asphalt paving & roofing, gypsum board
Horticultural Waste	Landscaping & maintenance of public & private cultivated areas such as parks, plazas, gardens, beaches & recreational areas	Leaves, grasses, twigs/branches, flowers, tree trimmings
Hazardous Waste	Healthcare facilities such as: Hospitals, laboratories, clinics, industries, i.e., wastes related to manufacturing and industrial processes and from construction and demolition activities.	Sludge from on-site effluent treatment; chemicals containing acids, paints, varnishes, adhesive and sealants, solvents, lead batteries, photographic films and papers, oil wastes, flammable liquids; toxic, infectious and corrosive substances; packaging materials, animal tissue waste, fluorescent tubes and other mercury containing waste
Medical Waste	Hospitals, clinics, physician's offices, dental offices, blood banks, veterinary, research facilities and laboratories, pharmaceuticals	Infectious fluids, bloods & body parts, sharps, expired medicines

Sewage Sludge	Sewage Treatment Plants from malls, apartment blocks (Primary and activated sludge) mainly composed of residual sludge	Sewage solids/sludge from treatment of domestic waste or sewage, e.g., biosolids, sludge, grits, screening and septage.
Tyres	Scrap tire generators, include: tire & car dealers, car repair shops, car dismantlers, car & truck fleet operators, industrial tire users	Include all types of tires from: passenger, trucks, automobiles, motorcycles, heavy equipment, bicycles

5.0 SOURCES AND TYPES OF SOLID WASTE

Table 2 below shows the waste types or categories in the *Emirates*. Sources of domestic wastes were mainly coming from the residential, commercial, institutional and light-industrial areas or combinations of two or more sources, such as, the residential-commercial areas and the commercial-industrial areas. C&D were practically generated from all over the area where construction, repair, renovation and demolition activities are done, while horticultural waste were mainly coming from the open spaces such as parks, plazas and gardens usually from the residential areas which also include street cleaning wastes. Details of the sources of wastes are discussed in the preceding sections below.

Table 2 Dubai Emirate's waste arising by type and proportion disposed to landfill or recycled.

Waste Type	**Tons of waste arising per annum**			**Ave. proportion disposed to landfill**	**Ave. proportion recycled**
	2009	**2010**	**2011[1]**		
Domestic	4,026,580	3,690,283	2,869,034	92%	8%
Horticultural	196,364	204,906	176,592	0%	100%
C & D	18,312,016	10,316,881	7,259,723	98.7%	1.3%
Medical	1,589	1,571	1,632	100%	0%
Hazardous	248,041	126,229	154,136	100%	0%
Tyres [2]	39,000	39,000	39,000	86%	14%
Sewage [2]	1,400,000	1,400,000	1,400,000	100%	0%

Note:
[1]Denotes projected figures
[2]Denotes that the volumes are estimated

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***Source*: Waste Management Department, Dubai Municipality cited in Mott McDonald 2012 Strategic Integrated Plan for Solid Waste Master Plan, Dubai, UAE.**

5.1 Domestic waste

Domestic waste refers to wastes generated from households in the residential, commercial, institutional and parts of the industrial areas which virtually encompasses all types of solid and non-hazardous wastes. Domestic waste contains more than just waste from households as identified by the Waste Management Master Plan which observed that the majority of waste collected incorporate both households and commercial properties and therefore commercial and industrial (C&I) waste is not collected and recorded separately. It has therefore been assumed that this category incorporates both C&I wastes and MSW.

Normally, domestic waste/MSW is assumed to include all community wastes with the exception of industrial process wastes and agricultural waste. However, wastes collected in these areas are stored into the same waste bins therefore, wastes generated are mixed wastes. If wastes components are not separated when discarded, then the mixture of these wastes is called as co-mingled residential and commercial MSW (*Tschobanoglous, G. et al*, 1993). There is also a possibility, that in some instances, it will be a co-mingled wastes for residential, commercial, institutions and industrial wastes.

In addition, examples of waste not included in MSW are the following: abatement debris, construction and demolition debris, bio solids (sewage sludge), industrial process waste, agricultural waste, automobile bodies, combustion ash, oil and gas waste and mining waste.

