

GUIDELINES FOR NON-RIGID SCHEDULED WASTES CONTAINERS: PACKAGING AND LABELLING

1.0 INTRODUCTION

- 1.1 Scheduled wastes due to its characteristics can pose risks to human health and the environment. Hence, there is a need to properly handle the wastes. To facilitate the proper handling of scheduled wastes, information about the hazards associated with the wastes must be communicated through proper labels to be used by wastes handlers.
- 1.2 To ensure that the wastes are safely handled, suitable containers are also needed to be used by the waste generators. It is the responsibility of the waste generators to ensure that scheduled wastes are packed based on the composition in a manner suitable for handling, storage and transportation.
- 1.3 To facilitate the waste generators to choose suitable containers and proper labelling, these guidelines are prepared in accordance to the requirements of Regulation 8(2) of the Environmental Quality (Scheduled Wastes) Regulations 2005 which has been enforced since 15th August 2005.

2.0 SCOPE

- 2.1 These guidelines describe the selection of proper containers and labels to be used by the waste generators in managing their scheduled wastes from the time a waste is generated and placed/filled/packed in a container, until the waste-filled container is transferred off site for recovery and/or final disposal.
- 2.2 These guidelines are only applicable to non-rigid scheduled wastes containers such as jumbo bags. For labelling and packaging for rigid scheduled wastes containers, please refer to Malaysia Standard MS 2304:2010.

3.0 IDENTIFICATION OF WASTE CHARACTERISTICS

- 3.1 The scheduled wastes characteristics shall be identified by the following methods:
 - 3.1.1 Sampling and analysing the scheduled wastes
 - (a) The scheduled waste shall be sampled and analysed to identify the hazards and contaminant in the waste.

- (b) During the sampling and analysis of the waste, the Material Safety Data Sheet (MSDS) / Chemical Safety Data Sheet (CSDS) / Safety Data Sheet (SDS) and/or waste card should be referred to, if it is available in order to get their hazards properties such as physical hazards, human health hazards and environmental hazards including any special protection requirement needed.

3.1.2 Identification based on process knowledge or history

Generally, the waste generated from a process may exhibit some similar hazardous characteristics of the raw materials or chemicals or substances used. Any changes in the process line or during the production process may lead to changes and alteration of the composition of the waste generated. The changes in the process shall be notified to, and be made aware of, by the relevant authorities.

3.2 The scheduled wastes may have the following hazardous characteristics:

- (a) corrosive substances;
- (b) explosive substances;
- (c) infectious substances;
- (d) inflammable liquids;
- (e) inflammable solids;
- (f) organic peroxides;
- (g) oxidising substances;
- (h) solid: spontaneously combustible;
- (i) solid: dangerous when wet;
- (j) toxic substances; and
- (k) mixture of miscellaneous dangerous substances.

Sufficient precaution shall be given when dealing with scheduled wastes having the above characteristics.

4.0 SELECTION OF CONTAINERS

- 4.1 Non-rigid scheduled wastes containers includes:
- (a) Corrugated box / carton box;
 - (b) Flexible Intermediate Bulk Containers (FIBCs) /Jumbo Bags / Bulk Bags / Polypropylene Big Bags
- 4.2 An appropriate container shall be selected according to the characteristics of the scheduled wastes. The characteristic of scheduled wastes shall be compatible with the type of material used for the container to prevent any reaction which will deteriorate the container.
- 4.3 The quantity of the wastes shall be taken into consideration to estimate the appropriate size and strength of container to avoid over spilling or container breakage.
- 4.4 The container used shall be in good condition (free from any damage such as tear or hole).
- 4.5 Assigning specific containers for specific wastes will allow the containers to be reused without further washing/cleaning.
- 4.6 Suggested packaging according to waste types and characteristics is as follows:

Type of non-rigid containers	Type of scheduled wastes	Packaging Requirement
Corrugated box / carton box	Dry solid waste with no free-flow liquid generated in small quantity such as e-waste, contaminated rags, expired drugs, cosmetics, etc.	<ul style="list-style-type: none"> • No tear, no hole
Flexible Intermediate Bulk Containers (FIBCs)/ Jumbo Bags	Dry solid waste with no free-flow liquid such as dust, slag, ash, clinker, e-waste, dry sludge, contaminated rags / garnet, etc.	<ul style="list-style-type: none"> • Preferably FIBCs made of high density poly ethylene (HDPE). • Must be doubled lining • Bags not to be filled more than 90% for secure packaging

5.0 LABELLING OF CONTAINERS

- 5.1 For identification and warning purposes, containers of scheduled wastes shall be clearly labelled in accordance with the Third Schedule of the Environmental Quality (Scheduled Wastes) Regulations 2005 and marked with the scheduled wastes code as specified in the First Schedule of the Environmental Quality (Scheduled Wastes) Regulations 2005.
- 5.2 The labels shall be divided into halves, the upper half of the label shall be reserved for the pictorial symbol (characteristic label) and the lower half for text printed in block capitals containing information as listed in paragraph 5.5. The text shall be printed in black on all labels. The colour used on the characteristic labels shall be in accordance with British Standard BS 381 C, "colours for specific purposes".
- 5.3 The labels may be of the following types:
- (a) stick on;
 - (b) metal plates;
 - (c) stencilled on the container; or
 - (d) printed on the container.
- 5.4 The characteristic label shall be a square set at an angle of 45 degrees and the dimension shall not be less than 10 cm by 10 cm except where the size of the container or package warrants for a label of smaller size. Examples of waste characteristic labels are as shown in Figure 1.

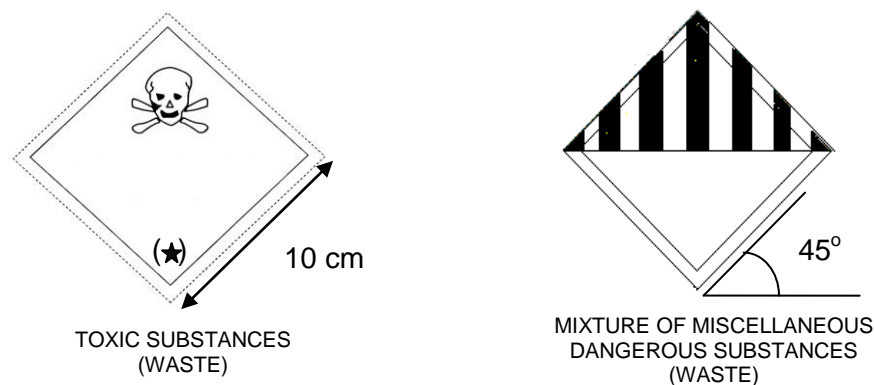


Figure 1: Examples of waste characteristic labels.

5.5 Information to be included in the label for scheduled wastes containers:

- (a) The date when the scheduled wastes are first generated; and
- (b) The name, address and telephone number of the scheduled waste generator.

No person is allowed to alter the identification number and the labels and markings.

