Consolidated Guidelines for Segregation, Collection and Disposal of Plastic Waste

CENTRAL POLLUTION CONTROL BOARD

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

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Contents

1. Introduction:

The rapid rate of urbanization and development has led to increase in consumption of plastic products vis-à-vis plastic waste generation. It is a fact that plastics waste constitutes a significant portion of the total municipal solid waste (MSW) generated in India. Plastics are non-biodegradable and remains on earth for thousands of years. The burning of plastics waste under uncontrolled conditions lead to generation of different hazardous air pollutants (HAPs), depending upon the type of polymers and additives used. However, the end-of-life plastics can be recycled into a second life application but after every thermal treatment/recycling deterioration in quality of recycled plastic products. Thus plastic waste can be recycled only 3-4 times. The visibility of huge quantity of plastic waste has been perceived as a serious problem and made plastics a target in the management of solid waste. As per the IS 14534: 1998 "Guidelines for Recycling of Plastics", to identify the raw material of plastic products, the symbols defined by Society of the Plastics Industry (SPI, USA) shall be marked on each product. Different types of plastics and their uses are given in **Table 1.**

Table 1. Different Types of Plastics &its Uses

S. No.	Symbol	Short Name	Scientific Name	Uses
1		PET	Polyethylene terephthalate	Soft drink bottles, furniture, carpet, paneling etc.
2		HDPE	High-density polyethylene	Bottles, carry bags, milk pouches, recycling bins, agricultural pipe, base cups, playground equipment etc.
3		PVC	Polyvinyl chloride	Pipe, Window profile, fencing, flooring, shower curtains, lawn chairs, non-food bottles and children's toys etc.
4		LDPE	Low-density polyethylene	Plastic bags, various containers, dispensing bottles, wash bottles, tubing etc.
5		PP	Polypropylene	Auto parts, industrial fibers, food containers, dishware etc.
6		PS	Polystyrene	Cafeteria trays, plastic utensils, toys, video cassettes and cases, clamshell containers, insulation board etc.
7		O	Other	Thermoset Plastics, Multilayer and Laminates, Bakelite, Polycarbonate, Nylon SMC, FRP etc.

Plastics are generally categorized into two types:

- **Thermoplastics**: Thermoplastics or Thermosoftening plastics are the plastics which soften on heating and can be molded into desired shape such as PET, HDPE, LDPE, PP, PVC, PS, etc.
- **Thermosets**: Thermoset or thermosetting plastics on heating, but cannot be remolded or recycled such as Sheet Molding Compounds (SMC), Fiber Reinforced Plastic (FRP), Bakelite etc. are the examples of the same.

For efficient management of plastic waste, the Government of India has superseded with the earlier Plastic Waste (Management & Handling) Rules, 2011 and notified **Plastic Waste Management (PWM) Rules, 2016** on **18th March, 2016**. These rules shall apply to every Waste Generator, Local Body, Gram Panchayat, Manufacturer, Importer, Producer and Brand Owner throughout India.

2. Environmental issues of plastic waste:

Followings are the major environmental issues related to plastic waste

- Littering of plastic waste is major environmental issues, it makes land infertile, choke the drains, on ingestion by cattle cause death and give ugly look of a city or town.
- Lack of proper system for plastic waste collection and segregation in cities/towns.
- Accumulation of non-recyclable plastic waste such as multilayered laminated packaging, thermoset plastic like SMC, FRP etc.
- Open burning of plastic waste, especially thermoset plastic waste is major health and environmental issue, as it emits toxic gases.
- Leaching impact on soil, underground water etc. due to improper dumping of plastic waste (contain metals & phthalates).
- Running of unregistered plastic manufacturing and recycling industries in residential areas.

3. Key Definitions of as per PWM Rules, 2016:

Some of the important keywords as per **PWM Rules**, 2016 are explained below:

i) **Brand Owner:** Brand Owner means a person or company who sells any commodity under a registered brand label.

ii) **Carrybags:** Carrybags mean bags made from plastic material or compostable plastic material, used for the purpose of carrying or dispensing commodities which have a self-

carrying feature but do not include bags that constitute or form an integral part of the packaging in which goods are sealed prior to use.

iii) **Commodity:** means tangible item that may be bought or sold and includes all marketable goods or wares.

iv) **Compostable Plastics:** Compostable Plastics mean plastic that undergoes degradation by biological processes during composting to yield CO_2, water, inorganic compounds and biomass at a rate consistent with other known compostable materials, **excluding conventional petro-based plastics**, and does not leave visible, distinguishable or toxic residue.

v) **Extended Producer's Responsibility (EPR):** EPR means the responsibility of a producer for the environmentally sound management of the product until the end of its life.

vi) **Importer:** Importer means a person who imports or intends to import and holds an Importer-Exporter Code number, unless otherwise specifically exempted.

vii) **Manufacturer:** Manufacturer means and include a person or unit or agency engaged in production of **plastic raw material** to be used as raw material by the producer.

viii) **Multilayered Packaging:** 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, metalized layers or aluminum foil, either in the form of a laminate or co-extruded structure.

ix) **Plastic:** 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.

x) **Plastic Sheet:** Plastic Sheet means Plastic sheet is the sheet made of plastic.

xi) **Plastic Waste**: Plastic Waste means any plastic discarded after use or after their intended use is over.

xii) **Producer:** Producer means persons engaged in manufacture or import of carry bags or multilayered packaging or plastic sheets or like, and includes industries or individuals using

plastic sheets or like or covers made of plastic sheets or multilayered packaging for packaging or wrapping the commodity.

xiii) **Waste Generator:** Waste Generator means and includes every person or group of persons or institution, residential and commercial establishments including Indian Railways, Airport, Port and Harbor and Defense establishments which generate plastic waste.

xiv) **Waste Management:** Waste Management means the collection, storage, transportation reduction, re-use, recovery, recycling, composting or disposal of plastic waste in an environmentally safe manner.