5.2 Construction and Demolition Waste

Construction and demolition waste are wastes derived from the construction, remodeling, and repairing of individual residences, commercial buildings and other structures are classified as construction wastes. The quantities [waste materials] produced are difficult to estimate. The composition is variable but may include dirt, stones, concrete, bricks, plaster; lumber, shingles and plumbing, heating and electrical parts. In addition, wastes from razed buildings, broken-out streets, sidewalks, bridges, and other structures are also classified as demolition wastes (*Tschobanoglous, G.* 1993:44).

In the case of Dubai, construction and demolition waste are those which arise from the clearing of old buildings and ground coverings and the

construction of new buildings, as well as refurbishment. Most of these wastes are sent to the landfill.

On the other hand, C&D waste is not a monolithic waste stream, but it is a family of waste streams. Therefore, it is important to define the types of materials, which could be available in C&D waste. The most common materials could be paper/cardboard, garden/vegetation, wood/timber, carpets, other textiles, rubber, glass, plastics, metals, hazardous wastes, ceramics, soil/rubble <150mm, cobbles/boulders, clean soil, concrete, plaster board, bricks, asphalt/bitumen, cement sheet, insulation and others.

5.3 Horticultural Waste

Horticultural waste refers to organic waste generated from landscaping and maintenance of the public and private cultivated areas. It also cover's wastes generated by agricultural/horticultural activities such as flower growing and nurseries and maintenance of landscape areas such as public open spaces (including parkland and grass areas), roadsides and roundabouts. It also includes waste from street cleaning activities.

This type of waste is recycled through composting. There is an existing contract in place with *Tadweer* to do the composting activity. Traditionally, this type of waste has been predominantly land filled and has been primarily increasing year after year (WMMP 2013).

5.4 Hazardous Waste

In general, hazardous wastes refer to wastes or combinations of wastes that pose a substantial present or potential hazard to human health or living organisms have been defined as hazardous waste. However, this guideline will only cover household hazardous waste found in municipal solid waste.

In the case of Dubai, majority of hazardous waste generation is related to manufacturing and industrial processes. As Dubai does not have a significant manufacturing industry, there is not a substantial quantity of hazardous waste produced [between 2005 and 2007]. Hazardous waste production was relatively steady in 2007, 2008 and 2009 at around 250,000 tpa. It further went down substantially to around 130,000 tpa in 2010. This reduction was primarily due to the diversion of the shot blasting grit from the dry docks from the landfill to being used in cement kiln at the National Cement Company in Dubai (WMMP 2013).

Properties of waste materials that have been used to assess whether a waste is hazardous are related to questions of safety and health related properties, such as: corrosivity, explosivity, flammability and reactivity for safety related issues and carcinogenicity, mutagenicity, toxicity (poison), radioactivity, irritant for health related aspects. However, when dealing with the hazardous waste materials found in MSW, the most commonly used parameters are: ignitability, corrosivity, reactivity and carcinogenicity (*Tschobanoglous, G. et al*, 1993:99-102).

5.5 Medical Waste

Medical waste refers to all waste materials generated at healthcare facilities, such as hospitals, clinics, physician's rooms/offices, dental clinics, blood banks and veterinary clinics, as well as, medical research facilities and laboratories. Wastes generated from these facilities are considered infectious. Normally, it contains human tissues, body parts and fluids, expired medicines, spent chemicals, including sharps and several other infectious wastes.

All medical wastes are brought to the Clinical Waste Incinerator at JAHWTF. This facility was installed in 2009 with a total capacity of 19.2 tonnes per day. Currently, it is only operating at 6 tons per day or about 30% of its capacity. Operation is intermittent (not continuous) since its operation depend on the volume of waste generated from these medical waste facilities. In 2011, the estimated medical waste generated was approximately **1,632** tons and producing around **400** tons of bottom ash which are disposed to the single-lined landfill in Jebel Ali (Mott McDonald, 2012).

5.6 Sewage Sludge

Dubai Municipality currently has two large sewage treatment plants (STP) located at Jebel Ali and Al Aweer. These STP's received the sewage from collection sewers and septic tanks delivered by tanker. In addition, there are also several smaller package treatment plants which treat sewage from the malls, apartment blocks and some of the newer residential developments. Sewage sludge from these smaller treatment plants are all disposed at the Jebel Ali landfill. At Al Aweer, the treatment process comprises the primary and biological filtration which means that the plant will generate a relatively small amount of sludge per capita compared to the Jebel Ali treatment plant which comprises the primary and activated sludge with a total estimated sludge generation of approximately 1.4 million tpa. The main route for sludge disposal is to the landfill (Mott McDonald, 2012).

