

Standard Operating Procedure and Checklist of Minimal Requisite Facilities for utilization of hazardous waste under Rule 9 of the Hazardous and Other Wastes (Management and Transboundary movement) Rules, 2016

Utilization of Resin & Glue waste as a Supplementary Fuel in Tile Manufacturing Industry



August, 2021

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Utilization of Resin & Glue as a Supplementary Fuel in Tile Manufacturing Industry

Procedure for grant of authorization by State Pollution Control Boards (SPCBs)/Polltion Control Committees (PCCs) for utilization of Hazardous waste

- 1) While granting authorization for utilization of hazardous wastes, SPCBs/PCCs shall ensure that authorization is given only to those wastes for which Standard Operating Procedures (SoPs) for utilisation have been circulated by Central Pollution Control Board (CPCB) ensuring the following:
 - a. The waste (intended for utilization) belongs to similar source of generation as specified in SoP.
 - b. The utilization shall be similar to as described in SoP.
 - c. End-use/ product produced from the waste shall be same as specified in SoP.
 - d. Authorization shall be granted only after verification of details and minimum requisite facilities as given in SoP.
 - e. Issuance of passbooks (similar to passbooks issued for recycling of used oil, waste oil, non-ferrous scraps, etc.) for maintaining records of receipt of hazardous waste for utilization.
- 2) After issuance of authorization, SPCBs/PCCs shall verify the compliance of checklist and SoP on quarterly basis for initial 2 years; followed by random checks during subsequent period for atleast once a year.
- 3) In-case of lack of requisite infrastructures with the SPCBs/PCCs, they may engage 3rd party institutions or laboratories having EPA, 1986/NABL/ISO17025 accreditation / recognition for monitoring and analysis of prescribed parameters in SoPs for verification purpose.
- 4) SPCBs/PCCs shall provide half yearly updated list of units permitted under Rule 9 of Hazardous & Other Wastes (Management & Transboundary Movement) Rules, 2016 (HOWM Rules, 2016) to CPCB and also upload the same on SPCB/PCC website, periodically. Such updated list shall be sent to CPCB on half yearly basis i.e., by July and January respectively.
- 5) Authorization for utilisation shall not be given to the units located in the State/Union Territory where there is no Common TSDF, unless the unit ensures authorised captive disposal of the hazardous waste (generated during utilisation) or its complete utilisation or arrangement of sharing with any other authorised disposal facility.
- 6) In case of the utilization proposal is not similar with respect to source of generation or utilization process or end-use as outlined in this SoP, the same may be referred to CPCB for clarification /conducting trial utilization studies and developing SoPs thereof.
- 7) The source and work zone standards suggested in the SoP are based on E(P)A notified and OSHA standard respectively, however, SPCBs/PCCs may impose more stringent standards based on the location or process specific conditions.

70.0 Utilization of Resin & Glue waste:

Type of HW	Source of generation	Recovery/Product
Resin & Glue waste, Category 23.1, Schedule I (of HOWM Rules, 2016)	Generated during manufacturing of Wind mill blades.	As a supplementary fuel (Energy recovery) along with coal in Chain stove of Ceramic tile manufacturing industry

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70.1 Source of Waste:

The Resin and Glue waste is generated during manufacturing of Wind Mill blades, falls under the Category 23.1, Schedule I of HOWM Rules, 2016.

Table 1. Typical Characteristics of Resin and Glue waste are given below:

Sr. No.	Parameter	Unit	Result
1.	Arsenic as As	mg/L	0.290
2.	Barium as Ba	mg/L	25.44
3.	Nickel as Ni	mg/L	0.401
4.	Zinc as Zn	mg/L	1.113
5.	Manganese as Mn	mg/L	8.7
6.	Cadmium as Cd	mg/L	BLQ (LOQ:0.1)
7.	Chromium as Cr	mg/L	BLQ (LOQ:0.1)
8.	Lead as Pb	mg/L	BLQ (LOQ:0.1)
9.	Mercury as Hg	mg/L	BLQ (LOQ:0.1)
10.	Copper as Cu	mg/L	BLQ (LOQ:0.1)

70.2 Utilization Process

Resin and glue waste is utilized as supplementary fuel along with coal in the chain stove for hot air generation. This hot air is supplied to the spray dryer chamber through hot air distributor. The slip (wet slurry of the ground mix of raw materials i.e. clay, minerals etc.) is sprayed and dried in the spray dryer to make fine sieved particles/powder for the tile manufacturing.

