

DRAFT FOR COMMENTS

Guidelines for the Disposal of Non-recyclable Plastic Waste

(As per Rule '6(2)(d)' of Plastic Waste Management Rules, 2016 dated 18th March, 2016)



CENTRAL POLLUTION CONTROL BOARD

(Ministry of Environment, Forest and Climate Change, Government of India)

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1.0 Background:

Plastic products have become an integral part in our daily life as a basic need. Its broad range of application is in packaging films, wrapping materials, shopping and garbage bags, fluid containers, clothing, toys, household & industrial products and building materials. It is a fact that plastics will never degrade and remain on landscape for several years. The recycled plastics are more harmful to the environment than the virgin products due to mixing of colour, additives, stabilizers, flame retardants etc. Further, the recycling of a virgin plastic material can be done 2-3 times only, because, after every recycling, the strength of plastic material is reduced due to thermal degradation.

The Government of India notified Plastic Waste Management (PWM) Rules, 2016 by superseding Plastic Waste (Management & Handling) Rules, 2011. As per the Rule '6(2)(d)' of PWM Rules, 2016, processing and disposal of non-recyclable fraction of plastic waste shall be in accordance with the Guidelines issued by the Central Pollution Control Board. In compliance of the direction, the Central Pollution Control Board has prepared the "**Guidelines for the Disposal of Non-recyclable Plastic Waste**". Thereafter, processing and disposal of non-recyclable plastic waste shall be in accordance with the said Guidelines, as amended from time to time.

2.0 Definitions:

Some of the important terminologies, as defined in the Plastic Waste Management (PWM) Rules, 2016, are given below:

a. Plastic:

As per Rule '3(o)' of PWM Rules, 2016, plastic means material which contains as an essential ingredient a high polymer such as polyethylene terephthalate, high density polyethylene, vinyl, low density polyethylene, polypropylene, polystyrene resins, multi-materials like acrylonitrile butadiene styrene, polyphenylene oxide, polycarbonate, polybutylene terephthalate.

b. Multilayer Packaging:

As per Rule '3(n)' of PWM Rules, 2016, Multilayer Packaging means any material used or to be used for packaging and having at least one layer of plastic as the main ingredients in combination with one or more layers of materials such as paper, paper board, polymeric materials, metalised layers or aluminium foil, either in the form of a laminate or co-extruded structure.

As per Rule '9(5)' of PWM Rules, 2016, no producer shall on and after the expiry of a period of **Six Months** from the date of final publication of these rules in the Official Gazette manufacture or use any plastic or multilayered packaging for packaging of commodities without registration from the concerned State Pollution Control Board or the Pollution Control Committees.

Also, As per Rule '9(3)' of Plastic Waste Management Rules, 2016, manufacture and use of non-recyclable multilayered plastic if any should be phased out in **Two years** time (from the date of issue of PWM Rules, 2016).

c. Recycling:

As per Rule '3(t)' of PWM Rules, 2016, recycling is the process of transforming segregated plastic waste into a new product or raw material for producing new products.

d. Non-recyclable fraction of Plastic Waste:

Non-recyclable fraction of plastic (here onwards referred as non-recyclable plastic) is the plastic which can not be recycled by conventional recycling methods. Such material mainly comprises of multilayer structure, which may be made from thermoplastic material, but due to complex structure, it can not be separated, hence non-recyclable. Multilayer plastic is generally used in the packaging industry where better barrier properties are required for food, pharmaceuticals, electronic goods etc. Multilayer laminates are produced by joining various input materials such as aluminium foil, polyethyleneterephthalate (PET), polypropylene (BOPP), polyethylene (PE), paper etc.

3.0 Sources of non-recyclable plastic waste:

S. No.	Sources	Uses
1	Food packaging	Multilayered films are used for packing of biscuits, namkeen, chips, edible oil, juices etc.
2	Pharmaceutical products	Multilayered packing for packing of medicines, tablets etc.
3	Electrical and electronic goods	Multilayered films such as bubble raps, laminates are used for packing of electrical and electronic items etc.
4	Food serving and fillers	Thermocol products such as plates, cups etc. are used for serving food, tea, coffee etc. Also used as fillers in packing of goods/items etc.