5.7 Waste Tyres

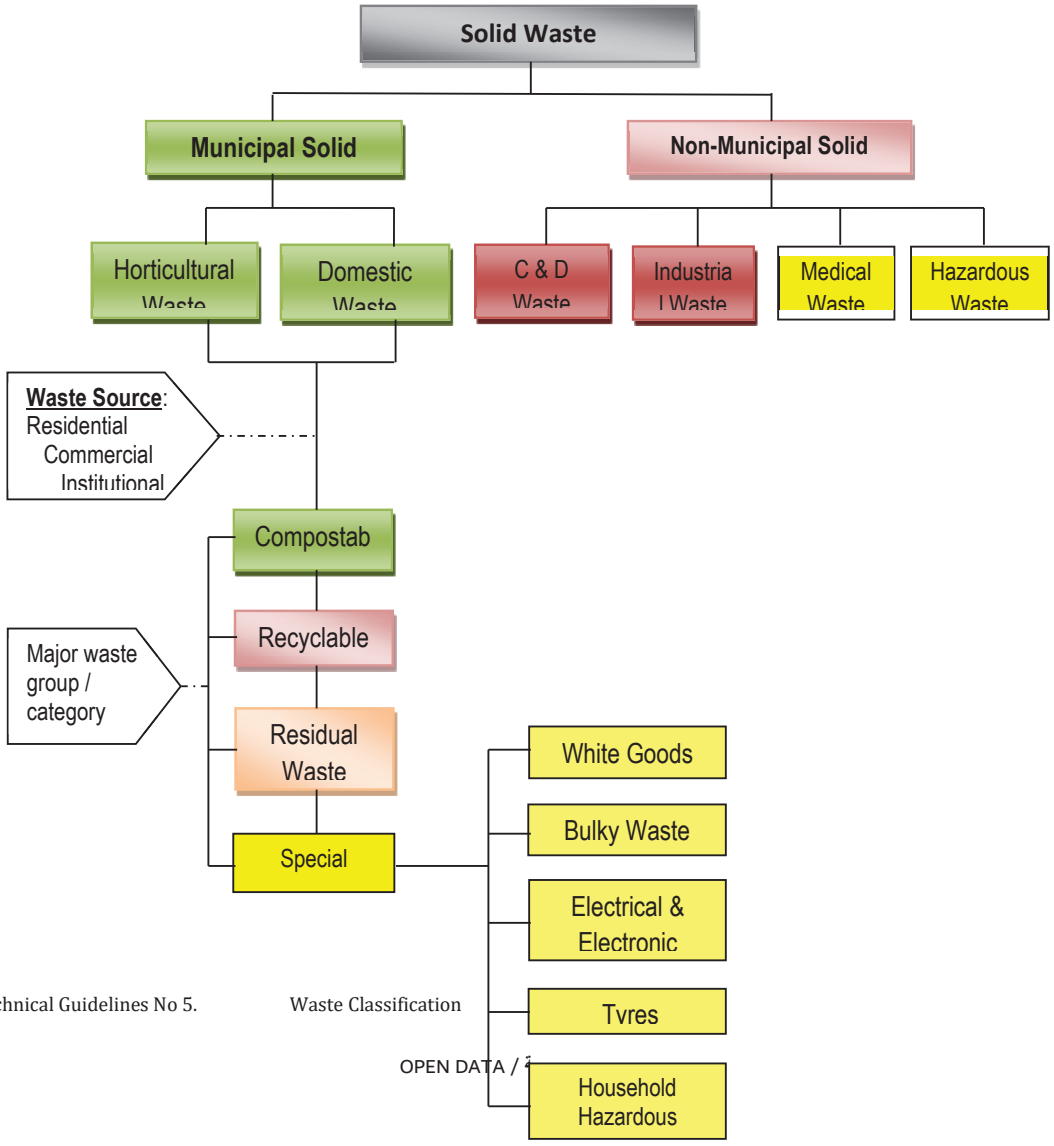
Waste tyres generations were coming from all type of vehicles in the Emirates and it comes from a variety of sources and sizes ranging from cars and/or automobiles, buses. trucks, tractors and heavy equipment. Sources were mainly coming from the residences (individual car owners), commercial tire dealers, government offices, private companies and other sources.