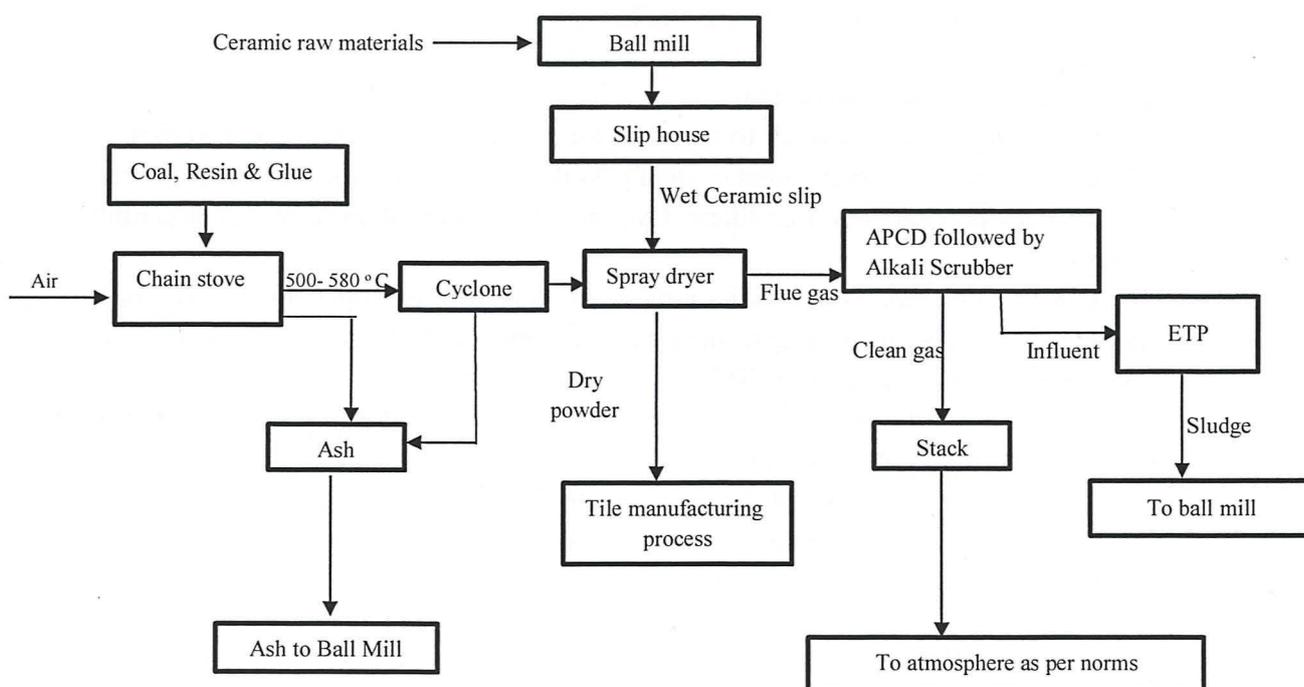


Figure: 1-Process flow diagram for utilization of hazardous waste.

70.3 Product Usage / Utilization

Resin and glue waste mixed with coal is used as a supplementary energy resource in Chain stove of Ceramic tile manufacturing industry which will conserve the natural resource i.e. coal.

70.4 Standard Operating Procedure for utilization

This SoP is applicable only for utilization of Resin & Glue waste (generated during manufacturing of Wind mill blades) as a supplementary fuel along with coal in Chain stove of Ceramic tile manufacturing industry.