4.0 Quantification of non-recyclable plastic waste generated in India:

As per the study conducted by Central Pollution Control Board (CPCB) in 60 major cities of India, it has been observed that around 4059 T/day of plastic waste is generated from these cities. The fraction of plastic waste in total Municipal Solid Waste (MSW) varies from 3.10% (Chandigarh) to 12.47% (Surat). Average plastic waste generation is around 6.92% of MSW. With extrapolation of per capita plastic waste generation data from 60 major cities, it is estimated that approximately 9.46 million tons per annum of plastic waste is generated in India, which is around 25,940 T/day. As per the results of the study, out of total plastic waste, around 94% waste comprises of thermoplastic content, which is recyclable such as PET, LDPE, HDPE, PVC etc. and remaining 6% belongs to the family of thermoset and other categories of plastics such as SMC, FRP, multi-layered, thermocol etc., which is non-recyclable. As per an estimation, every year approximately **0.56 million tons of non-recyclable plastic waste** is dumped in India.

5.0 Management of Non-recyclable plastic waste:

The use of plastic materials has simplified the modern life. At the same time, the extensive use of plastic materials in every walk of life have caused serious plastic waste management problems. The handling of increased amount of plastic waste has become a

serious issue globally and is also a cause of depletion of petroleum resources which are an essential requirement of the mankind.

5.1 Collection, Segregation & Transportation:

5.1.1 At present, no system exists with Municipal Bodies for collection, segregation & transportation of all kind of plastic waste including multilayer plastic waste. However, as per Rule “6” of the Plastic Waste Management Rules, 2016:-

“1. Every local body shall be responsible for development and setting up of infrastructure for segregation, collection, storage, transportation, processing and disposal of the plastic waste either on its own or by engaging agencies or producers.

2. The local body shall be responsible for setting up, operationalisation and co-ordination of the waste management system and for performing the associated functions, namely:-

- (a) Ensuring segregation, collection, storage, transportation, processing and disposal of plastic waste;
- (b) ensuring that no damage is caused to the environment during this process;
- (c) ensuring channelization of recyclable plastic waste fraction to recyclers;
- (d) ensuring processing and disposal on non-recyclable fraction of plastic waste in accordance with the guidelines issued by the Central Pollution Control Board;
- (e) creating awareness among all stakeholders about their responsibilities;
- (f) engaging civil societies or groups working with waste pickers; and
- (g) ensuring that open burning of plastic waste does not take place.

3. The local body for setting up of system for plastic waste management shall seek assistance of producers and such system shall be set up within **one year** from the date of final publication of these rules in the Official Gazette of India.

4. The local body to frame bye-laws incorporating the provisions of these rules.”

5.2 Extended Producers Responsibility (EPR):

As per the Rule “9(1)” of the Plastic Waste Management Rules, 2016, The producers, within a period of **six months** from the date of publication of PWM Rules, 2016, shall work out modalities for waste collection system based on Extended Producers Responsibility and involving State Urban Development Departments, either individually or collectively, through their own distribution channel or through the local body concerned.

5.3 Management /Disposal Options:

The most preferred options are:

- (i) Minimizing the waste generation
- (ii) Co-processing in cement kilns
- (iii) Disposal in secured landfills

Based on the various options practiced globally for disposal of non-recyclable plastic waste, the waste management hierarchy, recommendation on collection & disposal are illustrated in **Fig - 1**:

Figure - 1: Collection and Disposal of Non-recyclable Plastic Waste



5.3.1 Minimizing the waste generation:

The most preferred option is minimization of use of non-recyclable plastic products & promoting use of alternate material, which could be easily recyclable/reusable/degradable and compostable.