Currently, there is an estimated stock file of approximately 39,000 tonnes (more than 3 million tyres) at Al Quzais storage area which require disposal. A tyre recycling facility is being contracted under the Build, Own, Operate (BOO) contract between the Emirates Recycling Group and DM. Under this scheme, the company is required to recycle a minimum of 3,000 tonnes per month. This recycling rate is projected to reduce the stock file (including the incoming tyres) over a 10 year period (Mott McDonald, 2012).

6.0 WASTE CLASSIFICATION FLOW AND COMPOSITON

Solid waste classification system in Dubai is classified into two categories, namely: 1) Municipal Solid Waste (MSW), and 2) Non-Municipal Solid Waste (NMSW). MSW is composed of horticultural and domestic wastes, while the NMSW is composed of the construction and demolition waste, industrial waste, medical waste and hazardous waste. Waste sources for the domestic waste were primarily generated from the residential, commercial and institutional sources while the horticultural waste is primarily generated from the parks and open spaces as well as the street litters. The domestic and horticultural wastes are further classified into four major waste groups, namely: 1) Compostable/biodegradable, 2) Recyclable, 3) Residual and 4) Special waste. Moreover, of the four categories, the special waste was further classified into five sub-categories, namely: 1) Household hazardous waste, 2) White goods, 3) Bulky items, 4) Electrical and electronic equipment and 5) Tyres (see Figure 3 below):

Figure 2: Solid Waste Classification Flow



7.0 BASES FOR CLASSIFYING MUNICIPAL SOLID WASTE

The main reference materials used in classifying municipal solid waste are the List of Wastes (LoW) of the European Waste Catalogue (EWC) and 2) the Expanded and Standard List of Material Types published by the California Integrated Waste Management Board (CIWMB).

The EWC is composed of a very large database of the list of waste materials comprising more than 800 entries. It is composed of 20 Chapters-the so called *"Chapter List"* with two-digit number code, *i.e.*, from ***Chapter 01 to Chapter 20***. Each chapter has a chapter description describing the waste material types. In the same manner, each chapter also consists of sub-categories, comprising the detailed list of wastes with the final waste code designated by a 6-digit number (Table 4, p16).

The EWC system, follows an "order of precedence" designated by numbers 1 to 3. Order of precedence number 1 covers sixteen (16) chapters, *i.e.*, *Chapters 1 to 12* and continued in *Chapters 17 to 20*. This means that in finding the appropriate match of the type of waste to be classified, it has to start from *Chapter 01* through *Chapter 12* and continued to *Chapters 17* through 20, until a match is found. If no match is found then the next step would be to proceed to order of precedence No. 2, *i.e. Chapters 13 to 15*. If again, no match is found then the final step would be to proceed to order of precedence No. 3 that is in *Chapter 16* which is defined as "wastes not otherwise classified." In summary, MSW waste classification category is mainly found in Chapter 20, *i.e.*, the "municipal wastes…," however, MSW can also be found in other Chapter Lists, such as in Chapter 02 and in some other chapters (see Table below).

Table 3: Chapter of the list of waste code

Chapter	**Chapter Description**	**Order of Precedence**
01	Wastes resulting from exploration, mining, quarrying, physical and chemical treatment of minerals	**1**
02	Wastes from agriculture, horticulture, aquaculture, forestry, hunting and fishing, food preparation and processing	**1**
03	Wastes from wood processing and the production of panels and furniture, pulp, paper & cardboard	**1**
04	Wastes from the leather, fur and textile industries	**1**
05	Wastes from petroleum refining, natural gas purification and pyrolytic treatment of coal	**1**
06	Wastes from inorganic chemical processes	**1**

07	Wastes from organic chemical processes	**1**
08	Wastes from the manufacture, formulation, supply and use (MFSU) of coatings (paints, varnishes and vitreous enamels), sealants and printing inks	**1**
09	Wastes from photographic industry	**1**
10	Wastes from thermal processes	**1**
11	Wastes from chemical surface treatment and coating of metals and other materials; non-ferrous hydro-metallurgy	**1**
12	Wastes from shaping and physical and mechanical surface treatment of metals & plastics	**1**
13	Oil wastes and wastes of liquid fuels (except edible oils, 05 and 12)	**2**
14	Waste organic solvents, refrigerants and propellants (except 07 and 08)	**2**
15	Waste packaging; absorbents, wiping cloths, filter materials and protective clothing not otherwise specified	**2**
16	Wastes not otherwise specified in the list	**3**
17	Construction and demolition wastes (including excavated soil from contaminated sites)	**1**
18	Wastes from human or animal health care and/or related research (except kitchen and restaurant wastes not arising from immediate health care)	**1**
19	Wastes from waste management facilities, off-site waste water treatment plants and the preparation of water intended for human consumption and water for industrial use	**1**
20	Municipal wastes (household waste and similar commercial, industrial and institutional wastes) including separately collected fractions	**1**

