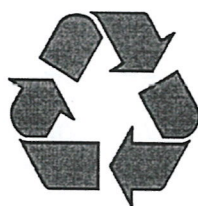


**Standard Operating Procedure and Checklist of Minimal
Requisite Facilities for utilization of hazardous waste under
Rule 9 of the Hazardous and Other Wastes (Management and
Transboundary movement) Rules, 2016**

**Utilization of Resin Waste generated during Resin
Impregnation of Electrical Coils**



CPCB

February, 2017

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

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:
 - a. The waste (intended for utilization) belongs to similar source of generation as specified in SoPs.
 - b. The utilization process is similar to the process of utilization described in SoPs.
 - c. End-use / product produced from the waste shall be same as specified in SoPs.
 - d. Authorisation be granted only after verification of utilization process and minimum requisite facilities as given in SoPs.
 - e. 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 shall verify the utilization process, checklist and SOPs on quarterly basis for initial 2 years; followed by random checks in the subsequent period for atleast 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 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.

27.0 Utilization of Resin Waste:

Type of HW	Source of generation	Recovery/Product
Resin Waste (mixture of Bisphenol A and Epichlorohydrin)- Category 23.1 of schedule-I of HOWM Rules, 2016	During Resin impregnation of electrical coils in power/hydro equipment manufacturing industries	Utilization as raw material for resin mix (to be used as insulation coat/cover on High Tension/Low Tension electrical components or articles)

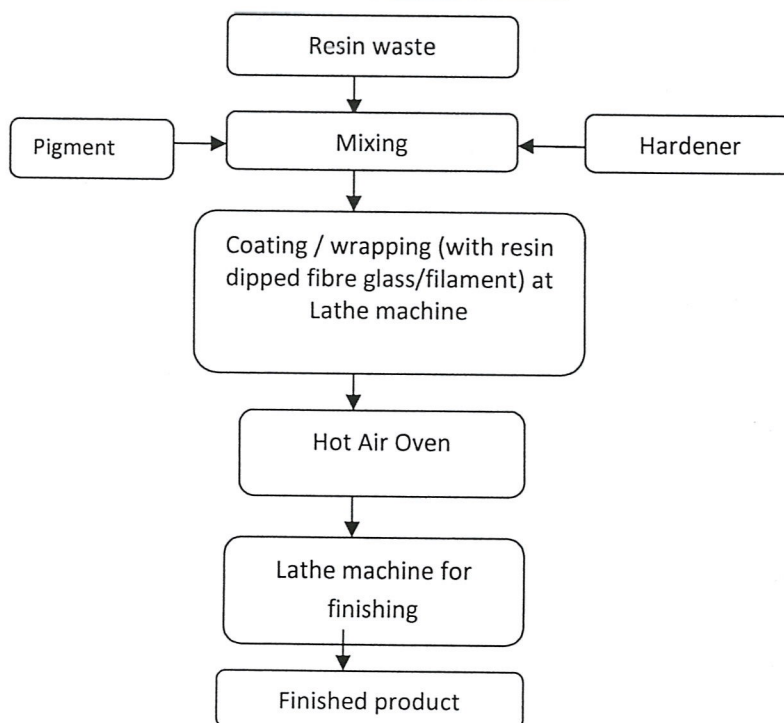
27.1 Source of Waste

Resin waste (mixture of Bisphenol A and Epichlorohydrin) is generated during impregnation of electrical coils by vacuum pressure impregnation process. When the viscosity of resin increases (around 50-60 centipoise) it is not suitable for impregnation, hence discarded as hazardous waste (Categorised under S.No. 23.1 of schedule-I of HWM Rules, 2016).

27.2 Utilization Process

The utilization process involves mixing of resin waste with amine based hardener (1%) and colour pigment (2%) followed by coating the ferrous or non-ferrous rods/bars with resin mix to get the insulation coating/cover. After coating or wrapping the resin-mix dipped fibre-glass filament over the surface of the material to desired thickness on a lathe machine, a shrink tape (made of polyester) is wrapped and kept in the oven at 120 - 140°C for 2-3 hours for curing. The oven dried material is further subjected to lathe machine for surface finishing so as to obtain desired insulation over the HT/LT electrical components.

Process Flow Diagram



27.3 Product Usage / Utilization

The resin waste along with amine based hardener is used for providing insulation coat over ferrous and non-ferrous rods/bars used on High Tension/Low Tension Insulation electrical components.

27.4 Standard Operating Procedure (SoP) for utilization

This SoP is applicable only for the utilization of resin waste (containing mixture of Bisphenol A and Epichlorohydrin), generated during manufacturing of electrical coils in power/hydro equipment manufacturing industry (by vacuum pressure impregnation process).