5.6 Figure 2 is an example of label for the scheduled wastes containers.

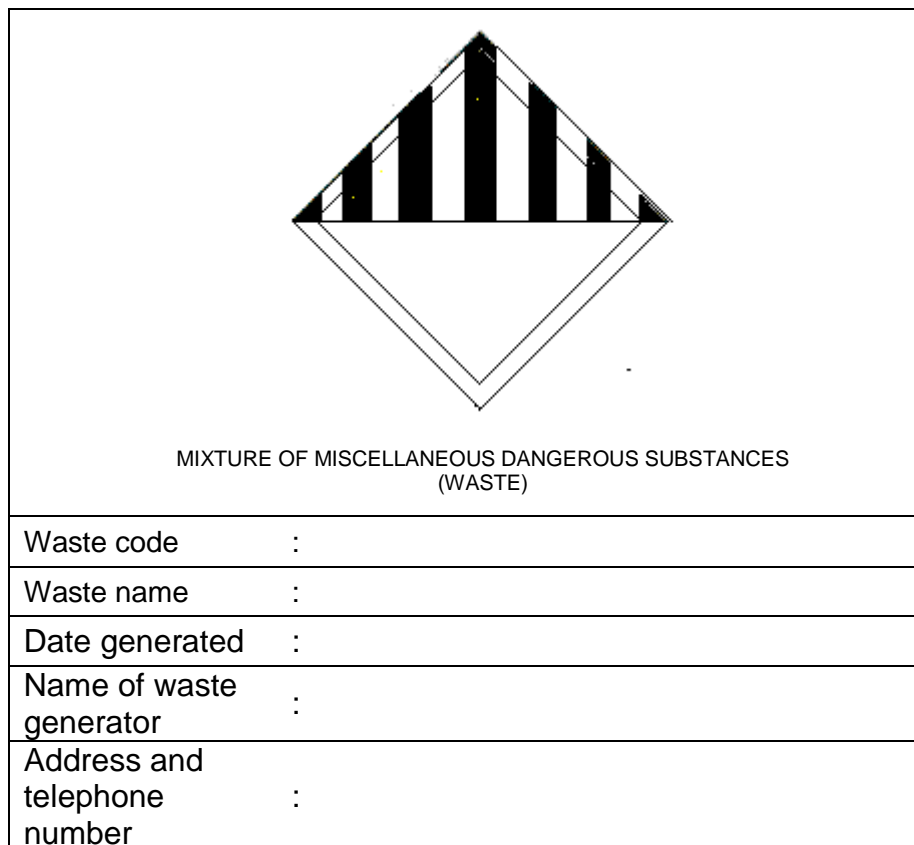


Figure 2: Example of label for scheduled wastes container

5.7 All labels shall be able to withstand open weather exposure without a substantial reduction in effectiveness.

5.8 Label shall be placed on a background of contrasting colour.

5.9 In the case of waste capable of causing two or more hazards, all the hazards must be clearly identified and the waste shall be labelled accordingly.

6.0 PLACING/FILLING/PACKING OF INCOMPATIBLE SCHEDULED WASTES IN CONTAINERS

- 6.1 Incompatible scheduled wastes shall be placed/filled/packed in separate containers. Incompatible scheduled wastes when mixed will produce hazardous situations. The indication of some of the hazards that can be expected if mixing of incompatible wastes took place is as shown in Fourth Schedule, Regulation 2 of the Environmental Quality (Scheduled Wastes) Regulations 2005 as in Appendix 1.
- 6.2 Since the waste generated from a process may exhibit some similar hazardous characteristics of the raw materials or chemicals or substances used, the Compatibility Chart for Chemical Mixtures as in Appendix 2 can be used to indicate the hazards that can arise from mixing of incompatible chemical wastes.

7.0 MANAGING OF CONTAINERS CONTAINING SCHEDULED WASTES

- 7.1 Containers containing scheduled wastes shall be properly managed to prevent spills and leakages. Containers containing scheduled wastes shall be placed on wooden pallet and can only be allowed to be stacked not more than 3 tiers on crate storage.
- 7.2 Incompatible scheduled wastes shall be stored in separate containers, and such containers shall be placed in separate secondary containment area.
- Secondary containment area is a liquid-tight barrier that will contain hazardous materials that are released from a container.
- 7.3 As precautions, non-rigid scheduled wastes containers shall be kept in a place where the floor is covered by concrete or other suitable material. The storage place should be sheltered or roofed or covered with suitable covering material. The storage area shall be properly managed in such a way to prevent rain water or surface water from entering the storage area.
- 7.4 The waste generator shall provide information (waste card) as in Appendix 3 for each type of scheduled wastes and shall be made aware to all relevant employees and parties.