Explanatory notes for finding appropriate code for a waste

- ✓ *Look at chapters 1-12 to see if your business sector is described there. If it is, look for the right sub-chapter(s) and the correct codes within it. Even if your business is aptly described, the best descriptions for some waste you produce may be found elsewhere in the list. Note that chapter 06–08 includes many wastes from the supply and use of chemicals and coatings in addition to wastes from their production. Even though your business sector may be described in these chapters, you should not expect to find every waste that they produce listed in their relevant sub chapter of chapters 01 – 12. General wastes and materials not specifically associated with a single process appear elsewhere in the catalogue.*
- ✓ *Chapter 17 lists construction and demolition wastes and is applicable to all business sectors.*
- ✓ *Chapters 18 and 19 cover wastes produced from healthcare, waste management and water treatment activities.*
- ✓ *Chapter 20 lists municipal wastes but some of the codes can also be used by any business sector if a similar material does not appear in their own specific sub-chapter of chapters 01–12 or within chapters 13-15.*
- ✓ *Chapter 13 lists oil and fuel waste. For non-municipal arisings of waste oil, this chapter should be referred to before using LoW code 201026*. Chapter 14 lists solvents, refrigerants and propellants. However, chapter 07 should be reviewed first for solvents arising from chemical production, formulation, supply or use. Chapter 08 should be referred to for solvents arising in paints and adhesives. Chapter 14 is the preferred chapter for all other, non-municipal, arisings of solvents.*
- ✓ *Chapter 15 lists packaging, filters, absorbents and protective clothing. All packaging should be recorded under chapter 15, irrespective of the sector from which it arose. Chapter 15 also includes codes for absorbents, contaminated wiping cloths and protective clothing. These wastes could arise from any business sector.*
- ✓ *Chapter 16 lists a number of miscellaneous wastes, including sub-chapters for end-of-life vehicles, waste electrical equipment, batteries, transport tank washings, explosives, catalysts, oxidants, lab chemicals and gases, refractories and unused or off specification chemicals*

(*Environment Agency 2006*)

Source: **EPA 2002 European Waste Catalogue and Hazardous Waste List, Ireland (hth://www.epa.ie, Available).**

Note: Full copy of the LoW of the EWC is provided as a separate attachment due to its numerous numbers of pages containing more than 20 pages.

In addition, since the LoW material entries from the EWC is so huge consisting of more than 800 entries, a shorter list of wastes was extracted from the EWC intended solely for the classification of MSW. This lists, is composed of four (4) sections, namely: 1) List of wastes for recycling, 2) Other materials, 3) Waste collected other than recycling, and 4) Other waste. Its major section is also composed of sub-sections containing the specific list of wastes with its corresponding 6-digit number code. This separate guide is handy and convenient to use instead of browsing the whole catalogue which contains hundreds of entries. See Annex A–Codes for Municipal Waste, p. 19.

On the other hand, the second reference used in classifying MSW was the waste classification guide published by the California Integrated Waste Management Board. This guide has a total of 85 lists of material type entries. It is divided into 10 categories, namely: 1) Paper comprising eleven material lists, 2) Glass with 6 material lists, 3) Metal with seven material lists, 4) Electronics with five material lists, 5) Plastics with 17 lists, 6) Other organic with eight entries, 7) Inert and other with fifteen entries, 8) Household hazardous waste with nine

entries, 9) Special waste with six material list entries, and 10) Mixed residue. A detailed list of the expanded and standard list of material types is found in Annex B, p. 21.

Procedures for classifying waste using the EWC and the Expanded and Standard List of Material Types are discussed in the succeeding Chapter below.

8.0 WASTE CLASSIFICATION PROCEDURE

Discussed below are the procedures for classifying municipal solid waste.

Step 1:

Perform ocular/physical inspection on the properties or characteristics of the waste materials in question.