4. Salient Features of PWM Rules, 2016:

4.1 The salient features of the PWM Rules, 2016 are given below:

- PWM Rules, 2016 shall apply to every Waste Generator, Local Body, Gram Panchayat, Manufacturer, Importer, Producer and Brand Owner.
- Carry bag made of virgin or recycled plastic shall not be less than fifty microns in thickness. The provision of thickness shall not be applicable to carry bags made up of compostable plastic, complying IS/ISO:17088.
- Waste Generators including institutional generators, event organizers shall not litter the plastic waste. They shall segregate waste and handover it to authorized agency and shall pay user fee as prescribed by ULB for waste management or spot fine in case of violation.
- Within a period of six months from publication of PWM Rules, 2016 in official Gazette, Producer, Brand Owner shall work out modalities for waste collection system for collecting back the plastic waste generated due to their products, in consultation with local authority/State Urban Development Department and implement it within two years thereafter.
- Promote use of plastic waste for road construction or energy recovery or waste to oil or co-processing in cement kilns etc.
- Only the registered shopkeepers or street vendors shall be eligible to provide plastic carrybags to the customers for dispensing the commodities after paying plastic waste management fees (minimum ₹48,000 per annum) to concerned Local Body.
- SPCB/PCC shall be the authority for enforcement of the provisions of PWM Rules, 2016, relating to registration, manufacture of plastic products and multi-layered packaging, processing and disposal of plastic wastes.

- Concerned Secretary-in-charge of Urban Development of the State or a Union Territory and concerned Gram Panchayat in the rural area of the State or a Union Territory shall be the authority for enforcement of the provisions of PWM Rules, relating to waste management by waste generator, use of plastic carry bags, plastic sheets or like, covers made of plastic sheets and multi-layered packaging.
- Stakeholders & Responsible Authorities shall use Forms **I to VI** of the PWM Rules, 2016 for providing information to respective authorities on implementation of PWM Rules, 2016 **(Annexure I to VI).**

4.2 Responsibilities of CPCB as defined in PWM Rules, 2016 are given below in Table 2: -

S. No.	Rule No. (as per PWM Rules, 2016)	Description
1	**4(h)**	The manufacturers or seller of compostable plastic carrybags shall obtain a certificate from the Central Pollution Control Board before marketing or selling their products.
2	**5(c)**	Thermoset plastic waste shall be processed and disposed of as per the guidelines issued from time to time by the Central Pollution Control Board.
3	**6(2)(d)**	The Local Bodies shall ensure processing and disposal of non-recyclable fraction of plastic waste in accordance with the guidelines issued by the Central Pollution Control Board.
4	**17(d)**	The CPCB shall prepare a consolidated Annual Report on the use and management of plastic waste and forward it to the Central Government along with its recommendations before the **31st August** of every year.

4.3 Prescribed Authorities for **Plastic Waste Management and their responsibilities as per provision '12' of PWM Rules, 2016 are given below in Table 3: -**

S. No	Prescribed Authority	Responsibilities
1	State Pollution Control Board	Enforcement of the provisions of PWM Rules, 2016, relating to registration, manufacture of plastic products and multilayered

	(SPCB)/ Pollution Control Committee	packaging, processing and disposal of plastic wastes.
2	Secretary-in-Charge, Urban Development Department	Enforcement of the provisions of PWM Rules, 2016, relating to waste management by waste generator, use of plastic carry bags, plastic sheets or like, covers made of plastic sheets and multilayered packaging.
3	Gram Panchayat	Enforcement of the provisions of PWM Rules, 2016, rules relating to waste management by the waste generator, use of plastic carry bags, plastic sheets or like, covers made of plastic sheets and multilayered packaging in the rural area of the State or a Union Territory.
4	District Magistrate or Deputy Commissioner	Shall provide the assistance to SPCBs/PCCs, Secretary-in-Charge, Urban Development Department and Gram Panchayat under his jurisdiction, whenever required for enforcement of provisions of PWM Rules, 2016.

5. Plastic Waste Generation 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. The plastic waste generation data for 60 major cities in India is annexed as **Annexure-VII.** With extrapolation of the plastic waste generation data from 60 major cities, it is estimated that around 25,940 T/day of plastic waste is generated in India. 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 sheet molding compound (SMC), fiber reinforced plastic (FRP), multi-layered, thermocol etc., which is non-recyclable.

6. Present Status of Plastic Waste Management in India:

As per the Annual Reports on Implementation of Plastic Waste Management Rules, 2016, the following key issues have been emerged;

- The manufacturing, stock, sale & use of less than fifty microns (<50μm) plastic carrybags is continued in majority of States/UTs. Besides, carrybags/films are manufactured, stocked sold and used without proper label or marking.
- Shopkeepers/Street vendors willing to provide plastic carrybags shall registered with Local Body by paying ₹48000/ annum @4000/month.
- Widespread littering of plastic waste is continued on road-side, railways tracks, open areas, open drains, river banks, sea-shores, beaches, public places like Bus-station/Bus-stops, open market etc.
- The estimated plastic waste (PW) generation in 25940 tons/day (based on per capita PW generation)
- A number of unlicensed/unregistered plastic manufacturing & recycling unit are running in residential or non-conforming areas.
- Accumulation of PW may lead to chocking of drains, cause land infertile, on ingestion by cattle's may lead to death etc.
- No proper system evolved by majority of Municipal Authorities for collection, segregation and disposal of PW.
- Many States/UTs have not constituted State Level Monitoring Committee (SLMC) Body for implementation of PW (M&H) Rules, 2011.
- Open burning of PW is continued &may contaminate ambient air quality resulting into diseases to human beings

7. Roles and Responsibilities of Different Stakeholders in Efficient Plastic Waste Management:

The concerned Local Bodies and Gram Panchayats are responsible for collection, storage, segregation, transportation and disposal of waste in their jurisdiction. For management of plastic waste, different activities and respective responsible stakeholders are summarized in **Table 4.**

Table 4.