5.3.2 Co-processing of non-recyclable plastic waste in cement plants:

Co-processing is a more environmentally friendly and sustainable method of waste disposal as compared to land filling and incineration because of reduced emissions and no residue after the treatment. Co-processing refers to the use of waste materials in industrial processes as alternative fuels or raw material (AFR) to recover energy and material from them. Due to the high temperature in cement kiln, all types of wastes can be effectively disposed without any harmful emissions. As per the Basel Convention, variety of wastes including hazardous wastes, get disposed in an environmentally safe and sound manner through the technology of co-processing in cement kiln. Disposal of non-recyclable plastic wastes through co-processing is practiced in many countries as a regular method for their environmentally sound disposal.

5.3.2.1 Pre-requisites for Co-processing of non-recyclable plastic waste in cement plants:

Following should be considered as a prerequisite for permitting Co-processing of non-recyclable plastic wastes in cement plants.

- a) The producers of non-recyclable plastic, major users like food packaging, pharmaceuticals, multilayer film manufacturing industries etc. in consultation with local body shall arrange to collect the non-recyclable plastic waste and handover to cement plants. They shall maintain a record of quantity generated and handed over to cement plants.
- b) The cement plants shall maintain a record of quantity received and utilised by them.
- c) The producers of non-recyclable plastic, major user like food packaging, pharmaceuticals, multilayer film manufacturing industries etc. shall assist the cement plants for establishment of required facilities for utilization of non-recyclable plastic like shredding, feeding system, safety measures as applicable for co-incineration. The cement industries should set-up online emission monitoring for PM, SO₂ and NO_x, and stack monitoring of heavy metals, dioxin and furans based on Extended Producers Responsibility.

5.3.2.2 Standards for Co-processing of Non-recyclable Plastic Waste in Cement Kilns:

The co-processing of the non-recyclable plastic waste in cement kilns shall follow the emission standards as notified by Ministry of Environment, Forest and Climate Change, in notification titled as "Environment (Protection) Third Amendment Rules, 2016", dated 10.05.2016 **(Annexure-I)**.

5.3.3 Secured Landfill:

Secured landfill is another option that can be utilised for disposal of the non-recyclable plastic waste. The experience has however demonstrated that the land utilised for the landfill purpose gets locked and the liability associated with this land, filled-up with materials tends to continue forever, besides the land remains unusable. Most countries have stopped the practice of utilising landfill as the option for disposal of wastes. The cost of landfill expected to keep on increasing over the time due to increase in land and fuel cost. Further, availability of land is a major issue in the cities/towns, therefore, this method could be ranked as least preferred option. The producers of non-recyclable plastic in collaboration with Local Bodies may also explore the possibility of establishing common secured landfills for disposal of non-recyclable plastic waste.

6.0 Recommendations & Conclusion:

- The most preferred option is minimization of use of non-recyclable plastic products & promoting use of alternate material, which could be easily recyclable/reusable and/or compostable.
- The preferred option for disposal of non-recyclable plastic waste is therefore co-processing in cement plants due to its high temperature (upto 2000°C). The producers of non-recyclable plastic, major uses like food packaging, pharmaceuticals, multilayer film manufacturing industries etc. in consultation with local authority, cement plants shall work out modalities for co-processing of such waste in cement kilns.
- The producers of non-recyclable plastic and major users like food packaging, pharmaceuticals, multilayer film manufacturing industries etc. shall assist the cement plants for establishment of required facilities for utilization of non-recyclable plastic waste like shredding, feeding system, safety measures as applicable for co-incineration.
- The co-processing of the non-recyclable plastic waste in cement kilns shall follow the emission standards as notified by Ministry of Environment, Forest and Climate Change, in notification titled as "Environment (Protection) Third Amendment Rules, 2016", dated 10.05.2016.
- The State Pollution Control Board / Pollution Control Committee may consider stipulating suitable condition in consent order of these Cement Plants on the co-processing of non-recyclable plastic waste.
- SPCB/PCC may consider incentives such as reduction of water cess/consent fee etc. for such cement plants.

**MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE
NOTIFICATION**

New Delhi, the 10th May, 2016

G.S.R. 497 (E). – In exercise of powers conferred by sections 6 and 25 of the Environment (Protection) Act, 1986 (29 of 1986), the Central Government hereby makes the following rules further to amend the Environment (Protection) Rules, 1986, namely :-

1. Short title and commencement - (1) These rules may be called the Environment (Protection) Third Amendment Rules, 2016.
(2) They shall come into force on the date of their publication in the Official Gazette.

2. In the Environment (Protection) Rules, 1986,-
(a) in schedule I, after serial number 10 and the entries relating thereto, the following serial number and entries shall be inserted, namely:-

“S. No. (1)	Industry (2)	Parameter (3)	Standards (4)		
“10A.	Cement Plant with co-processing of wastes	A- Emission Standards			
		Rotary Kiln – with co-processing of Wastes			
			Date of Commissioning	Location	Concentration not to exceed, in mg/Nm³
			(a)	(b)	(c)
		Particulate Matter (PM)*	on or after the date of notification (25.8.2014)	anywhere in the country	30
			before the date of notification (25.8.2014)	critically polluted area or urban centres with population above 1.0 lakh or within its periphery of 5.0 kilometer radius	30
			other than critically polluted area or urban centres	30	
SO ₂ *	irrespective of date of commissioning	anywhere in the country	100, 700 and 1000 when pyritic sulphur in the limestone is less than 0.25%, 0.25 to 0.5% and more than 0.5% respectively.		
NO _x *	After the date of notification (25.8.2014)	anywhere in the country	(1) 600		
	Before the date of notification	anywhere in the country	(2) 800 for rotary kiln with In Line Calciner		

		(25.8.2014)	(ILC) technology. (3) 1000 for rotary kiln using mixed stream of ILC, Separate Line Calciner (SLC) and suspension pre-heater technology or SLC technology alone or without calciner.
		HCl	10 mg/Nm ³
		HF	1 mg/Nm ³
		TOC	10 mg/Nm ³ **
		Hg and its compounds	0.05 mg/Nm ³
		Cd +Tl and their compounds	0.05 mg/Nm ³
		Sb+As+Pb+Co+Cr+Cu+Mn+Ni+V and their compounds	0.5 mg/Nm ³
		Dioxins and Furans	0.1 ngTEQ/ Nm ³
		<p>Note: The abbreviations used in the Table shall mean as under: SO₂- Sulphur dioxide; NO_x - Oxides of Nitrogen; HCl – Hydrogen Chloride; HF – Hydrogen Flouride; TOC - Total Organic Carbon; Hg – Mercury; Cd – Cadmium; Tl – Thallium; Sb – Antimony; As – Arsenic; Pb – Lead; Co – Cobalt; Cr – Chromium; Cu – Copper; Mn – Manganese; Ni – Nickel; and V - Vanadium.”;</p> <p>* The concentration values and timeline for implementation in respect of PM, SO₂ and NO_x shall be governed in accordance with the provisions under notification published vide GSR No. 612 (E), dated the 25th August, 2014 and amended from time to time.</p> <p>**Permitting authority may prescribe separate standards on case to case basis, if Total Organic Carbon (TOC) does not result from the co-processing of waste.</p> <p>(a) The height of each individual stack connected to Kiln, Clinker Cooler, Cement Mill, Coal Mill, Raw Mill, Packaging section, etc. shall be of a minimum of 30 metres or, as per the formula $H = 14 (Q1)^{0.3}$ and $H = 74 (Q2)^{0.27}$ whichever is more, where “H” is the height of stack in metres and “Q1” is the maximum quantity of SO₂ expected to be emitted in kg/hr and “Q2” is the maximum quantity of PM expected to be emitted in tonnes/hr through the stack at 100 percent rated capacity of the plant;</p> <p>(b) The monitored values of SO₂, NO_x, HCl, HF, TOC, Metals and Dioxins and Furans at main kiln stack shall be corrected to 10% Oxygen, on dry basis and the norms for SO₂, NO_x, HCl, HF, TOC, Metals and Dioxins and Furans shall be applicable to main kiln stack and the norms for Particulate Matter (PM) shall be applicable to all the stacks in the plant. PM, SO₂, NO_x shall be monitored continuously. HCl, HF, TOC, Metals and Dioxins and Furans shall be monitored once in a year;</p> <p>(c) Scrubber meant for scrubbing emissions shall not be used as quencher and plants having separate stack for gaseous emission for the scrubbing unit, the height of this stack shall be at least equal to the main stack.</p>	
		<p>B- Service waste water (with co-processing of wastes) All efforts shall be made by the industry for ‘zero discharge’ of service wastewater and in case, the industry prefers to discharge service wastewater, the following norms shall be complied with:</p>	
			Concentration not to exceed, milligram per litre (except pH and temperature)
		pH	5.5 to 9.0
		Suspended Solids	100