- 7.5 If a container is in poor condition or leaking, the waste shall be immediately transferred to a new or a good condition container, as mentioned in paragraph 4.4.
- 7.6 All container storage areas shall be clearly marked.
- 7.7 Suitable equipment such as forklift, etc shall be used to move the non-rigid containers.
- 7.8 Non-rigid containers shall be stored with an ample aisle space in the storage area to ensure easy access for people and equipment.
- 7.9 Filling of wastes into non-rigid containers shall be as nearest as possible to the point of waste generation.
- 7.10 Waste containers shall always be closed all the time, and only open when the scheduled wastes is added or removed to the container'

8.0 STORAGE AREA INSPECTION

- 8.1 Inspection of the stored containers shall be carried out weekly to avoid any mishap.
- 8.2 Waste generators and handlers shall prepare a standard inspection checklist for the purpose of regular inspection, an example of which is as shown in Appendix 4.
- 8.3 Inspection checklist shall be kept and updated from time to time.
- 8.4 Upon inspection, immediate action shall be taken if any problem is detected.
- 8.5 The waste generators shall prepare an accurate and up-to-date inventory of scheduled wastes as stipulated under Regulation 11 of the Environmental Quality (Scheduled Wastes) Regulations 2005.

Appendix 1

SCHEDULED WASTES OF POTENTIAL INCOMPATIBILITY

The mixing of a waste in Group A with a waste in Group B may have the following potential consequences:

Group 1-A

Alkaline caustic liquids
Alkaline cleaner
Alkaline corrosive liquid
Caustic wastewater
Lime sludge and other corrosive
alkalies

Group 1-B

Acid sludge
Chemical cleaners
Electrolyte, acid
Etching acid, liquid or solvent
Pickling liquor and other corrosive acid
Spent acid
Spent mixed acid

Potential consequences: Heat generation, violent reaction

Group 2-A

Asbestos
Beryllium
Unrinsed pesticide containers
Pesticides

Group 2-B

Solvents
Explosives
Petroleum
Oil and other flammable wastes

Potential consequences: Release of toxic substances in case of fire or explosion

Group 3-A

Aluminium
Beryllium
Calcium
Lithium
Magnesium
Potassium
Sodium
Zinc powder and other reactive
metals and metal hydrides

Group 3-B

Any waste in Group 1-A or 1-B

Potential consequences: Fire or explosion; generation of flammable hydrogen gas

Group 4-A

Alcohols

Group 4-B

Any concentrated waste in Group 1-A or 1-B
Calcium
Lithium
Metal hydrides
Potassium
Sodium
Water reactive wastes

Potential consequences: Fire, explosion or heat generation; generation of flammable toxic gases

Group 5-A

Alcohols
Aldehydes
Halogenated hydrocarbons
Nitrated hydrocarbons and other
reactive organic compounds and
solvents
Unsaturated hydrocarbons

Group 5-B

Concentrated Group 1-A or 1-B wastes
Group 3-A wastes

Potential consequences: Fire, explosion or violent reaction

Group 6-A

Spent cyanide and sulphide
solution

Group 6-B

Group 1-B wastes

Potential consequences: Generation of toxic hydrogen cyanide or hydrogen sulphide gas

Group 7-A

Chlorates and other strong oxidizers
Chlorites
Chromic acid
Hypochlorites
Nitrates
Nitric acid
Perchlorates
Permanganates
Peroxides

Group 7-B

Organic acids
Group 2-B wastes
Group 3-B wastes
Group 5-A wastes and other
flammable and combustible wastes

