

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 Coal Tar/Tarry Residue generated from Coal Gasifier Units



cpcb

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Central Pollution Control Board
(Ministry of Environment, Forest & Climate Change, Government of India)
Parivesh Bhawan, East Arjun Nagar,
Shahdara, Delhi – 110032

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Standard Operating Procedure and Checklist of Minimal Requisite Facilities - Utilization of Coal Tar/Tarry residue generated Coal Gasifier Units

Procedure for grant of authorisation by SPCBs/PCCs for utilization of Hazardous Waste

- (i) While granting authorisation for utilization of hazardous wastes, SPCBs/PCCs shall ensure the following:
- The waste (intended for utilization) belongs to similar source of generation as specified in SoPs.
 - The utilization process is similar to the process of utilization described in SoPs.
 - End-use / product produced from the waste shall be same as specified in SoPs.
 - Authorisation be granted only after verification of utilization process and minimum requisite facilities as given in SoPs.
 - Issuance of passbooks (similar to the passbooks issued for recycling of used oil, waste oil, non-ferrous scrap, etc.) for maintaining records of receipt of hazardous wastes for utilization.
- (ii) After issuance of authorization, SPCB/PCC shall verify the utilization process, checklist and SOPs on quarterly basis for initial 2 years; followed by random checks in the subsequent period for at least once a year.
- In-case of lack of requisite infrastructures with the SPCB/PCC, they may engage 3rd party institutions or laboratories having EPA/NABL/ISO17025 accreditation/recognition for monitoring and analysis of prescribed parameters in SoPs for verification purpose.
- (iii) SPCBs/PCCs shall provide half yearly updated list of units permitted under Rule 9 of HOWM Rule, 2016 to CPCB and also upload the same on SPCB website, periodically. Such updated list shall be sent to CPCB half yearly by July and January respectively.
- (iv) Authorisation for utilisation shall not be given to the units located in the State/UT 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.
- (v) In case 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.
- (vi) The source and work zone standards suggested in the SoPs are based on the E(P)A notified and OSHA standards respectively, however, SPCB/PCC may impose more stringent standards based on the location or process specific conditions.

34.0 Utilization of Coal Tar/Tarry Residue Waste:

Type of HW	Source of generation	Recovery/Product
Coal Tar/Tarry residue waste (category no. 35.1 as per Schedule I of the HOWM Rules, 2016)	Coal gasifier units	As energy recovery in Frit manufacturing units

34.1 Source of Waste

The Coal Tar/Tarry Residue waste is generated from gas cleaning unit (wet ESP) of coal gasifier plants where coal is gasified to produce coal gas categorised as hazardous waste at S.No. 35.1 of schedule-I of HOWM Rules, 2016 which are required to be disposed in authorized disposal facility in accordance with authorization condition, when not utilized as energy/resource recovery.

34.2 Utilization Process

Frit is produced by fusing a variety of minerals in Furnace at temperature of 1350-1450°C and then rapidly quenching the molten material. The raw materials for manufacturing frit are quartz, feldspar, calcite, dolomite, china clay, zir floor, zinc oxide, borax, soda ash, etc. in desired proportions and the same are mixed in a mixer and conveyed through conveyor to hopper for continuous feeding to the Furnace.

Utilisation process of the Coal Tar/Tarry Residue waste involves heating of the same and firing of liquid coal tar/Tarry Residue through burners in pre-heated furnace (after the furnace achieves a temperature >1100°C) as a supplementary fuel in place of conventional fuels such as furnace oil, LPG, CNG, LDO etc. The resulting molten mass is poured in water bath to form crystals after cooling/quenching. The product- frit is then packaged in bags.

The flue gas from furnace passes through recuperators (heat exchanger to heat the combustion air) alkali scrubber and exits from stack. The water used for cooling/quenching is re-circulated through collection tank and cooling tower.

34.3 Product Usage / Utilization

Coal tar/tarry residue shall be used for energy recovery in Frit manufacturing units.