S. NO	ACTIVITY	RESPONSIBLE AGENCIES
1.	Door to door collection and segregation of all category of **plastic waste**.	Safai Karamchari (Municipal Staff) or Authorized Waste Collector/Picker
2.	Collection of **littered/dumped plastic waste** in public places like market areas, bus stands, railway stations, cinema halls, parks, community centers, road side etc.	Safai Karamchari (Municipal Staff) or Authorized Waste Collector/Picker
3.	Storage of collected **plastic waste** from households	Municipal Staff

	and other places in a covered yard authorized by Municipal Authority.	or Authorized Agency or NGO
4.	Segregation of **stored plastic waste** and shredding into 2-4 mm size using plastic shredder.	Municipal Staff or Authorized Agency or NGO
5.	Storage of shredded plastic waste in bags and utilization in following different technologies as per requirement and infrastructure. I) Use of shredded plastic waste in construction of bituminous road through hot mix plant (IRC Code SP 98:2013). II) Conversion of plastic waste in liquid fuel (As per CPCB's website). III) Transporting stored plastic waste in nearest cement kilns for co-processing (As per CPCB's website on PWM). IV) Disposal of plastic waste through plasma Pyrolysis technology (As per CPCB's website on PWM).	Municipal Staff or Authorized Agency or NGO

The process for collection, segregation and utilization of plastic waste is explained at Figure-1.

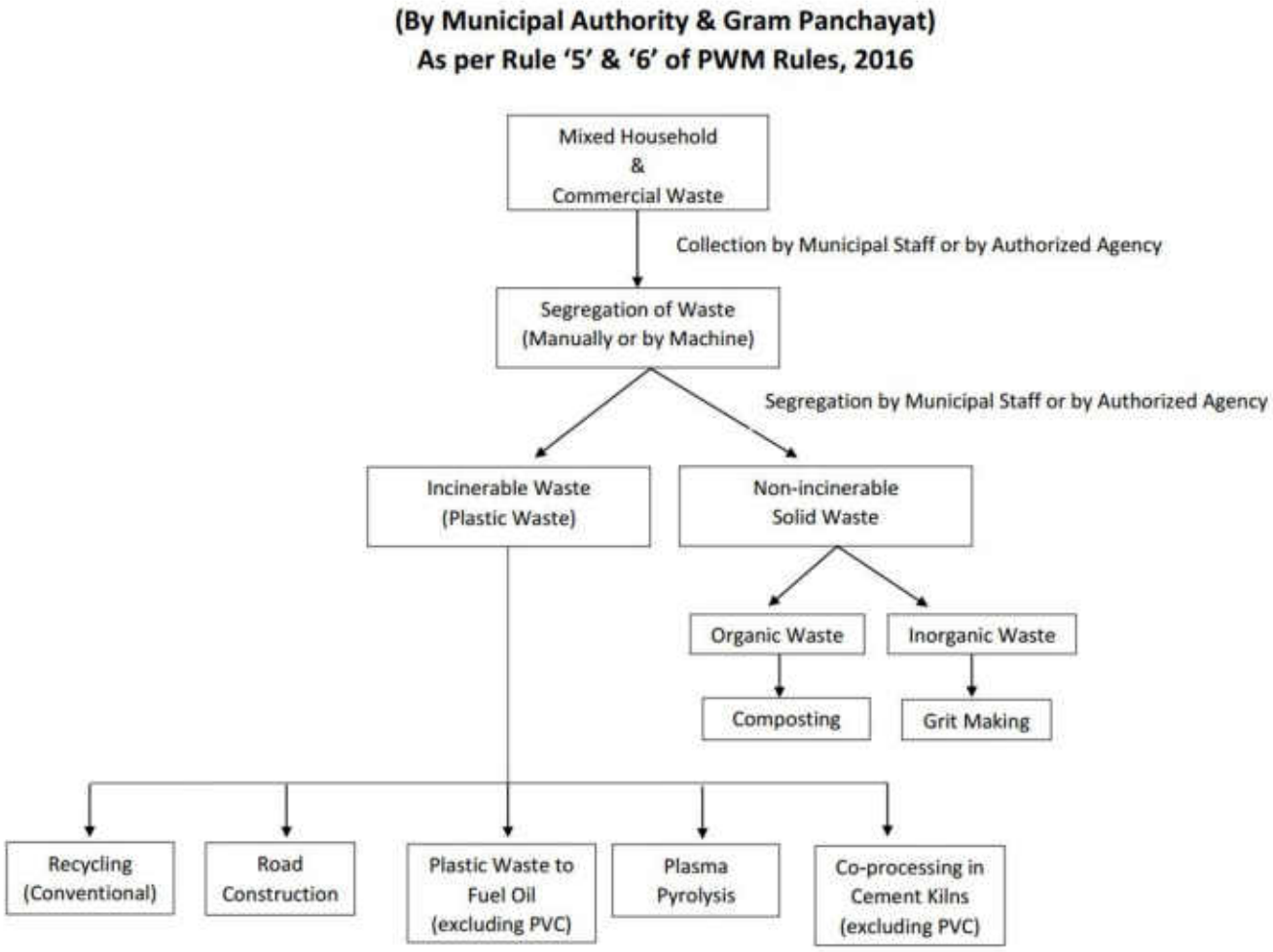

Figure 1. Flow Diagram for Plastic Waste Management

8. Technologies for Disposal of Plastic Waste:

The provision '5(b)' of PWM Rules, 2016, encourages the use of technologies for disposal of plastic waste. The major technologies for the disposal of plastic waste are discussed below:

8.1. Utilization of Plastic Waste in Road Construction: -

Plastic waste is collected and segregated (except chlorinated/brominated plastic waste) from mixed MSW. The segregated plastic waste is stored and should be transported to the location working site for drying. The dried plastic waste is shredded to 2-4 mm size and added to heated stone aggregate followed by mixing. Further, the coated aggregate is mixed with hot bitumen, which is used for laying and compaction. The use of plastic waste in road construction shall follow the IRC: SP:98-

2013, titled as "Guidelines for the use of waste plastic in hot bituminous mix (dry mixing) in wearing courses". Presently, several roads have been constructed by using plastic waste with bitumen in many of the States/UTs, such as: Tamil Nadu, Himachal Pradesh, Nagaland, West Bengal, Pondicherry etc. A process flow diagram for construction of polymer-bitumen road is shown at **Figure-2**.

