

**Use of hazardous wastes as fuel in
cement kiln and environmental policy
on their rational use**

Central Pollution Control Board

Delhi

Hazardous Waste Generation in India

- **13,011 hazardous waste generating units located in 373 Distt. of 21 States.**
- **11,138 units given Authorisation by SPCBs under Hazardous Waste (Management & Handling) Rules, 2003 – mostly for temporary storage of hazardous waste within the plant premises.**
- **Total hazardous waste generation – 4.43 Million Tonnes / Annum**
- **Incinerable hazardous waste generation – 71,833 Tonnes / Annum**

Hazardous Waste Disposal Methods

Conventional:

- **Dedicated Hazardous Waste Incinerator**
- **Land fill**

Alternative:

- **Utilisation in Cement Kiln as Fuel**

High Calorific Value Hazardous Waste likely to be Used in Cement Kiln as Fuel

- **Petroleum Coke**
- **Paint sludge**
- **Slaughter house waste**
- **Waste oil**
- **ETP Sludge**
- **Sludge from Petrochemical, Oil refinery & other industries**
- **Spent solvent from Pesticide Industry**

Environmental Benefits of Using Hazardous Waste as Fuel in Cement Kiln

- **High temp. (flame temp. of 2000°C and material temp. up to 1400°C) and residence time of 4-5 seconds in an oxygen rich atmosphere ensure the destruction of organic compounds found in any waste.**
- **Any acid gases formed during combustion are neutralised by the raw material being of an alkaline nature and are incorporated into the cement clinker.**
- **Interaction of the flue gases and the raw material present in the kiln ensures that the non-combustible part of the residue is held back in the process and is incorporated into the clinker in a practically irreversible manner.**
- **No waste is generated that requires subsequent processing.**

Other Benefits

- **No requirement of new facility for hazardous waste disposal.**
- **Integrated solutions to waste management.**
- **Conservation of fossil fuel resources.**
- **Immobilisation of toxic and heavy materials.**
- **Reduction in energy/cement production costs.**

Disadvantage

- **Possibility of emissions of toxic metals, VOC and other toxic gases**

Precautions required to be taken for environmental safe use of combustible hazardous waste in cement kiln

- **Careful control of the cement plant operations.**
- **Careful control of the composition of the waste.**
- **Careful control of the emissions**
- **Careful control of the quality of the clinker**

International Experience

- **250 cement plants located in the European Union (EU) are using around 3 Million Tonnes of hazardous waste as alternate fuel.**
- **This is over 10% of the fuels used and the figure is rising steadily across the EU.**
- **Germany leading the way**

What to do in India?

- **Need to promote utilisation of high calorific value hazardous waste in cement kiln as fuel.**
- **Inventorisation of high calorific value hazardous waste.**

Environmental Policy for use of high calorific value hazardous waste in cement kiln as fuel

- **Hazardous waste generator and cement industry will submit application to SPCB to get approval/ authorization for trial run for utilization of hazardous waste in cement kiln as fuel. All relevant data such as characteristics of hazardous waste, its quantity etc. have to be submitted by the cement industry.**
- **After examining the case, SPCB may grant approval / authorization for trial run (2 weeks) subject to at least following conditions.**
- **Cement kiln have to meet the emission standards as per draft emission standards for hazardous waste incinerator.**

- **Plant Authorities have to monitor all the parameters mentioned in draft emission standards for Hazardous Waste Incinerator during non-use of hazardous waste and during use of hazardous waste in cement kiln so as to evaluate the likely impact on environment. For stack monitoring in respect of dioxins, a reputed laboratory / agency capable of monitoring and analysis of dioxins such as RRL, Trivandrum NEERI, Nagpur may be consulted.**
- **Plant Authorities have to monitor the ambient air quality during non-use and use of hazardous waste in cement kiln.**
- **Clinker shall meet the requirements of BIS norms.**
- **Manifest system shall be followed for the transportation of hazardous waste. Industry shall inform SPCB/CPCB in advance about the date for trial run so that SPCB/CPCB Officials may visit the plant and conduct monitoring, if required.**

- **After trial run industry will submit the flue gas emission data, ambient air quality data and quantity of hazardous waste utilized in cement kiln to SPCB/CPCB.**
- **After generating sufficient data, the matter will be discussed in Task Force constituted for cement industries by CPCB. After approval of the Task Force, matter will be forwarded to MoEF for amendment in the Hazardous Waste (Management and Handling) Rules, 2003 to incorporate cement kiln for treatment and disposal of hazardous waste.**
- **After necessary amendments, cement industry may apply to SPCB to get Authorisation under Hazardous Waste (Management and Handling) Rules, 2003 for utilization of hazardous waste in cement kiln as fuel.**