Step 2:

Using the MSW Waste Classification Guide, look from the ***Category*** column of the Guide and find the appropriate waste category that correspond to the waste being classified, whether it is compostable, recyclable, residual or special waste.

Each category is assigned a two-digit number code: ***01*** for Compostable, ***02*** for Recyclable, ***03*** for Residual and ***04*** for Special Waste. This code also represents the first two-digit waste code that appears in the final waste code column (Table 4, p. 16).

Step 3:

On the ***Sub-Category*** column, find the specific type of waste material that corresponds to the waste material in question. For instance, under the compostable category is organic. Organic waste generally refers to non-hazardous and readily-compostable waste materials. It is classified into 9 sub-categories, such as: Food waste, green waste, etc., which is also designated by a two-digit code.

Step 4:

Under the '***Waste Material Type***' select the most appropriate type of waste from among the list of wastes or material types that exactly correspond to the waste being classified for. This section is also designated by a two-digit code including the wild **code 99** which is defined as 'other materials not otherwise specified.' Code 99 is used when waste material in question does not exist in the list or if no match is found among the list.

Step 5:

The final step would be to write the type of waste that has just been classified and the corresponding six-digit waste code listed under the "Final Waste Code." Use only the **six-digit waste code** under the Final Waste Code column to describe the waste that is being classified.

In summary, other waste materials or types that have yet to be classified must undergo same procedures mentioned above.

Notes:
1. *The asterisk (*) symbol located at the upper right side of the final waste code means that waste material is perceived to be hazardous waste.*
2. *This guide is only applicable to the municipal solid waste (MSW) and does not include the construction and demolition waste, hazardous waste, medical waste and hazardous waste except household hazardous waste.*

Table 4.Municipal Solid Waste Classification Code

Category	Sub-Category		Waste Material Type		Final Waste Code
I. Compostable	*Code*	**Organic**	*Code*		
Category 01	01	Food waste	01	Food waste	01 01 01
			02	Fruits and vegetables	01 01 02
	02	Green waste	01	Leaves, grasses, flowers	01 02 01
			02	Pruning and trimmings	01 02 02
			03	Branches and stumps	01 02 03
			04	Street cleaning residues	01 02 04
	03	Market Waste	01	Market waste	01 03 01
	04	Manure	01	Animal excreta	01 04 01
	05	Carcasses	01	Animal carcasses, birds, fish and other marine mammals	01 05 01
	06	Paper	01	Soiled papers, tissues, etc.	01 06 01

			02	Mixed papers & cardboards	01 06 02
	07	Leather	01	Unusable leather	01 07 01
	08	Textile	01	Unusable textile, carpets, etc.	01 08 01
	09	Other	99	Other compostable materials not otherwise specified	01 09 99
II. Recyclable					
Category 02	01	Paper	01	Newspapers	02 01 01
			02	Magazines, books, catalogues & directories	02 01 02
			03	Cardboard / cartons / boxes	02 01 03
			04	Office papers	02 01 04
			05	Paper bags	02 01 05
			06	Remainder / composite paper	02 01 06
	02	Plastic	01	PETE bottles (#1)	02 02 01
			02	HDPE (#2)	02 02 02
			03	Other plastic including durable plastics (e.g., buckets, etc.)	02 02 03
	03	Metal	01	Steel, copper, aluminum, brass, bronze	02 03 01
			02	Tin / Steel can	02 03 02
			03	Aluminum can	02 03 03
			04	Other scrap metals	02 03 04
	04	Glass	01	Clear glass	02 04 01
			02	Color glass	02 04 02
			03	Flat glass	02 04 03
	05	Rubber	01	Reusable rubber	02 05 01
	06	Leather	01	Reusable leather	02 06 01
	07	Textile	01	Reusable textile	02 07 01
	08	Wood	01	Reusable lumber / wood	02 08 01
			02	Good pallets and crates	02 08 02
	09	Other	99	Other recyclable materials not otherwise specified	02 09 99
III. Residual					