Figure 2. Process Flow Diagram for Construction of Polymer-bitumen Road

Salient Features of Polymer-Bitumen Road: -

- Stronger road with increased Marshal Stability Value.
- Better resistance towards rain water and water stagnation.
- No stripping and no potholes.
- Increased binding and better bonding of the mix.
- Reduction in pores in aggregate and hence less rutting and raveling.
- For 1km x 3.75m road, 1 ton of plastic is used, which leads to saving of 1 ton of bitumen.
- Cost of road construction is decreased due to saving of bitumen.
- Value addition to the waste plastics.

8.2. Co-processing of Plastic Waste in Cement Kilns: -

Co-processing refers to the use of waste materials in industrial processes as alternative fuels and raw material (AFR) to recover energy and material from them. Due to the high temperature and long residence time in cement kiln, all types of wastes can be effectively disposed without any harmful emissions. As per the Basal 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. In cement plants, plastic waste is used as Alternate Fuel and Raw-material (AFR), subjected to higher temperature around 1400ºC-1500ºC. During the process, energy is recovered while burning of plastic waste and its inorganic content get fixed with clinker. It requires an automatic feeding mechanism for feeding plastic waste to cement kilns. This technology is used successfully in some of the States where, cement plants (have facility for co-processing of waste) are present, such as: Gujarat, Tamil Nadu, Karnataka, Chhattisgarh, Himachal Pradesh, Madhya Pradesh, Odisha etc. Flow diagram for co-processing of plastic waste in cement kilns is shown at **Figure-3.**

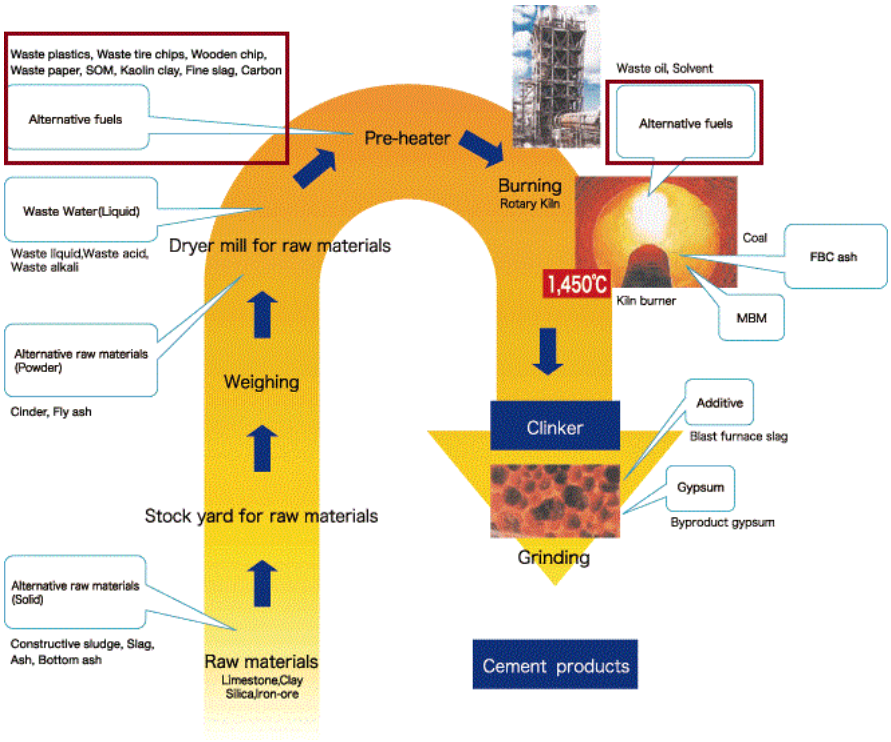

Figure 3. Flow Diagram for Co-processing of Plastic Waste in Cement Kilns

8.3. Conversion of Plastic Waste into Fuel-oil: Refused-derived Fuel (RDF): -

For converting plastic waste into fuel-oil (RDF), plastic waste is collected and segregated. The segregated plastic waste is then fed into multi fractionalization, where the unwanted material is rejected for better handling & processing. The segregated plastic waste (only HD, LD, PP and multilayer packaging except PVC) is then fed into in-vessel for depolymerisation system. The Catalytic Gasolysis in-vessel is designed to handle polymers. The selection of catalyst depends on the type of raw material used. The reactor operates at high temperature and in absence on Air. At high temperature, the polymers are Gasolysied to small chain hydro carbon linkage. The vapors produced are condensed in the Condensers and collected as crude oil. There are three types of condensing takes place where first cut gives fuel oil (FO), second cut gives light diesel oil (LDO) and third constitutes of highest grade diesel oil. The total percentage of this is generally at 40% to 50% of input depending on the input quality of plastics and contaminations. The non-condensable remains are then passed through scrubber for removal of gases like Chlorine, Gas-Fuel etc. This Gas-Fuel is used in process for heating.