- 1) The unit shall ensure the removal of plastics (PVC / polythene) from the Resin & Glue waste through proper dismantling and segregation and plastics contents shall not exceed 5 % of the Resin & Glue waste.
- 2) The unit shall not use Fibre Reinforced Plastics (FRPs) that are generated along with Resin & Glue waste as hazardous waste from Wind mill blades manufacturing industry.
- 3) Utilisation of Resin & Glue waste shall not exceed 15 % of the fuel consumption in Chain stove. The fuel shall be uniformly mixed in the ratio of 85:15 (Coal: Resin & Glue waste) by using appropriate mechanized mixing units and transferred to the Chain stove through mechanized system.
- 4) Resin & Glue waste shall be allowed to utilized with only coal as a supplementary fuel for energy recovery.
- 5) The unit shall ensure Resin & Glue waste to be crushed and sized down to less than 50 mm before utilization.
- 6) The unit shall ensure minimum temperature of 900 °C in chain stove after which Resin & Glue waste can be utilized. There must be provision for minimum automation in the process such as temperature sensor with chain stove.
- 7) Utilization of Resin & Glue waste shall not be carried out during un-stable/breakdown conditions in the Chain stove units.
- 8) The unit shall ensure excess Air to fuel ratio for proper combustion of the materials.
- 9) The gases from spray dryer chamber shall pass through Air Pollution Control Device like Electro static precipitators/ Bag filters/ Cyclone and further followed by Alkali scrubbing system.
- 10) The treated gases shall comply with emission norms prior to dispersion into atmosphere through stack. The stack height shall be minimum of 30m from ground level or as prescribed by the concerned SPCB/PCC, whichever is higher.
- 11) The unit shall ensure control of fugitive emissions through dust extraction system near Coal crushing and Spray dryer area.
- 12) The unit shall carryout intermittent water sprinkling in the working area (especially coal, raw material handling and spray dryer sections etc.) to avoid fugitives and dust emissions.
- 13) Treatment and disposal of wastewater:
Wastewater generated from floor-washings, spillages, reactor washing, scrubber bleed shall be treated Physico-Chemically in an Effluent Treatment Plant (ETP) or may be sent to Common Effluent Treatment Plant (CETP) for final disposal or be treated further in a captive facility to comply with surface water discharge standards.
In case of zero discharge, the treated waste water from ETP may be managed as per conditions stipulated by the concerned SPCB/PCC.

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- 14) The treated effluent shall be discharged in accordance with the conditions stipulated in the Consent to Operate issued by concerned SPCB/PCC under the Water (Prevention and Control of Pollution) Act, 1974.
- 15) The unit shall install storage area under cool, dry, well ventilated covered storage shed(s) within premises, as authorized by the concerned SPCB/PCC under HOWM Rules, 2016. Resin & Glue waste generated from manufacturing of Wind Mill blades shall be collected and stored under covered storage shed(s) with impervious floor within premises, so as to eliminate rain water intrusion.
Further, the storage sheds shall have proper slope and seepage collection pit so as to collect seepage/floor washings. The collected seepage/floor washings shall be channelized to ETP for treatment.
- 16) The unit shall maintain proper ventilation in the work zone and process areas. All personnel involved in the plant operation shall wear proper personal protective equipment (PPE) specific to the process operations involved and type of chemicals handled as per Material Safety Data Sheet (MSDS). The safety precautions of the worker shall be in accordance with the Factory Act, 1948, as amended from time to time.
- 17) The wastes generated during utilization of Resin & Glue waste (namely ash, APCD dust, ETP sludge etc.) during manufacturing process of unit shall be captively utilized with in the process as mentioned in figure-1 or collected and temporarily stored in non-reactive drums/ bags under a dedicated hazardous waste storage area and be sent to authorized common TSDF or other authorized facility within 90 days from generation of the waste in accordance with the authorization issued by the concerned SPCB/PCC.
- 18) The unit shall ensure that the Resin & Glue waste procured from the industries, which have valid authorization from the concerned SPCB/PCC as required under HOWM Rules, 2016.
- 19) Transportation of Resin & Glue waste shall be carried out by sender (generator) or receiver (utilizer) only after obtaining authorization from the concerned SPCB/PCC under HOWM Rules, 2016. Requisite manifest document shall be followed as laid down under the said Rules.
- 20) Prior to utilization of Resin & Glue waste, the unit shall obtain authorization for storage, utilization and disposal of Resin & Glue waste from the concerned SPCB/PCC under HOWM Rules, 2016.
- 21) In case of environmental damages arising due to improper handling of hazardous wastes including accidental spillage during generation, storage, processing, transportation and disposal, the occupier (sender or receiver, as the case may be) shall be liable to implement immediate response measures, environmental site assessment and remediation of contaminated soil/ groundwater/ sediment etc. as per the "*Guidelines on Implementing Liabilities for Environmental Damages due to Handling & Disposal of Hazardous Wastes and Penalty*" published by CPCB.
- 22) The unit shall provide suitable fire safety arrangements and flame proof electrical fittings.
- 23) During the process of utilization and handling of hazardous waste the unit shall comply with requirement in accordance with the Public Liability Insurance Act, 1991 as amended, wherever applicable.