Category 03	01	Construction & Demolition Materials	01	Sand, stones and fines	03 01 01
			02	Bricks, concrete, ceramics, marble tiles, asphalt, etc.	03 01 02
			03	Gypsum board/powder	03 01 03
	02	Glass	01	Broken glass, flat glass and other non-recyclable glasses	03 02 01
	03	Metal	01	Mixed scrap metals	03 03 01
			02	Aluminum foil	03 03 02
	04	Plastic	01	Mixed plastic residues	03 04 01
	05	Wood	01	Unusable lumber / wood	03 05 01
			02	Unusable pallets and crates	03 05 02
	06	Diaper	01	Diaper	03 06 01
	07	Styrofor	01	Foam / Styrofor	03 07 01
	08	Mixed Residues	01	Unusable textiles, paper, carton, plastics, rubber, etc.	03 08 01
	09	Other	99	Other residual not otherwise specified **including mixed/co-mingled waste**	03 09 99
IV. Special Waste					
Category 04	01	Household Hazardous Waste	01	Batteries (wet and dry cell)	04 01 01
			02	Fluorescent tubes, bulbs & other mercury containing items	04 01 02
			03	Chemical containers, canisters, aerosols (e.g. spray paints), disposable lighters	04 01 03
			04	Used oil from vehicle and equipment fluids	04 01 04
			05	Spent chemical, drugs, adhesives	04 01 05

			06	Sharps (e.g., syringes/needles, scalpel, broken glass, etc.)	04 01 06
			07	Used cooking oil	04 01 07
			08	Used paints, thinners, solvents	04 01 08
	02	Electronic Waste	01	Consumer's electronics and electrical equipment	04 02 01
	03	Sewage Sludge	01	Bio-solids, sewage sludge, septic tank waste	04 03 01
	04	Bulky Waste	01	Furniture	04 04 01
			02	Twigs & branches of trees	04 04 02
	05	White Goods	01	Appliances	04 05 01
			02	Refrigerator, freezer, coolers, air-conditioners	04 05 02
			03	Washing machines, dryers, bath tubs	04 05 03
	06	Tyres	01	Used tyres (end-of-life tyres)	04 06 01
	07	Ash	01	Ash	04 07 01
	08	Other	99	Other special waste not otherwise specified	04 08 99

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Appendix 1 Waste Codes for Municipal Waste extracted from the EWC

Waste for recycling – description	EWC Code	Notes
Green glass bottles and jars	15 01 07	
Brown glass bottles and jars	15 01 07	
Clear glass bottles and jars	15 01 07	
Mixed glass bottles and jars	15 01 07	
Flat glass	20 01 02	
Paper	20 01 01	Newspaper, office paper, not packaging
Cardboard	15 01 01	Corrugated boxes and other packaging
Books	20 01 01	
Mixed paper and card	20 01 01	
Steel cans	15 01 04	
Aluminum cans	15 01 04	
Mixed cans	15 01 04	
Other Scrap metal	20 01 40	Excludes abandoned vehicles - not MSW
Aluminum foil	20 01 40	
Fridges and Freezers	20 01 23* 20 01 36	Correct code depends on whether or not they contain chlorofluorocarbons
Other White Goods	20 01 35* 20 01 36*	Correct code depends on whether or not they contain dangerous substances
Other electrical goods – TVs, Videos, CD Players, Toasters, Hair Dryers, Mobile phones, etc.	20 01 35* 20 01 36	Correct code depends on whether or not they contain dangerous substances
Plastic	20 01 39	
Clothes & footwear	20 01 10	
Other textiles	20 01 11	
Oil	20 01 25 20 01 26*	Correct code depends on whether or not they contain dangerous substances. For edible oils use 20 01 25

Green waste only	20 02 01	
Other compostable waste	20 02 01 20 01 08	
Wood	20 01 37* 20 01 38	
Furniture	20 01 38	
Rubble	17 01 07 20 02 03	Excluded from MSW list for clarity, as large volumes are not MSW
Co-mingled materials	20 03 01	
Fluorescent tubes	20 01 21*	If WCA collect them or delivered to WDA
Automotive batteries	20 01 33*	
Post consumer, non-automotive batteries	20 01 34	
Paint	20 01 28	
Other materials	EWC Code	Notes
Construction & demolition waste	17 01 17	This code should be used for mixtures of bricks and concrete etc.
Street cleaning	20 03 03	
Bulky waste	20 03 07	
Waste collected, other than recycling	**EWC Code**	**Notes**
Regular household collection waste	20 03 01	
Mixed Civic Amenity site waste	20 03 01	
Separately collected healthcare waste	18 01 04	
Abandoned Vehicles	16 01 04* 16 01 06	Use first code if vehicles still contains polluting liquids
Beach cleansing	20 03 99	Exclude all fly-tipped waste except 20 03 01
Construction & demolition waste	17 09 04	From refurbishment of LA properties only
Waste Arising from clearance of fly-tipped materials	17 01 07 17 09 04 20 03 01	C & D type Waste from households and similar only
Other waste	**EWC Code**	**Notes**
Asbestos cement	17 06 05	
Tyres	16 01 03	End-of-life tyres
Animal Excreta	18 01 04	

Market waste	20 03 02	
Septic tank waste	20 03 04	This is an effluent

***Source*: Environment Agency 2006 "Using the List of Wastes to Code Waste-Living Guidance from the Environment Agency", p.72.**

Note: Waste code with asterisk (*) means waste is hazardous.