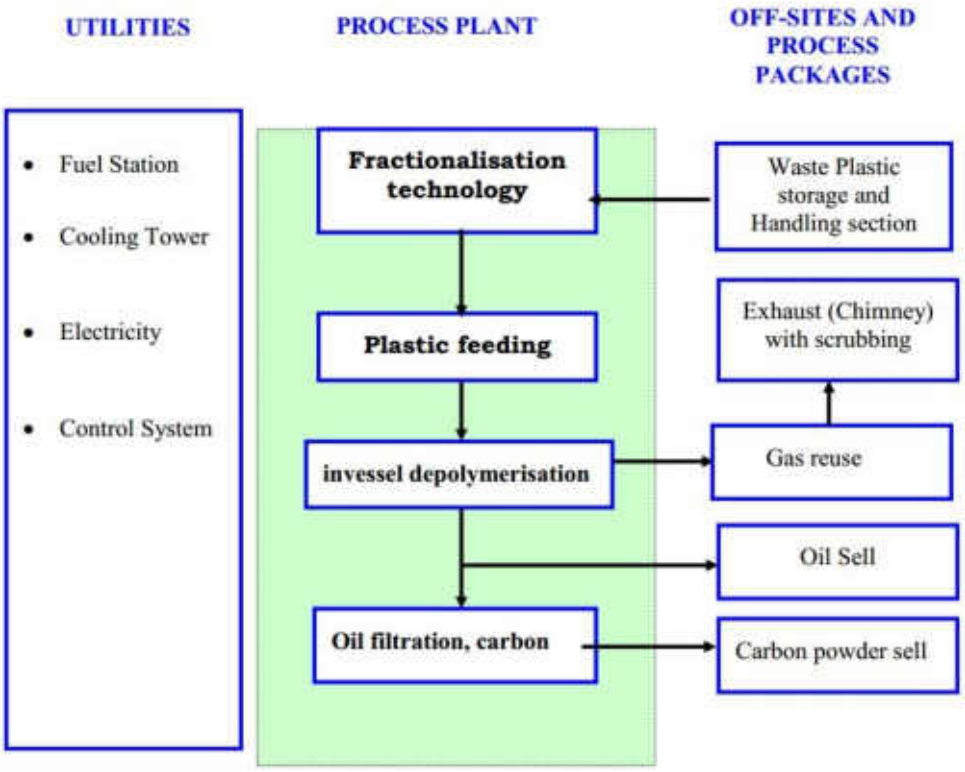

Figure 4. Process block diagram for Conversion of plastic waste into fuel-oil

This technology is used by few municipalities like Vadodara (Gujarat), NDMC (New Delhi), etc. Process block diagram for Conversion of plastic waste into liquid fuel-oil is shown at **Figure 4.**

Cost of plastic waste to liquid RDF plant: -

From 100 kg of mixed plastic waste approximately 35L of LDO, 40kg of LPG, 20kg of carbon and 5L of water is generated. Plant establishment cost for conversion of plastic waste into fuel-oil of input capacity of 100 kg/day (raw material-mixed plastic waste) is approximately 18 lacs and monthly operational cost is around 87,000. Return back period for such plant is from 3 to 4 years.

8.4. Disposal of plastic waste through Plasma Pyrolysis Technology (PPT): -

Plasma pyrolysis technology is the disintegration of organic/inorganic compounds into gases and non- leachable solid residues in an oxygen-starved environment. Plasma pyrolysis utilizes large fraction of electrons, ions and excited molecules together with the high energy radiation for decomposing chemicals. In this process the fourth state of matter i.e. plasmas (core temperature is around 20,000°K) is used for dissociating molecular bonds. Different types of plastic waste such as polyethylene bags, soiled plastic, metalized plastic, multi-layer plastic and PVC plastic can be disposed through PPT.

In Plasma Pyrolysis, firstly the plastics waste is fed into the primary chamber at 850^{o}C through a feeder. The waste material dissociates into carbon monoxide, hydrogen, methane, higher hydrocarbons etc. Induced draft fan drains the pyrolysis gases as well as plastics waste into the secondary chamber where these gases are combusted in the presence of excess air. The inflammable gases are ignited with high voltage spark. The secondary chamber temperature is maintained at 1050^{o}C. The hydrocarbon, CO and hydrogen are combusted into safe carbon dioxide and water. The process conditions are maintained such that it eliminates the possibility of formation of toxic dioxins and furans molecules (in case of chlorinated waste). This process is used by few Municipalities and hospitals, however, this can be useful for tourist place, hill stations, pilgrimage, coasts and other remote places. The process flow diagram of plasma pyrolysis for disposal of plastic waste is shown at **Figure 5.**

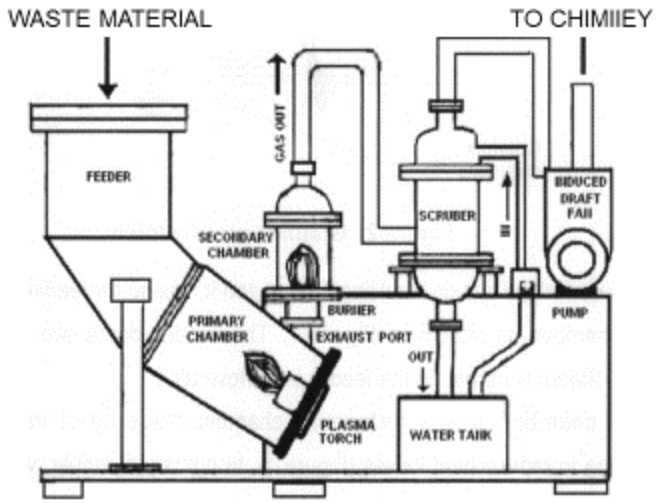

Figure 5. Process Flow Diagram of Plasma Pyrolysis for Disposal of Plastic Waste

Cost of plasma pyrolysis plant for the disposal of plastic waste: -

Approximately plant cost of capacity 1 Ton/day is 1.7 Crore and 6.5 Crore for capacity of 10 Tons/day plant, excluding operational cost. Payback period of plasma pyrolysis plant of higher capacity (>1Ton/day) is around 4 to 5 years. With energy recovery system, plasma pyrolysis plant will be profitable.

Merits of Plasma Pyrolysis Technology: -

- The plasma pyrolysis system can resolve the problems associated with particularly non-recyclable and low grade plastic waste.
- Generation of extremely high temperature in oxygen starved environment makes this technology useful for the safe destruction of plastic wastes.
- This technology (PPT) can safely destroy chlorinated as well as multi-layer plastic wastes.
- The plasma pyrolysis system can be installed in tourist/hilly locations
- PPT for the disposal of plastic waste along in conjunction with energy recovery makes it economically viable in higher capacity systems.

9. Constraints in Use of Plastic Waste Disposal Technologies:

Non-availability of required infrastructure including segregated plastic waste is a major issue due to which plastic waste disposal technologies are not used by most of the Municipalities. It is well known that majority of the Municipal Authorities don't have proper system for collection, segregation and disposal of plastic waste. Therefore, segregated plastic waste is not available to be

used in these technologies. Besides, the modalities for disposal of plastic waste have also not been finalized by Municipal Authorities. Some of the technologies like co-processing of plastic waste is limited to the States only where cement kilns having clinker facilities are located. In other States, the transportation of plastic waste to the cement kilns having clinker facilities becomes costly affair.