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70.5 Record>Returns Filing

- 1) The unit shall maintain a passbook issued by concern SPCB/PCC and maintain details of each procurement of Resin & Glue waste as mentioned below:
 - Address of the sender
 - Date of dispatch
 - Quantity procured
 - Seal and signature of the sender
 - Date of Receipt in the premises
- 2) A log book with information on source and date of procurement of Resin & Glue waste, date wise utilization of the same, hazardous waste generation and its disposal, etc. shall be maintained including analysis report of fugitive emission monitoring & effluent discharged, as applicable.
- 3) The unit shall maintain record of hazardous waste generated, utilized and disposed as per Form 3 & also file annual returns in Form 4 as per Rule 20 (1) and (2) of the HOWM Rules, 2016, to concerned SPCB/PCC.
- 4) The unit shall submit quarterly and annual information on hazardous wastes consumed, its source, products generated or resources conserved (specifying the details like, type and quantity of resources conserved) to the concerned SPCB/PCC.

70.6 Standards

- 1) Source emissions from the stack connected to spray dryer shall comply with the following Emission standards or as prescribed by the concerned SPCB/PCC, whichever is stringent;

Particulate Matter	150 mg/Nm ³
NO _x	400 mg/Nm ³
SO ₂	200 mg/Nm ³
HCl Mist	50 mg/Nm ³
Total Dioxins and Furans	0.1 ngTEQ/Nm ³
Sb+As+Pb+Co+Cr+Cu+ Mn+Ni+V+their compounds	0.50 mg/Nm ³

- 2) Fugitive emission in the work zone area shall comply with the following standards:

PM ₁₀	5 mg/m ³ TWA* (PEL)
NO ₂	9 mg/m ³ Ceiling limit
SO ₂	13 mg/m ³ TWA* (PEL)
HCl mist	7 mg/m ³ Ceiling Limit
Arsenic as As	0.5 mg/m ³ TWA* (PEL)
Chromium as Cr	1 mg/m ³ TWA* (PEL)
Copper as Cu	1 mg/m ³ TWA* (PEL)
Lead as Pb	1 mg/m ³ TWA* (PEL)
Manganese as Mn	5 mg/m ³ Ceiling Limit
Nickel as Ni	1 mg/m ³ TWA* (PEL)

*PEL - Permissible Exposure Limit

*time-weighted average (TWA)- measured over a period of 8 hours of operation of process.

A ceiling limit is one that may not be exceeded for any period of time, and is applied to irritants and other materials that have immediate effects.

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- 3) Monitoring of the above specified parameters for source emission shall be carried out quarterly for first year followed by at least annually in the subsequent year of utilization. Fugitive emission for specified parameters shall be carried out quarterly. The monitoring shall be carried out by ISO 17025 accredited or EPA, 1986 approved laboratories and the results shall be submitted to the concerned SPCB/PCC on a quarterly basis.
- 4) Standard for wastewater discharge: Treated effluent shall be discharged in accordance with the conditions stipulated in Consent to Operate issued by concerned SPCB/PCC under the Water (Prevention and Control of Pollution) Act, 1974. In case of zero discharge or no discharge condition stipulated in the said consent or non-availability of CETP, zero discharge shall be met.

70.7 Siting of Industry

Facilities for utilization of Resin & Glue waste shall be preferably located in a notified industrial area or industrial park/estate/cluster and in accordance with Consent to Establish issued by the concerned SPCB/PCC.

70.8 Size of Plant and Efficiency of Utilisation

This SoP is applicable for utilization of coal and Resin & Glue waste in the ratio of 85:15 for energy recovery. Therefore, requisite facilities of adequate size of storage shed and other plant & machineries shall be installed accordingly.

70.9 On-line Detectors / Alarms / Analyzers

In case of continuous process operations, online emission analyzers for PM, SO₂, NO_x in the stack shall be installed and the online data be connected to the server of the concerned SPCB/PCC.

70.10 Checklist of Minimal Requisite Facilities

Sl. No	Particulars
1.	Cool, dry well-ventilated covered sheds for Resin & Glue waste and process activities within premises and dedicated hazardous storage area for temporary storage of hazardous waste generated during utilization process.
2.	Mechanized systems for handling & transfer of coal and Resin & Glue waste.
3.	Chain stove, feeders, cyclone and ETP
4.	APCD like Electro static precipitators/ Bag filters/ Cyclone followed by Alkali scrubber
5.	Stack to have sampling port, platform, access to the platform etc. as per the guidelines on methodologies for source emission monitoring published by CPCB under Laboratory Analysis Techniques LATS/80/2013-14.
6.	Online analyzers for PM, SO ₂ & NO _x emission monitoring in the stack, in case of continuous process operations.