Potential consequences: Fire, explosion or violent reaction

Compatibility chart for chemical mixtures

Reactivity Group No.	Reactivity Group Name																																						
1	Acids, Mineral, Non-oxidizing	1																																					
2	Acids, Mineral, Oxidizing		2																																				
3	Acids, Organic		G, H	3																																			
4	Alcohol and Glycols	H	H, F	H, P	4																																		
5	Aldehydes	H, P	H, F	H, P		5																																	
6	Amines	H	H, GT				6																																
7	Amines, Aliphatic and Aromatic	H	H, GT	H				7																															
8	Azo compounds, Diazo compounds and Hydrazines	H, G	H, GT	H, G	H, G	H			8																														
9	Carbamates	H, G	H, GT					G, H	9																														
10	Cautistics	H	H	H						H, G	10																												
11	Cyanides	GT, GF	GT, GF	GT, GF						G	11																												
12	Dithiocarbamates	H, GF, F	H, GF, F	H, GF, F	H, GF, F	H, GF, F	GF, GT		U	H, G		12																											
13	Esters	H	H, F							H, G	H			13																									
14	Ethers	H	H, F												14																								
15	Fluorides, Inorganic	GT	GT	GT												15																							
16	Hydrocarbons, Aromatic	H, F														16																							
17	Halogenated Organics	H, GT	H, GT, P							H, GT	H, G	H, GF	H			17																							
18	Isocyanates	H, G	H, GT, P	H, G	H, P					H, P	H, G	H, P, G	H, G	U		18																							
19	Ketones	H	H, F								H, G	H				19																							
20	Mercaptans and other Organic Sulfides	GF, GT	H, GT, F								H, G					H	H	H	20																				
21	Metals, Alkali and Alkaline Earth Elemental	GF, H, F	GF, H, F	GF, H, F	GF, H, F	GF, H, F	GF, H, F	GF, H	GF, H	GF, H	GF, H	GF, H	GF, H	GF, H	GF, H	GF, H			21																				
22	Metals, other Elemental Alloys as powders, vapors or sponges	GF, H, F	GF, H, F	GF, H, F						H, E	GF, H, F					GF, H, F			22																				
23	Metals, other Elemental Alloys as sheets, rods, moldings, etc.	GF, H, F	GF, H, F								H, F, G					H, F			23																				
24	Metals and Metal compounds, Toxic	S	S	S							S	S				S			24																				
25	Nitrides	GF, H, F	GF, H, F, E	GF, H, F						U	H, G	U	GF, H	GF, H	GF, H	GF, H	U	GF, H	GF, H	25																			
26	Nitriles	H, GT, GF	GT, H														H, P			S	GF, H	26																	
27	Nitro compounds, Organic	GT, H, F											H, E				GF, H, E				GF, H, E	27																	
28	Hydrocarbons, Aliphatic, Unsaturated	H	H, F																	H, E			28																
29	Hydrocarbons, Aliphatic, Saturated	H, F																					29																
30	Peroxides and Hydroperoxides, Organic	H, G	H, E	H, F	H, G					GT, H, E	H, F, F	GT, H, E	GT, H, E	H, E	H	GT, H, F	H, E	H, G	H, G	GF, H, E	GT, H, P	H, P	H	30															
31	Phenols and Cresols	H	H, F														H, P				GF, H			H	31														
32	Organophosphates, Phosphothioates, Phosphodithioates	GT, H	GT, H																						U	32													
33	Sulfides, Inorganic	GT, GF	GT, H, F	GT																					GT, H	33													
34	Epoxydes	H, P	H, P	H, P	H, P	U																			H, P	H, P	U	H, P	34										
101	Combustible and Flammable materials, Miscellaneous	H, G	GT, H, F																							H, G, F	GF, H, F	GT, H, F	GT, H, F	101									
102	Explosives	H, E	H, E	H, E																										H, E	H, E	H, E	H, E	H, E	H, E	H, E	102		
103	Polymerizable compounds	P, H	P, H	P, H																											P, H	P, H	P, H	P, H	P, H	P, H	P, H	103	
104	Oxidizing Agents, strong	GT, H	GT, H	H, F	H, F	GT, H, F	GT, H, F	GT, H, F	GT, H, F	GT, H, F	GT, H, F	H, F	H, F	H, F	GT, H, F	GT, H, F	H, F	GT, H, F	H, F	H, F	H, F	H, F	H, F	H, F	H, F	H, F	H, F	H, F	H, F	H, F	H, F	H, F	H, F	H, F	104				
105	Reducing Agents, strong	GF, H	GT, H, F	GF, H, F	GF, H, F	GF, H, F	GF, H, F	GF, H, F	GF, H, F	GF, H, F	GF, H, F	GF, H, F	GF, H, F	GF, H, F	GF, H, F	GF, H, F	GF, H, F	GF, H, F	GF, H, F	GF, H, F	GF, H, F	GF, H, F	GF, H, F	GF, H, F	GF, H, F	GF, H, F	GF, H, F	GF, H, F	GF, H, F	GF, H, F	GF, H, F	GF, H, F	GF, H, F	GF, H, F	GF, H, F	105			
106	Water and mixtures containing water	H	H																												H, G	GF, H	GF, H	S	GF, H	GF, GT	106		
107	Water reactive substances	E	X	T	R	E	M	E	L	Y																												107	