10. Alternate to Conventional Petro-based Plastic Carrybags/films:

An alternate to petro-based plastic carrybags/films has been introduced i.e. compostable (100% bio-based)carrybags/films conforming IS/ISO: 17088.The PWM Rules 2016 also encourages the use of compostable carrybags and products by exempting minimum thickness criteria of 50µm.Further, as per provision 4 (h) of PWM Rules, 2016, the manufacturers or sellers of compostable plastic carry bags shall obtain a certificate from the Central Pollution Control Board (CPCB) before marketing or selling their products. The manufacturers/sellers of compostable carrybags/products are required to apply to CPCB as per Standard Operating Procedure (SOP) available on CPCB's Website (http://cpcb.nic.in/Plastic_waste.php). Thereafter, certificate will be issued to manufacturer/seller, those fulfilling criteria as per SOP. Presently, the manufacturers of compostable films/carrybags are being done by few industries due to cost constraints, however if the import duty on raw-material like PLA etc. is reduced, then manufacturing and use of compostable films/carrybags can be encouraged. CPCB has issued 'Certificate' under Rule 4(h) of PWM Rules, 2016 to firms for marketing and selling of compostable carrybags/films in Indian market. The list of firms is given on CPCB's website.

11. Do's and Don'ts.

S.no	Do's	Don't
1	Use >50um plastic carrybags/sheet/ or like.	Don't use <50um plastic carrybags/sheet or like
2	Use Virgin plastic carrybags for storing/packaging/food stuffs.	Don't use colored & recycled for storing/packaging/food stuffs.
3	Plastic can be recycled to 2-3 time & then disposed or dumped on landfill and cause environmental problems.	Dumping of PW leads to infertility of soil, contaminate underground water quality due to leachate, chocking of drains, death of cattle's due to ingestion, burning of PW in open areas etc.
4	Collect PW is separate bins	Don't mix with bio-degradable waste.
5	Plastic can be co-processed in cement kilns.	Burning of plastic waste may contaminate air quality & cause a pulmonary cancer mesothelioma

		asthma liver and other types of cancer
6	Carry a compostable, jute, cloth bag, compostable material bag, while going for purchasing.	Don't ask for plastic carry bag from shopkeeper or vender.
7	Avoid buying items in packaged plastic	Buy food in glass jars or any other material rather than plastic
8	Don't litter plastic waste on oceans and sea beaches.	Sea turtles and marine mammals ingest plastic bags thinking they are food.
9	Use and encourage bio based made carrybags/films/packaging etc.	Do not use petro-based of plastic products to save fossil fuel and mother earth.

12. Recommendations:

- SPCBs/PCCs are required to interact with Concerned Municipalities and to provide technical support to municipalities in setting-up of proper plastic waste management system for segregation, collection, transportation, disposal of PW as per PWM Rules, 2016.
- SPCBs/PCCS can ask State Urban Development Department to constitute State Level Advisory Body for implementation of PWM Rules, 2016.
- SPCBs/PCCS should constitute vigilance squad in collaboration with Concerned Municipalities to check surprisingly thickness of carrybags (both manufacturing & stocking), for not allowing <50 µm thickness carry bags.
- SPCBS/PCCs can organize Mass-Awareness programmer in various districts involving Municipalities & Stake-holders for not using less than fifty micron carry bags.
- Municipal Authorities shall set-up plastic waste management system and disposed PW using various technology such as Road Construction, Co-processing, PW into Liquid Fuel etc.
- Promote eco-friendly compostable carrybags (conforming IS/ISO:17088) and certified by CPCB.
- Imposing penalties against the defaulters and non-complying units.
- Open burning of PW shall be strictly prohibited.

Annexure-I

FORM - I

[See rules 13 (2)]

APPLICATION FOR REGISTRATION FOR PRODUCERS or Brand Owners

From: .....

.....

.....(Name and full address of the occupier)

To

The Member Secretary,

..... Pollution Control Board or Pollution Control Committee

.....

.....

Sir,

I /We hereby apply for registration under rule 9 of the Plastic Waste Management Rules, 2015

1. Producers

PART – A GENERAL		
1.(a)	Name and location of the unit	
(b)	Address of the unit	
(c)	Registration required for manufacturing of: (i) Carry bags; (a) petro- based, (b) Compostable (ii) Multilayered plastics	
(d)	Manufacturing capacity	
(e)	In case of renewal, previous registration number and date of registration	
2.	Is the unit registered with the District Industries Centre of the State Government or Union territory? If yes, attach a copy.	
3.(a)	Total capital invested on the project	
(b)	Year of commencement of production	
4. (a)	List and quantum of products and by-products	
(b)	List and quantum of raw materials used	
5.	Furnish a flow diagram of manufacturing process showing input and output in terms of products and waste generated including for captive power	

	generation and water.	
6.	Status of compliance with these rules- Thickness – fifty micron (Yes/No)	
	PART – B PERTAINING TO LIQUID EFFLUENT AND GASEOUS EMISSIONS	
7.	(a) Does the unit have a valid consent under the Water (Prevention and control of Pollution) Act, 1974 (6 of 1974)? If yes, attach a copy	
	(b) Does the unit have a valid consent under the Air (Prevention and Control of Pollution) Act, 1981 (14 of 1981)? If yes, attach a copy	
	PART – C PERTAINING TO WASTE	
8.	Solid Wastes or rejects: (a) Total quantum of waste generated (b) Mode of storage within the plant (c) Provision made for disposal of wastes	
9.	Attach or Provide list of person supplying plastic to be used as raw material to manufacture carry bags or plastic sheet of like or multilayered packaging	
10.	Attach or provide list of personnel or brand Owners to whom the products will be supplied	
11.	Action plan on collecting back the plastic wastes	
		Name and Signature Designation
Date : Place :		

II Brand Owners:

	PART – A GENERAL	
1.	Name, address and Contact number	
2	In case of renewal, previous registration number and date of registration	
3	Is the unit registered with the District Industries Centre of the State Government or Union	

	territory? If yes, attach a copy.	
4.(a)	Total capital invested on the project	
(b)	Year of commencement of production	
5. (a)	List and quantum of products and by-products	
(b)	List and quantum of raw materials used	
PART – B PERTAINING TO LIQUID EFFLUENT AND GASEOUS EMISSIONS		
5	Does the unit have a valid consent under the Water (Prevention and control of Pollution) Act, 1974 (6 of 1974)? If yes, attach a copy	
6	Does the unit have a valid consent under the Air (Prevention and Control of Pollution) Act, 1981 (14 of 1981)? If yes, attach a copy	
PART – C PERTAINING TO WASTE		
7.	Solid Wastes or rejects: (c) Total quantum of waste generated (d) Mode of storage within the plant (d) Provision made for disposal of wastes	
8.	Attach or Provide list of person supplying plastic material	
9	Action plan on collecting back the plastic wastes	
		Name and Signature Designation Date : Place :

Annexure-II

FORM - II

[see rule 13 (3)]

APPLICATION FORM FOR REGISTRATION OF UNITS ENGAGED IN PROCESSING OR RECYCLING OF PLASTIC WASTE

1.	Name and Address of the unit				
2.	Contact person with designation, Tel./Fax /email				
3.	Date of commencement				
4.	No. of workers (including contract labour)				
5.	Consents Validity	a. Water (Prevention & Control of Pollution) Act, 1974; Valid up to _____ b. Air (Prevention & Control of Pollution) Act, 1981; Valid up to_____ c. Authorization ; valid up to ….			
6.	Manufacturing Process	Please attach a flow diagram of the manufacturing process flow diagram for each product.			
7.	Products and installed capacity of production (MTA)	Products		Installed capacity	
8.	Waste Management:	S No	Type	Category	Qty.
	a. Waste generation in processing plastic-waste	(i)			
		(ii)			
		(iii)			
	b. Waste Collection and transportation (attach details)				
	c. Waste Disposal details	S No	Type	Category	Qty
		(i)			

		(ii)			
	d. Provide details of the disposal facility, whether the facility is authorized by SPCB or PCC				
	e. Please attach analysis report of characterization of waste generated (including leachate test if applicable)				
9.	Details of plastic waste proposed to be acquired through sale, auction, contract or import, as the case may be, for use as raw material	(i) Name (ii) Quantity required /year			
10.	Occupational safety and health aspects	Please provide details of facilities			
11.	Pollution Control Measures				
	Whether the unit has adequate pollution control systems or equipment to meet the standards of emission or effluent.	If Yes, please furnish details			
	Whether unit is in compliance with conditions laid down in the said rules.	Yes/No			
	Whether conditions exist or are likely to exist of the material being handled or processed posing adverse immediate or delayed impacts on the environment.	Yes/No			
	Whether conditions exist (or are likely to exist) of the material being handled or processed by any means capable of yielding another material (e.g. leachate) which may possess eco-toxicity.	Yes/No			
12.	Any other relevant information including fire or accident mitigative measures				
13.	List of enclosures as per rule				

Name and Signature

Designation

Date :
Place :

FORM - III

[See rules 13(4)]

APPLICATION FOR REGISTRATION FOR MANUFACTURERS of plastic raw materials

From: .....

.....

.....(Name and full address of the occupier)

To

The Member Secretary,

..... Pollution Control Board or Pollution Control Committee

.....

.....

Sir,

I/We hereby apply for registration under the Plastic Waste Management Rules, 2011

PART – A GENERAL		
1.(a)	Name and location of the unit	
(b)	Address of the unit	
(c)	In case of renewal, previous registration number and date of registration	
2.	Is the unit registered with the DIC or DCSSI of the State Government or Union territory? If yes, attach a copy.	
3.(a)	Total capital invested on the project	
(b)	Year of commencement of production	
(c)	List of producers and quantum of raw materials supplied to producers	
		Name and Signature Designation
Date : Place :		

Form - IV

[See rules 17 (1)]

Format of Annual Report by Operator of plastic waste processing or recycling Facility to the Local Body

Period of Reporting:

(1)	Name and Address of operator of the facility	
(2)	Name of officer in-charge of the facility (Telephone/Fax/Mobile/ E-mail)	
(3)	Capacity:	
(4)	Technologies used for management of plastic waste:	
(5)	Quantity of plastic waste received during the year being reported upon along with the source	
(6)	Quantity of plastic waste processed (in tons): - Plastic waste recycled(in tons) - Plastic waste processed (in tons) - Used (in tons)	
(7)	Quantity of inert or rejects sent for final disposal to landfill sites:	
(8)	Details of land fill facility to which inert or rejects were sent for final disposal: - Address -Telephone	
(9)	Attach status of compliance to environmental conditions, if any specified during grant of Consent or registration	

Signature of Operator

Dated :
Place:

Form - V

[See rules 17(2)]

FORMAT FOR ANNUAL REPORT ON PLASTIC WASTE MANAGEMENT TO BE SUBMITTED BY THE LOCAL BODY

Period of Reporting:

(1)	Name of the City or Town and State:	
(2)	Population	
(3)	Area in sq. kilometers	
(4)	Name & Address of Local body Telephone No. Fax No. E-mail:	
(5)	Total Numbers of the wards in the area under jurisdiction	
(6)	Total Numbers of Households in the area under jurisdiction	
(7)	Number of households covered by door to door collection	
(8)	Total number of commercial establishments and Institutions in the area under jurisdiction -Commercial establishments - Institutions	
(9)	Number of commercial establishments and Institutions covered by door to door collection -Commercial establishments - Institutions	
(10)	Summary of the mechanisms put in place for management of plastic waste in the area under jurisdiction along with the details of agencies involved in door to door collection	
(11)	Attach details of infrastructure put in place for management of plastic waste generated in the area under jurisdiction	
(12)	Attach details of infrastructure required, if any along with justification	
(13)	Quantity of Plastic Waste generated during the year from area under jurisdiction (in tons)	
(14)	Quantity of Plastic Waste collected during the year from area under jurisdiction (in tons)	
(15)	Quantity of plastic waste channelized for recycling during the year (in tons)	