		Oil and Grease	10
		Temperature	not more than 5°C higher than the intake water temperature
		C- Storm water	
		(I) Storm-water shall not be allowed to mix with effluent, treated sewage, scrubber water and or or floor washings.	
		(II) Storm-water within battery limits of industry shall be channelised through separate drain(s).”.	

- (b) in Schedule VI, under ‘Part-D’ relating to General Emission Standards, in item III relating to Load or Mass based standards, after serial number 10 and the entries relating thereto, the following serial number and entries shall be inserted, namely:-

(1)	(2)	(3)	(4)
“10A	Cement Plants (with co-processing)	Rotary kiln based plants (Particulate Matter from raw mill, kiln and pre-calciner system put together)	0.125 kg/ tonne of clinker.”.

[F. No.- Q-15017/30/2007-CPW]

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Note .- The principal rules were published in the Gazette of India, Extraordinary, Part II, Section 3, Sub-section (i), *vide* number S.O. 844 (E), dated the 19th November, 1986 and subsequently amended *vide* the following notifications, namely:-

S.O. 433 (E), dated the 18th April 1987; G.S.R. 176(E), dated the 2nd April, 1996; G.S.R. 97 (E), dated the 18th February, 2009; G.S.R. 149 (E), dated the 4th March , 2009; G.S.R. 543(E), dated the 22nd July,2009; G.S.R. 739 (E), dated the 9th September, 2010; G.S.R. 809(E), dated, the 4th October, 2010, G.S.R. 215 (E), dated the 15th March, 2011; G.S.R. 221(E), dated the 18th March, 2011; G.S.R. 354 (E), dated the 2nd May, 2011; G.S.R. 424 (E), dated the 1st June, 2011; G.S.R. 446 (E), dated the 13th June, 2011; G.S.R. 152 (E), dated the 16th March, 2012; G.S.R. 266(E), dated the 30th March, 2012; and G.S.R. 277 (E), dated the 31st March, 2012; and G.S.R. 820(E), dated the 9th November, 2012; G.S.R. 176 (E), dated the 18th March, 2013; G.S.R. 535(E), dated the 7th August, 2013; G.S.R. 771(E), dated the 11th December, 2013; G.S.R. 2(E), dated the 2nd January, 2014; G.S.R. 229 (E), dated the 28th March, 2014; G.S.R. 232(E), dated the 31st March, 2014; G.S.R. 325(E), dated the 07th May, 2014, G.S.R. 612, (E), dated the 25th August 2014; G.S.R. 789(E), dated the 11th November 2014; S.O. 3305(E), dated the 7th December, 2015; S.O.4(E), dated the 1st January 2016; G.S.R. 35(E), dated the 14th January 2016 and lastly amended *vide* notification G.S.R. 281 (E), dated the 7th March, 2016.