Appendix 2. The California Expanded and Standard List of Material Types

No.	Material List	No.	Material List	No.	Material List
I	***Paper***	***V***	***Plastic***	***VII***	***Inert and Other*** *(Cont'n)*
1	*Uncoated Corrugated Cardboard*	*30*	*PETE Water Bottles*	*60*	*Built-up Roofing*
2	*Paper Bags*	*31*	*PETE Sealed Containers*	*61*	*Other Asphalt Roofing Material*
3	*Newspaper*	*32*	*Other PETE Containers*	*62*	*Clean Dimension Lumber*
4	*White Ledger Paper*	*33*	*HDPE Containers*	*63*	*Clean Engineered Wood*
5	*Other Office Paper*	*34*	*PLA Water Bottles*	*64*	*Clean Pallets and Crates*
6	*Magazine and Catalogues*	*35*	*#3-#7 Sealed Containers*	*65*	*Other Wood Waste*
7	*Phone Books and Directories*	*36*	*#3-#7 Other Containers*	*66*	*Clean Gypsum Board*
8	*Other Miscellaneous Paper-Non-food Packaging*	*37*	*Plastic Trash Bags*	*67*	*Painted/Demolition Gypsum Board*
9	*All Other Miscellaneous Paper*	*38*	*Plastic Grocery and Other Merchandise Bags*	*68*	*Rock, Soil and Fines*
10	*Remainder/Composite Paper-Non-food Packaging*	*39*	*Non-Bag Commercial and Industrial Packaging Film*	*69*	*Remainder/Composite Inerts and Other*
11	*All Other Remainder/Composite Paper*	*40*	*Film Products*	***VIII***	***Household Hazardous Waste***
II	***Glass***	*41*	*Food Contact Film Packaging*	*70*	*Paint*
12	*Clear Glass Bottles and Containers*	*42*	*Other Film*	*71*	*Vehicle & Equipment Fluids*
13	*Green Glass Bottles and Containers*	*43*	*HDPE Buckets*	*72*	*Used Oil*
14	*Brown Glass Bottles and Containers*	*44*	*#3 #7 Buckets*	*73*	*Lead-acid (automotive) Batteries*
15	*Other Colored Glass Bottles and Containers*	*45*	*Durable Plastic Items*	*74*	*Other Batteries*
16	*Flat Glass*	*46*	*Remainder/Composite Plastic*	*75*	*Sharps*

17		**VI**	**Other Organic**		Pharmaceuticals
III	**Metal**	47	Food	77	Fluorescent Lights/Other Mercury-containing Items
18	Tin/Steel Cans	48	Leaves and Grass	78	Remainder/Composite Household Hazardous
19	Major Appliances	49	Pruning's and Trimmings	**IX**	**Special Waste**
20	Used Oil Filters	50	Branches and Stumps	79	Ash
21	Other Ferrous	51	Manures	80	Treated Medical Waste
22	Aluminum Cans	52	Textiles	81	Bulky Items
23	Other Non-Ferrous	53	Carpet	82	Vehicle and Truck Tires
24	Remainder/Composite Metal	54	Remainder/Composite Organic	83	Other Tires
IV	**Electronics**	**VII**	**Inert and Other**	84	Remainder/Composite Special Waste
25	Brown Goods	55	Concrete	**X**	**Mixed Residue**
26	Computer-related Electronics - Large	56	Asphalt Paving	85	Mixed Residue
27	Computer-related Electronics - Small	57	Asphalt Composition Shingles		
28	Other Small Consumers Electronics	58	Roofing Tar Paper/Felt		
29	Video Display Devices	59	Roofing Mastic		

Source: CIWMB 2009 "Appendix B:"Expanded and Standard List of Material Types," California 2008 Statewide Waste Characterization Study, California, USA

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