The Municipal Solid Wastes (Management and Handling) Rules-2000

Central Government notified in exercise of the Powers conferred by Section 3, 6 and 25 of the Environment (Protection) Act, 1986 with the objective of regulating the management and handling of the Municipal Solid Wastes.

Applicability:-
Apply to all municipal authorities responsible for collection, segregation, storage, transportation processing and disposal of municipal solid wastes.

Responsibility of Municipal Authority:-
1. Every municipal authority shall, within the territorial area of the municipality, be responsible for the implementation of the provisions of these rules, and for any infrastructure development for collection, storage, segregation, transportation, processing and disposal of municipal solid wastes.
2. the municipal authority or an operator of a facility shall make an application in Form-I, for grant of authorisation for setting up waste processing and disposal facility including landfills from the State Board or the Committee in order to comply with the implementation programme laid down in Schedule-I.
3. the municipal authority shall comply with these rules as per the implementation schedule laid down in Schedule-I.
4. The municipal authority shall furnish its annual report in Form-II.
(a) to the Secretary-incharge of the Department of Urban Development of the concerned State or as the case may be of the Union Territory, in case of a metropolitan city; or
(b) to the District Magistrate or the Deputy Commissioner concerned in case of all other town and cities, with a copy to the State Board or the Committee on or before the 30th day of June every year.

Management of Municipal Solid Wastes:-
(1) Any municipal solid waste generated in a city or a town, shall be managed and handled in accordance with the compliance criteria and the procedure laid down in Schedule-II
(2) The waste processing and disposal facilities to be set up by the municipal authority on their own or through an operator of a facility shall meet the specifications and standards as specified in Schedule-III and Schedule-IV.

Municipal Solid Wastes - Schedule I

Implementation Schedule

S.No.	Compliance Criteria	Schedule
1.	Setting up of waste processing and disposal facilities	By 31.12.2002 or earlier
2.	Monitoring the performance of waste processing and disposal facilities	Once in six months
3.	Improvement of existing landfill sites as per provisions of these rules	By 31.12.2002 or earlier
4.	Identification of landfill sites for future use and making site(s) ready for operation	By 31.12.2002 or earlier

Municipal Solid Wastes - Schedule II
Management of Municipal Solid Wastes

Collection of Municipal Solid Wastes

1. Littering of municipal solid waste shall be prohibited in cities, town and in urban areas notified by the State Governments. To prohibit littering and facilitate compliance, the following steps shall be taken by the Municipal Authority, namely:-

(i) Organising house-to-house collection of municipal solid wastes through any of the methods, like community bin collection (central bin), house-to-house collection, collection on regular pre-informed timings and scheduling by using bell ringing of musical vehicle (without exceeding permissible noise levels);

(ii) Devising collection of waste from slums and squatter areas or localities including hotels, restaurants, office complexes and commercial areas;

(iii) Wastes from slaughter houses, meat and fish markets, fruits and vegetable markets, which are biodegradable in nature shall be managed to make use of such wastes;

(iv) Bio-medical wastes and industrial wastes shall not be mixed with municipal solid wastes and such wastes shall follow the rules separately specified for the purpose;

(v) Collected waste from residential and other areas shall be transferred to community bin by hand fdiven containerised carts or other small vehicles;

(vi) Horticultural and construction or demolition wastes or debris shall be separately collected and disposed off following proper norms. Similarly, wastes generated at dairies shall be regulated in accordance with the State laws;

(vii) Waste (garbage, dry leaves) shall not be burnt;

(viii) Stray animals shall not be allowed to move around waste storage facilities or at any other place in the city or town and shall be managed in accordance with the State laws.

2. The Municipal authority shall notify waste collection schedule and the likely method to be adopted for public benefit in a city or town

3. It shall be the responsibility of generator of waste to avoid littering and ensure delivery of wastes in accordance with the collection and segregation system to be notified by the municipal authority as per para 1(2) of the Schedule.

Segregation of Municipal Solid Wastes

In order to encourage the citizens, municipal authority shall organise awareness programmes for segregation of wastes and shall promote recycling or reuse of segregated materials. The municipal authority shall undertake phased programme to ensure community participation in waste segregation. for this purpose, regular meetings at quarterly intervals shall be arrange by the

municipal authorities with representatives of lacal resident welfare associations and non-governmental organisations.