Inter State Movement of Hazardous Waste

- **There is a possibility that Hazardous Waste generated in one State may be required to be utilised in cement kiln located in other State. Hence, need of Inter State movement of Hazardous Waste.**
- **Need for Inter State movement would also arise in case of units in such States in which Hazardous Waste generation would not justify setting up of a common TSDF.**
- **When units of the same company are located in different States, the company may justifiably want to transport Hazardous Waste to one unit and utilise the incinerator already available at that unit.**

Rule 7, Sub – rule 4 of Hazardous Waste (Management & Handling) Rules, 2003

The occupier shall prepare 6 copies of the manifest in form 9 comprising of colour code indicated below (all 6 copies to be signed by the transporter)

Copy No. with colour code	Purpose
Copy 1 (White)	To be forwarded by the occupier to the SPCB
Copy 2 (Yellow)	To be retained by the occupier after taking sign. on it from the transporter & rest of the 4 copies to be carried by the transporter
Copy 3 (Pink)	To be retained by the operator of the facility after sign.
Copy 4 (Orange)	To be returned to the transporter by the operator of facility after accepting waste
Copy 5 (Green)	To be returned by the operator of the facility to SPCB / Com. after treatment & disposal of waste
Copy 6 (Blue)	To be returned by the operator of the facility to the occupier after treatment & disposal of waste

Rule 7, Sub – rule 5 of Hazardous Waste (Management & Handling) Rules, 2003

The occupier shall forward copy no. 1 to the SPCB / Com. & in case the hazardous waste is likely to be transported through any transit State, the occupier shall prepare an additional copy each for such State and forward the same to the concerned SPCB / Com. before he hands over the hazardous waste to the transporter. No transporter shall accept hazardous wastes from an occupier for transport unless it is accompanied by copy numbers 2 to 5 of the manifest. The transporter shall return copy no. 2 of the manifest signed with date to the occupier as token of receipt of the other 4 copies of the manifest and retain the remaining 4 copies to be carried and handed over to respective agencies as specified in sub – rule (4).

Rule 7, Sub – rule 6 of Hazardous Waste (Management & Handling) Rules, 2003

In case of transport of hazardous waste to a *facility* for transport, storage and disposal existing in a State other than the State where hazardous wastes are generated, the occupier shall obtain NOC from the SPCB / Committee of the concerned State or Union Territory Administration where the *facility* is existing.

Interpretation on Similarity basis

In case of transport of hazardous waste to a *cement plant* for transport, storage and disposal existing in a State other than the State where hazardous wastes are generated, the occupier shall obtain NOC from the SPCB / Committee of the concerned State or Union Territory Administration where the *cement plant* is existing.

Draft Emission Standards for Hazardous Waste Incinerator

S.No.	Pollutant	½ hourly average mg/Nm³	24 hourly average mg/Nm³
1.	Particulate matter	30	10
2.	HCl	60	10
3.	SO ₂	200	50
4.	CO	100	50
5.	HBr	60	10

All values are corrected to 11% oxygen on a dry basis

Hydrocarbons:

10 ppm over an hourly rolling average dry basis and reported as propane.

Opacity:

While operating properly at rated capacity, the system shall have a visible emission rate of less than or equal to 10% except for condensed water vapor, from the discharge stack to atmosphere (one hour rolling average).

Dioxine/Furans:

While operating properly at rated capacity, the system shall have an emission of dioxins and furans of less than or equal to 0.1 ng TEQ/Nm³ corrected to 11% oxygen.

Emission Standards for metals

S. No.	Metals	Emission Standard mg/Nm³
1.	Cadmium (Cd)	0.05
2.	Thallium (Ti)	0.05
3.	Mercury (Hg)	0.05
4.	Antimony (Sb)	0.5
5.	Arsenic (As)	0.5
6.	Lead (Pb)	0.5
7.	Chromium (Cr)	0.5
8.	Cobalt (Co)	0.5
9.	Copper (Cu)	0.5
10.	Manganese (Mn)	0.5
11.	Nickel (Ni)	0.5
12.	Vanadium (V)	0.5
13.	Tin (Sn)	0.5

All values are corrected to 11% oxygen on a dry volume basis.

Thank You