(16)	Quantity of plastic waste channelized for use during the year (in tons)	
(17)	Quantity of inert or rejects sent to landfill sites during the year (in tons)	
(18)	Details of each of facilities used for processing and disposal of plastic waste **Facility-I** i) Name of operator ii) Address with Telephone Number or Mobile iii) Capacity iv) Technology Used v) Registration Number vi) Validity of Registration (up to) **Facility-II** i) Name of operator ii) Address with Telephone Number or Mobile iii) Capacity iv) Technology Used v) Registration Number Validity of Registration (up to)	
(19)	Give details of: Local body's own manpower deployed for collection including street sweeping, secondary storage, transportation, processing and disposal of waste.	
(20)	Give details of: Contractor or concessionaire's manpower deployed for collection including street sweeping, secondary storage, transportation, processing and disposal of waste.	
(21)	Mention briefly, the difficulties being experienced by the local body in complying with provisions of these rules including the financial constrains, if any	
(22)	Whether an Action Plan has been prepared for improving solid waste management practices in the city? If yes (attach copy) Date of revision:	

Signature of CEO or Municipal Commissioner or
Executive Officer or Chief Officer

Date:
Place:

Annexure-VI

Form-VI

STATE-WISE STATUS OF IMPLEMENTATION OF PLASTIC WASTE MANAGEMENT RULES, 2016 FOR THE YEAR ... ANNUAL REPORT Format

Name of the SPCB or PCC	Estimated Plastic Waste generation Tons Per Annum (TPA)	No. Of registered Plastic Manufacturing or Recycling (including multilayer, compostable) units. (Rule 9)			No. of Unregistered plastic manufacturing Recycling units. (in residential or unapproved areas)	Details of Plastic Waste Management (PWM) e.g. Collection, Segregation, Disposal (Co-processing road construction etc.) (Rules 6) (Attach separate sheet)	Partial or complete ban on usages of Plastic Carry Bags (through Executive Order) (Attach copy of notification or executive order)	Status of Marking Labelling on carry bags (Rule 8) [Specify the number of units or not complied)complied	Explicit Pricing of carry bags (Rule 10)	Details of the meeting of State Level Advisory Body (SLA) along with its recommendations on Implementation (Rule 11)	No. of violations and action taken on non-compliance of provisions of these Rules	Number of Municipal Authority or Gram Panchayatunder jurisdiction and Submission of Annual Report to CPCB (Rule 12)
		Plastic units	Compostable Plastic Units	Multilayer Plastic units								
(1)	(2)	(3)			(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)

[F.No. 17-2/2001-HSMD]

Bishwanath Sinha
Joint Secretary to Government of India

Annexure-VII

Table: Plastic Waste Generation in Sixty Major Cities of India (2010-2012)

S. No.	Name of City	Total Municipal Solid Waste (Tonnes per day)	Plastic Waste (Percentage of Municipal Solid Waste)	Plastic Waste (Tonnes per day)
1.	Kavaratti	2	12.09	0.24
2.	Dwarka	18	8.08	1.45
3.	Daman	25	4.64	1.16
4.	Panjim	25	4.47	1.12
5.	Gangtok	26	8.95	2.33
6.	Jamshedpur	28	3.36	0.94
7.	Silvassa	35	6.11	2.14
8.	Port Blair	45	10.07	4.53
9.	Kohima	45	5.01	2.26
10.	Shimla	50	4.45	2.23
11.	Meerut	52	6.42	3.34
12.	Gandhinagar	97	4.81	4.66
13.	Shillong	97	5.44	5.27
14.	Itanagar	102	5.35	5.46
15.	Agartala	102	5.71	5.83
16.	Aizwal	107	7.95	8.50
17.	Imphal	120	5.13	6.16
18.	Ranchi	140	5.92	8.29
19.	Kochi	150	6.29	9.43
20.	Dhanbad	150	5.02	7.52
21.	Guwahati	204	5.04	10.27
22.	Asansol	210	6.01	12.62
23.	Dehradun	220	6.67	14.66
24.	Patna	220	5.73	12.60
25.	Raipur	224	10.61	23.76
26.	Rajkot	230	6.93	15.93
27.	Thiruvananthapuram	250	6.02	15.06
28.	Pondicherry	250	10.46	26.15
29.	Chandigarh	264	3.10	8.18
30.	Jammu	300	7.23	21.68
31.	Jaipur	310	5.03	15.58
32.	Vishakhapatnam	334	9.03	30.17
33.	Nashik	350	5.82	20.38
34.	Bhopal	350	6.59	23.08

35.	Allahabad	350	5.39	18.86
36.	Jabalpur	400	5.18	20.70
37.	Bhubaneswar	400	7.98	31.92
38.	Madurai	450	5.06	22.77
39.	Varanasi	450	5.76	25.92
40.	Agra	520	7.86	40.89
41.	Srinagar	550	5.12	28.14
42.	Amritsar	550	4.44	24.42
43.	Vadodara	600	4.57	27.41
44.	Vijayawada	600	7.29	43.72
45.	Nagpur	650	7.07	45.96
46.	Coimbatore	700	9.47	66.31
47.	Faridabad	700	11.29	79.03
48.	Indore	720	8.81	63.40
49.	Ludhiana	850	5.96	50.68
50.	Surat	1200	12.47	149.62
51.	Lucknow	1200	5.90	70.84
52.	Pune	1300	7.80	101.35
53.	Kanpur	1600	6.67	106.66
54.	Ahmedabad	2300	10.50	241.50
55.	Kolkata	3670	11.60	425.72
56.	Bangalore	3700	8.48	313.87
57.	Hyderabad	4200	4.75	199.33
58.	Chennai	4500	9.54	429.39
59.	Mumbai	6500	6.28	408.27
60.	Delhi	6800	10.14	689.52
	Total MSW	50592		
	Average PW generation		**6.92**	**4059.18**

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