Storage of Municipal Solid Wastes

Municipal authorities shall establish and maintain storage facilities in such a manner as they do not create unhygienic and insanitary conditions around it. following criteria shall be taken into account while establishing and maintaining storage facilities, namely:-

(i) Storage facilities shall be created and established by taking into account quantities of waste generation in a given area and the population densities. A storage facility shall be so place that it is accessible to users.

(ii) Storage facilities to be set up by municipal authorities or any other agency shall be so designated that wastes stored are not exposed to open atmosphere and shall be aesthetically acceptable and user-friendly;

(iii) Storage facilities or 'bins' shall have 'easy to operate' design for handling, transfer and transportation of waste bins for storage of bio-degradable wastes shll be painted green, those for storage of recyclable wastes shll be painted white and those for storage of other wastes shall be painted black;

(iv) Manual handling of waste shall be prohibited. If unavoidable due to constraints, manual handling shall be carried out under proper precaution with due care for safety of workers.

Transportation of Municipal Solid Wastes

Vehicles used for transportation of wastes shall be covered. Waste should not be visible to public, nor exposed to open environment prevention their scattering. the following criteria shall be met, namely:-

(i) The storage facilities set up by municipal authorities shall be daily attended for clearing of wastes. The bins or containers wherever placed shall be cleaned before they start overflowing;

(ii) Transportation vehicles shall be so designed that multiple handling of wastes, prior to final disposal, is avoided.

Processing of Municipal Solid Wastes

Municipal authorities shall adopt suitable technology or combination of such technologies to make use of wastes so as to minimize burden on land fill. Following criteria shall be adopted, namely:-

(i) The biodegradable wastes shall be processed by compositing vermicomposting, anaerobic digestion or any other appropriate biological processing for stabilization of wastes. It shall be ensured that compost or any other end product shall comply with standards as specified in Schedule-IV;

(ii) Mixed waste containing recoverable resources shall follow the route of recycling. Incineration with or without energy recovery including pelletisation can also be used for processing wastes in specific cases. Municipal authority or the operator of a facility wishing to use other state-of-the-art technologies shall approach the Central Pollution Control Board to get the standards laid down before applying for grant of authorisation.

Disposal of Municipal Solid Wastes

Land filling shall be restricted to non-biodegradable, inert waste and other waste that are not suitable either for recycling or for biological processing. Land filling shall also be carried out for residues of waste processing facilities as well as pre-processing rejects from waste processing facilities. Land filling of mixed waste shall be avoided unless the same is found unsuitable for waste processing. Under unavoidable circumstances or till installation or alternate facilities, land filling shall be done following proper norms. Landfill sites shall meet the specifications as given in Schedule-II

Municipal Solid Wastes - Schedule III
Specifications for Landfill Sites

Site Selection

1. In areas falling under the jurisdiction of 'Development Authorities, it shall be the responsibility of such Development Authorities to identify the landfill sites and hand over the sites to the concerned municipal authority for development, operation and maintenance. Elsewhere, this responsibility shall lie with the concerned municipal authority.
2. Selection of land fill sites shall be based on examination of environmental issues. The Department of Urban Development of the State or the Union Territory shall co-ordinate with the concerned organisations for obtaining the necessary approvals and clearances.
3. The landfill site shall be planned and designed with proper documentation of a phased construction plan as well as a closure plan.
4. The landfill sites shall be selected to make use of nearby wastes processing facility. Otherwise, wastes processing facility shall be planned as an integral part of the landfill site.
5. The existing landfill sites which continue to be used for more than five years shall be improved in accordance of the specifications given in this Schedule.
6. Biomedical wastes shall be disposed off in accordance with the Bio-medical Wastes (Management and Handling) Rules, 1998 and hazardous wastes shall be managed in accordance with the Hazardous Wastes (Management and Handling Rules, 1989), as amended from time to time.
7. The landfill site shall be large enough to last for 20-25 years.
8. The landfill site shall be away from habitation clusters, forest areas, water bodies, monuments, National Parks, Wetlands and places of important cultural, historical or religious interest.
9. A buffer zone of no-development shall be maintained around landfill site and shall be incorporated in the Town Planning Department's land use plans.
10. Landfill site shall be away from airport including airbase. Necessary approval for airport or airbase authorities prior to the setting up of the landfill site shall be obtained in cases where the site is to be located within 20 km of an airport or airbase.