Reactivity code H F G GT GF E P S U	Consequence Heat generation Fire Innocuous non-flammable gas generation Toxic gas generation Flammable gas generation Explosion Violent polymerization Solubilization toxic substance Maybe hazardous but unknown
Example H, F, GT	Heat generation, fire and toxic gas generation

- NOTES:
- Source from EPA-600/2-80-076, April 1980. 'A method determining the compatibility of chemical mixtures.'
 - This chart can be used to identify hazards that can be expected when chemical wastes are mixed.
 - This list is not an exhaustive list as there are different activities of the thousands of compounds that may be encountered.
 - Any blanks that appear in the chart does not mean that the mixture cannot result in a hazard occurring.
 - Detailed information on hazards involved in handling and disposing of any given waste should be obtained from the waste generator.

Appendix 3

A. Properties

1. Category of waste
 - according to the First Schedule
2. Origin
 - State from which process, activity, occurrence, etc. the waste is generated
3. Physical properties of waste
 - Flashpoint °C
 - Boiling point °C
 - Consistency at room temperature (gas, liquid, sludge, solid)
 - Vapours lighter/heavier than air
 - Solubility in water
 - Waste lighter/heavier than water
4. Risks
 - by inhalation
 - by oral intake
 - by dermal contact

B. Handling of Waste

1. Personal protection equipment
 - Gloves, goggles, face shield etc.
2. Procedures/Precautions in handling, packaging transporting and storage
3. Appropriate label
 - Labels for the containers
4. Recommended Method of Disposal

C. Precautions in case of spill or accidental discharge causing personal injury

1. In case of inhalation of fumes or oral intake
 - Symptoms of intoxication
 - Appropriate first aid
 - Guidelines for the physician

2. In case of dermal contact or contact with eyes
 - Symptoms of intoxication
 - Appropriate first aid
 - Guideline for the physician

- D. Steps to be taken in case of spill or accidental discharge causing material damage arising from –
 1. Spill on floor, soil, road etc.
 2. Spill into water
 3. Fire
 4. Explosion

Appendix 4

Scheduled wastes storage inspection checklist

Date of inspection: _____

Instructions:

- (a) Tick "Yes" next to all inspection items that meet facility procedures.
- (b) Tick "No" next to all inspection items that do not meet the procedures.
- (c) Provide specific comments on all "No" items.
- (d) Inspector **shall** sign at the bottom of the table and submit the report to the supervisor once the inspection is completed.

Inspection Item	YES	NO	Comments and remarks	Action to be taken (if any)
Number of containers in stock according to the Fifth Schedule of the Environmental Quality (Scheduled Wastes) Regulations				
Containers dated properly				
Containers labelled properly				
Containers stored within 180 days				
Total quantity of scheduled wastes stored did not exceed 20 metric tonnes				
Containers observed FREE of leakage or stains				
Ample aisle space maintained				
Containment system FREE of water or other liquids				

Signature: _____

Name of inspector: _____

Overall comments: _____

Name of supervisor: _____ Date: _____

Comments: _____

REFERENCES

1. Environmental Quality (Scheduled Wastes) Regulations 2005
2. Malaysia Standard MS 2304:2010: Practices for Managing Scheduled Waste Containers
3. Environmental Institute of Malaysia (EiMAS)'s training material for Certification Course for Scheduled Wastes Managers
4. <http://www.co.thurston.wa.us/health/ehhw/seccontain.html>
5. Hazardous Waste Storage Guidelines, Environmental Protection Services, Alberta Environment, June 1988