34.4 Standard Operating Procedure (SoP) for utilization

This SoP is applicable only for the utilization of coal tar/tarry residue generated from gas cleaning unit (wet ESP) of coal gasifier plants for energy recovery in Frit manufacturing units

- (1) Coal Tar/ Tarry Residue waste shall be procured only in tanker mounted over vehicles as authorised by SPCB/PCC.
- (2) It shall be ensured that the Coal Tar/ Tarry Residue shall be free from water content at the point of procurement. Residual water, if any, present in the Coal Tar/ Tarry Residue shall be injected into the furnace (refer point no. 8 below) along with the Coal Tar/ Tarry Residue.
- (3) Coal Tar/Tarry Residue waste shall be received into storage tank and a transfer pump shall be used to transfer the tarry waste to day tank. All the tanks and transfer pump shall be

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- under covered shed to eliminate any contact with rain water. The storage tanks shall be provided with water seals to all probable leaking points so as to minimise the VOCs emissions.
- (4) The storage tank shall be placed above the ground with low raise bund wall & acid proof floor with slope to collect spillages, if any, to collection pit. The collected seepage shall be reused in the process.
 - (5) There should be designated space for unloading Coal Tar/Tarry Residue waste into storage tank.
 - (6) Melting of Coal Tar/Tarry Residue waste for use in furnace shall be done by using electric heaters and molten tarry waste shall be transferred using transfer pumps to day-tank.
 - (7) Utilisation of Coal Tar/Tarry Residue waste shall not exceed 0.45 ton per ton of Frit production.
 - (8) Coal Tar/Tarry Residue waste shall not be injected into the furnace until the temperature of the furnace is heated up to $> 1100^{\circ}\text{C}$, using conventional fuels such as furnace oil, LPG, CNG, LDO etc. as per the consent issued by the concerned SPCB under Air (Prevention and Control of Pollution) Act, 1981. Temperature in Furnace during utilization of Coal Tar/Tarry Residue waste shall always be maintained more than 1350°C and a temperature display system shall be provided to display the same.
 - (9) Fume extraction hoods shall be provided above the Coal Tar/Tarry Residue waste melting unit, day-tank and molten mass tapping point and the same shall be channelized as combustion air into the furnace. Negative (suction) pressure condition shall be maintained in the Furnace as well as the said fume extraction hoods using pumps of suitable capacity.
 - (10) The hot flue gases shall be passed through heat economiser (for heating combustion air) and treated in Venturi scrubber with ID fan connected to stack of height as specified by SPCB/PCC. Venturi scrubber shall have provision of chemical dosing in scrubbing medium for pH correction.
 - (11) Treatment and disposal of wastewater: Sources of waste water generation are – (i) scrubber bleed, and (ii) floor washing. The wastewater from scrubber bleed shall be treated Physico-Chemical by collection, neutralization, settling and filtration and treated effluent shall be evaporated in single or multi effect evaporator so as to meet zero discharge. The waste water generated from floor washing shall be sent for disposal to authorized common hazardous waste incinerator. Alternate to ETP and single or multi effect evaporator, the scrubber bleed water may also be sent to authorized common hazardous waste incinerator.
 - (12) The ETP residue and/or residue of single or multi effect evaporator, as applicable, shall be collected and temporarily stored in non-reactive drums / bags under a dedicated hazardous

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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. Such storage area shall be covered with proper ventilation.

- (13) The unit shall ensure that all personnel involved in the plant operation shall wear proper personal protective equipment such as masks, safety gloves, goggles, safety shoes etc.
- (14) The unit shall provide suitable fire safety arrangements and flame proof electrical fittings.
- (15) It shall be ensured that coal tar/tarry residue is procured from the industries who have valid authorization for generation/storage of the same from the concerned SPCB/PCC as required under Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016.
- (16) Prior to utilization of coal tar/tarry residue, the unit shall obtain authorization for generation, storage and utilisation of Spent Pot Lining from the concerned State Pollution Control Board under the Hazardous and Other Wastes (Management & Transboundary Movement) Rules, 2016.
- (17) In case of environmental damages arising due to improper handling of hazardous wastes including accidental spillage during generation, storage, processing, transportation and disposal, the unit 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.
- (18) During the process of utilization and handling of hazardous waste, the unit shall comply with the requirements in accordance with the Public Liability Insurance Act, 1991 as amended, wherever applicable.