Facilities at the Site

11. Land fill site shall be fenced or hedged and provided with proper gate to monitor incoming vehicles or other modes of transportation.
12. The landfill site shall be well protected to prevent entry of unauthorised persons and stray animals.
13. Approach and other internal roads for free movement of vehicles and other machinery shall exist at the landfill site.
14. The land fill site shall have wastes inspection facility to monitor wastes brought in for landfill, office facility for record keeping and shelter for keeping equipment and machinery including pollution monitoring equipments.
15. Provisions like weigh bridge to measure quantity of waste brought at landfill site, fire protection equipments and other facilities as may be required shall be provided.
16. Utilities such as drinking water (preferably bathing facilities for workers) and lighting arrangements for easy landfill operations when carried out in night hours shall be provided.
17. Safety provisions including health inspections of workers at landfill site shall be periodically made.

Specification for land filling

18. Waste subjected to land filling shall be compacted in thin layers using landfill compactors to achieve high density of the wastes. In high rainfall areas where heavy compactors can not be used, alternative measures shall be adopted.

19. Wastes shall be covered immediately or at the end of each working day with minimum 10cm of soil, inert debris or construction material till such time waste processing facilities for composting or recycling or energy recovery are set up as per Schedule-I.
20. Prior to the commencement of monsoon season, an intermediate cover of 40-65 cm thickness of soil shall be placed on the land-fill with proper compaction and grading to prevent infiltration during monsoon. Proper drainage berms shall be constructed to divert run-off away from the active cell of the landfill.
21. After completion of landfill, a final cover shall be designed to minimize infiltration and erosion. The final cover shall meet the following specifications, namely:-
(a)The final cover shall have a barrier soil layer comprising of 60 cms of clay or amended soil with permeability coefficient less that 1x10-7 cm/sec.
(b)On top of the barrier soil layer, there shall be a drainage layer of 15 cm.
(c)On top of the drainage layer, there shall be a vegetative layer of 45 cm to support natural plant growth and to minimize erosion.

Pollution prevention
22. In order to prevent pollution problems from landfill operations, the following provisions shall be made, namely:-
(a)Diversion of storm water drains to minimize leachate generation and prevent pollution of surface water and also for avoiding flooding and creation of marshy conditions;
(b)Construction of a non-permeable lining system at the base and walls of waste disposal area. For landfill receiving residues of waste processing facilities or mixed waste or waste having contamination of hazardous materials (such as aerosols, bleaches, polishes, batteries, waste oils, paint products and pesticides) minimum liner specifications shall be a composite barrier having 1.5 mm high density polyethylene (HDPE) geomembrane, or equivalent, overlying 90 cm of soil (clay or amended soil) having permeability coefficient not greater than 1x10-7 cm/sec. The highest level of water table shall be at least two meter below the base of clay or amended soil barrier layer;
(c)Provisions for management of leachates collection and treatment shall be made. The treated leachates shall meet the standards specified in Schedule-IV;
(d)Prevention of run-off from landfill area entering any stream, river, lake or pond.

Water Quality Monitoring

23. Before establishing any land fill site, baseline date of ground water quality in the area shall be collected and kept in record for future reference. The ground water quality within 50 meters of the periphery of landfill site shall be periodically monitored to ensure that the ground water is not contaminated beyond acceptable limit as decided by the Ground Water Board or the State Board or the Committee. Such monitoring shall be carried out to cover different seasons in a year that is, summer, monsoon and post-monsoon period.

24. Usage of ground water in and around land fill sites for any purpose (including drinking and irrigation) is to be considered after ensuring its quality. The following specifications for drinking water quality shall apply for monitoring purposes, namely:-

S.No.	Parameters	IS 10500:1991 Desirable limit (mg/l except for pH)
1	Arsenic	0.05
2	Cadmium	0.01
3	Chromium	0.05
4	Copper	0.05
5	Cyanide	0.05
6	Lead	0.05
7	Mercury	0.001
8	Nickel	---
9	Nitrate as NO_3	45.0
10	pH	6.5-8.5
11	Iron	0.3
12	Total Hardness (as $CaCO_3$)	300.0
13	Chlorides	250
14	Dissolved Solids	500
15	Phenolic Compounds (as C_6H_5OH)	0.001
16	Zinc	5.0
17	Sulphate (as SO_4)	200

Ambient Air Quality Monitoring

25. Installation of landfill gas control system including gas collection system shall be made at landfill site to minimize odour generation, prevent off-site migration of gases and to protect vegetation planted on the rehabilitated landfill surface.