34.5 Records/Return Filing

- (1) The unit shall maintain a passbook issued by concerned SPCB wherein the following details of each procurement of resin waste shall be entered:
 - 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 shall be maintained with information on source and date of procurement of resin waste, quantity, date wise utilization of the same, hazardous waste generation and its disposal, etc.

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- (3) The unit shall maintain record of hazardous waste utilised, hazardous waste generated and disposed as per Form 3 & shall file annual returns in Form 4 as per Rule 20 (1) and (2) of the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016, to concerned SPCB.

34.6 Standards

- (1) Fugitive emissions in the work zone shall comply with following:
- Respirable dust (PM₁₀) - 5000 µg/m³
 - Carbon Monoxide - 50 ppm
 - Coal tar volatiles (benzene-soluble fraction viz. anthracene, Benzo (a) Pyrene, phenanthrene, Dibenzo[b,e]pyridine, chrysene & pyrene) : 0.2 mg/m³ (8-hour time-weighted average values)
- (2) Emissions from stack shall comply with the following:
- Particulate Matter - as stipulated by concerned SPCB
 - Oxides of Nitrogen - 400 mg/Nm³
 - Carbon Monoxide – 100 mg/Nm³
 - TOC – 20 mg/Nm³
 - SO₂ – 200 mg/Nm³
- (3) Monitoring of the specified parameters for source emission shall be carried out quarterly for the first year followed by atleast annually in the subsequent year of utilization. Fugitive emission for specified parameters shall be carried out quarterly. The monitoring shall be carried out by NABL accredited or EPA approved laboratories results shall be submitted to the concerned SPCB/PCC quarterly.

34.7 Siting of Industry

Facilities for processing of coal tar/tarry residue shall preferably be located in a notified industrial area or industrial park/estate/cluster and in accordance with Consent to Establish issued by the concerned SPCB/PCC.

34.8 Size of Plant & Efficiency of utilisation

Utilisation of Coal Tar/Tarry Residue waste shall not exceed 0.45 ton per ton of Frit production. Therefore, requisite facilities of adequate size of storage shed and other plant & machineries as given in para 34.10 below shall be installed accordingly.

34.9 On-line detectors / Alarms / Analysers

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Online analyzers for CO emission monitoring in stack with transmission of the online emission data to CPCB and SPCB servers. Smoke detector and fire alarm system shall be installed at coal tar/ tarry residue storage and handling area.

34.10 Checklist of Minimal Requisite Facilities

S.No	Minimal Requisite Facilities
1.	MS tanks for receiving and storage of Tarry waste.
2.	Cover over tarry waste storage tank, transfer pump, day-tank etc. so as to eliminate any contact with rain water.
3	Storage tanks for conventional fuels FO/LDO/LPG/CNG etc.
4.	Fire prevention facilities
5.	Suction arrangement to arrest dust from raw materials mixer (while unloading raw material) and hopper and channelization of the same to scrubber
6.	Dedicated covered shed for storage of HW generated (leaks/spills/debris containing tarry wastes, used oils, and scrubber residue etc.)
7.	Electric heating system for melting of Coal Tar/Tarry Residue waste
8.	Closed Furnace for fusing minerals (raw materials) with provisions of burners for consented Fuel and Coal Tar/Tarry Residue waste
9.	Temperature display system for displaying temperature in the Furnace
10.	Fume extraction systems (with suction hoods and ducts with induced draft arrangement) over storage tanks, Coal Tar/Tarry Residue waste melting unit, molten mass tapping point and day-tank connected to FD fan for use as combustion air to the Furnace.
11.	Flue gas heat recuperator (heat exchanger) to heat the combustion air
12.	Venturi Scrubber (for cleaning flue gases) with chemical dosing arrangement for pH correction and outlet be connected to stack through ID fan
13.	Stack with sampling port, platform, access to the platform etc. as per the Guidelines on Methodologies for Source Emission Monitoring published by CPCB under

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	Laboratory Analysis Techniques LATS/80/2013-14.
14.	Online analyzers for CO emission monitoring in stack with transmission of the online emission data to CPCB and SPCB servers.
15.	Effluent Treatment Plant (ETP) and single or multi effect evaporator Or Arrangement for disposal of waste water to authorized common hazardous waste incinerator.

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