26. The concentration of methane gas generated at landfill site shall not exceed 25 percent of the lower explosive limit (LEL).

27. The landfill gas from the collection facility at a landfill site shall be utilized for either direct thermal applications or power generation, as per viability. Otherwise, landfill gas shall be burnt (flared) and shall not be allowed to directly escape to the atmosphere or for illegal tapping. Passive venting shall be allowed if its utilization or flaring is not possible.

28. Ambient air quality at the landfill site and at the vicinity shall be monitored to meet the following specified standards, namely:-

S.No.	Parameter	Acceptable
(i)	Sulphur dioxide	120g/m^3 (24 hours)
(ii)	Suspended Particulate Matter	500g/m^3 (24 hours)
(iii)	Methane	Not to exceed 25 per cent of the lower explosive limit (equivalent to 650 mg/m^3)
(iv)	Ammonia daily average (sample duration 24 hrs)	0.4 mg/m^3 (400 g/m^3)
(v)	Carbon monoxide	1 hours average : 2 mg/m^3 8 hour average : 1 mg/m^3

29. The ambient air quality monitoring shall be carried out by the concerned authority as per the following schedule, namely:-

(a) Six times in a year for cities having population of more than fifty lakhs;

(b) Four times in a year for cities having population between ten and fifty lakhs;
(c) Two times in a year for town or cities having population between one and ten lakhs.

Plantation at Landfill Site

30. A vegetative cover shall be provided over the complete site in accordance with the following specifications, namely:-

(a) Selection of locally adopted non-edible perennial plants that are resistant to drought and extreme temperature shall be allowed to grow;

(b) The plants grown be such that their roots do not penetrate more than 30 cms. This condition shall apply till the landfill is stabilised;

(c) Selected plants shall have ability to thrive on low-nutrient soil with minimum nutrient addition;

(d) Plantation to be made in sufficient density to minimize soil erosion.

Closure of Landfill Site and Post-care

31. The post closure care of land fill site shall be conducted for at least fifteen years and long term monitoring or care plan shall consist of the following, namely:-

(a) Maintaining the integrity and effectiveness of final cover, making repairs and preventing run-on and run-off from eroding or otherwise damaging the final cover;

(b) Monitoring leachate collection system in accordance with the requirement;

(c) Monitoring of ground water in accordance with requirements and maintaining ground water quality;

(d) Maintaining and operating the landfill gas collection system to meet the standards.

32. Use of closed landfill sites after fifteen years of post-closure monitoring can be considered for human settlement or otherwise only after ensuring that gaseous and leachate analysis comply with the specified standards.

Special provisions for hilly areas

33. Cities and towns located on hills shall have location-specific methods evolved for final disposal of solid wastes by the municipal authority with the approval of the concerned State Board or the Committee. The municipal authority shall set up processing facilities for utilization of biodegradable organic wastes. The inert and non-biodegradable waste shall be used for building roads or filling-up of appropriate areas on hills. Because of constraints in finding adequate land in hilly areas, wastes not suitable for road-laying or filling up shall be disposed of in specially designed landfills.

Municipal Solid Wastes - Schedule IV

Standards for Composting Treated Leachates and Incineration

1.The waste processing or disposal facilities shall include composting, incineration, pelletisation, energy recovery or any other facility based on state-of-the-art technology duly approved by the Central Pollution Control Board.

2. In case of engagement of private agency by the municipal authority, a specific agreement between the municipal authority and the private agency shall be made particularly, for supply of solid waste and other relevant terms and conditions

3. In order to prevent pollution problems from compost plant and other processing facilities, the following shall be complied with, namely:-

(i)The incoming wastes at site shall be maintained prior to further processing. To the extent possible, the waste storage area should be covered. If, such storage is done in an open area, it shall be provided with impermeable base with facility for collection of leachate and surface water run-off into lined drains leading to a leachate treatment and disposal facility;

(ii)Necessary precautions shall be taken to minimize nuisance of odour, flies, rodents, bird menace and fire hazard;
(iii)In case of breakdown or maintenance of plant, waste intake shall be stopped and arrangements be worked out for diversion of wastes to the landfill site;
(iv)Pre-process and post-process rejects shall be removed from the processing facility or regular basis and shall not be allowed to pile at the site. Recyclables shall be routed through appropriate vendors. the non-recyclables shall be sent for well designed landfill site(s).
(v)In case of compost plant, the windrow area shall be provided with impermeable base. Such a base shall made of concrete or compacted clay, 50 cm thick, having permeability coefficient less than 10-7 cm/sec. The base shall be provided with 1 to 2 per cent slope and circled by lined drains for collection of leachate or surface run-off;
(vi)Ambient air quality monitoring shall be regularly carried out particularly for checking odour nuisance at down wind direction on the boundary of processing plant.
(vii)In order to ensure safe application of compost, the following specifications for compost quality shall be met, namely:-

Parameters	Concentration not to exceed * (mg/kg dry basis, except pH value and C/N ratio)
Arsenic	10.00
Cadmium	5.0
Chromium	50.0
Copper	300.0
Lead	100.0
Mercury	0.15
Nickel	50.0
Zinc	1000.0
C/N ratio	20-40
pH	5.5-8.5

* Compost (final product) exceeding the above stated concentration limits shall not be used for food crops. However, it may be utilized for purposes other than growing food crops.

4. The disposal of treated leachates shall follow the following standards namely:-

S.No.	Parameter	Standards (Mode of disposal)		
		Inland Surface water	Public Sewers	Land disposal
1.	Suspended solids, mg/l, max	100	600	200
2.	Dissolved solids (inorganic) mg/l, max.	2100	2100	2100
3.	pH value	5.5 to 9.0	5.5 to 9.0	5.5 to 9.0
4.	Ammonical nitrogen (as N), mg/l, max	50	50	---
5.	Total Kjeldahl Nitrogen (as N), mg/l, max.	100	---	---
6.	Biochemical oxygen demand (3 days at 27oc) max (mg/l)	30	350	100
7.	Chemical oxygen demand, mg/l, max	250	---	---
8.	Arsenic (as As), mg/l, max	0.2	0.2	0.2
9.	Mercury (as Hg), mg/l, max.	0.01	0.01	---
10.	Lead (as Pb), mg/l, max.	0.1	1.0	---
11.	Cadmium (as Cd), mg/l, max.	2.0	1.0	---
12.	Total Chromium (as Cr), mg/l, max	2.0	2.0	---
13.	Copper (as Cu), mg/l, max	3.0	3.0	---

14.	Zinc (as Zn), mg/l, max.	5.0	15	---
15.	Nickel (as Ni), mg/l, max.	3.0	3.0	---
16.	Cyanide (as CN), mg/l, max.	0.2	2.0	0.2
17.	Chloride (as Cl), mg/l, max	1000	1000	600
18.	Floride (as F), mg/l, max.	2.0	15	---
19.	Phenolic Compounds (as C6H5OH), mg/l, max.	1.0	5.0	---

Note: While discharging treated leachates into inland surface waters, quantity of leachates being discharges and the quantity of dilution water available in the receiving water body shall be given due consideration.

5. The incinerators shall meet the following operating and emission standards, namely:-

A. Operating Standards (1) The combustion efficiency (CE) shall be at least 99.00%

(2) The combustion efficiency is computed as follows

$$C.E. = \frac{\%CO_2}{\%CO_2 + \%CO} \times 100$$

B. Emission Standards Parameter **Concentration mg/Nm^3 at (12% CO_2 correction)** (1) Particulate Matter 150

(2) Nitrogen Oxides 450

(3) HCl 50

(4) Minimum stack height shall be 30 meters above ground.

(5) Volatile organic compounds in ash shall not be more than 0.01%

Note:

(1) Suitably designated pollution control devices shall be installed or retrofitted with the incinerator to achieve the above emission limits, if necessary.

(2) Wastes to be incinerated shall not be chemically treated with any chlorinated disinfectants.

(3) Chlorinated plastics shall not be incinerated.

(4) Toxic metals in incineration ash shall be limited within the regulatory quantities as specified in the Hazardous Waste (Management and Handling) Rules, 1989 as amended from time to time.

(5) Only low sulphur fuel like LDO, LSHS, Diesel shall be used as fuel in the incinerator.