- (1) The resin waste shall be transported in non-reactive drum/ container mounted on vehicles fitted with requisite safeguards, ensuring no spillage of waste in accordance with provisions stipulated under Hazardous and Other Wastes (Management & Transboundary Movement) Rules, 2016.
- (2) Transportation of resin waste shall be carried out by the sender (generator) or receiver (utilizer) as per the authorization issued by concerned SPCB under the Hazardous and Other Wastes (Management & Transboundary Movement) Rules, 2016.
- (3) There shall be a designated space for unloading of resin waste container. The receiving storage area shall be placed above the ground and be contained with low raise bund wall & concrete floor with slope to collect spillages, if any, into collection pit.
- (4) The unit shall store resin waste under cool, dry and well-ventilated covered storage shed(s) within premises, as authorized by the concerned State Pollution Control Board/Pollution Committee under Hazardous and Other Wastes (Management & Transboundary Movement) Rules, 2016, so as to eliminate rain water intrusion.
- (5) The entire process area shall have leak-proof and tiled floor with adequate slope to collect spillages, if any, into a collection pit and send to TSDF for disposal.
- (6) Resin waste along with amine based hardener and pigments shall be mixed in closed vessel with mechanised stirring system. The mixer shall be kept under covered shed with adequate safety gadgets provided to workers, as well as ensuring proper ventilation in the process area.
- (7) Resin waste from drums shall be transferred using mechanical means such as mechanically operated drum tilter. Further, coating of resin mix over the HT/LT electrical components shall be done using mechanical system.
- (8) After coating or wrapping the resin dipped fibre-glass filament to desired thickness on a lathe machine, a shrink tape (made of polyester) is wrapped and kept in the oven at

120 – 1400 °C for 2-3 hours for curing. The oven dried material is further subjected to lathe machine for finishing so as obtaining desired insulation over the HT/LT insulator.

- (9) The unit shall maintain proper ventilation in the work zone and process areas (preferably with ventilation ducts above the process units connected to ID fan with exhaust above roof level). All personnel involved in the plant operation shall wear proper personal protective equipment such as Safety glasses with side shields or chemical splash goggles; wear liquid-proof, chemical resistant gloves (such as nitrile-butyl rubber, neoprene, butyl rubber or natural rubber) and full body covered clothing.
- (10) The unit shall provide suitable fire safety arrangements and flame proof electrical fittings.
- (11) It shall be ensured that resin waste 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.
- (12) 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.
- (13) The waste generated (such as waste resin mix, waste generated during cutting/finishing cuttings and used chemical drums) shall be collected and temporarily stored in non-reactive drums/container in a dedicated hazardous waste storage area and sent to TSDF within 90 days from generation of the waste. Such storage area shall be covered with proper ventilation.
- (14) 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
- (15) 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.
- (16) 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.

- (17) Prior to utilization of resin waste, the unit shall obtain authorization for generation, storage and utilisation of resin waste from the concerned State Pollution Control Board under the Hazardous and Other Wastes (Management & Transboundary Movement) Rules, 2016.
- (18) 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.
- (19) 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.

27.5 Standards

- (1) Fugitive emissions in the work zone for MDA (4,4- Methylenedianiline) shall comply with 10 ppb TWA. *Reference:Occupational Safety and Health Standards 1910:1000*;

TWA - Time-weighted average

The Permissible Exposure Limit is 8-hour TWA.

- (2) Monitoring of the specified parameters for fugitive emission shall be carried out by NABL accredited or EPA approved laboratories quarterly and the results shall be submitted quarterly to the concerned SPCB/PCC.

27.6 Siting of Industry

Facilities for processing of resin waste shall preferably be located in a notified industrial area or industrial park/estate/cluster.

27.7 Size of Plant & Efficiency of utilisation

Maximum 970 kg of resin waste would be required to produce 1 ton of resin mix which will be used in insulation of HT/LT electrical components. Therefore requisite facilities of adequate size of storage shed and other plant & machineries as given in para 26.9 below shall be installed accordingly.

27.8 On-line detectors / Alarms / Analysers

Smoke detector and fire alarm system shall be installed at resin waste storage and handling area.

27.9 Checklist of Minimal Requisite Facilities

**Standard Operating Procedure and Checklist of Minimal Requisite Facilities - Utilization of Resin Waste
generated during Resin Impregnation of Electrical Coils**

S. No.	Requisite Facilities
1.	Storage shed(s) for storage of resin waste in steel container only under cool, dry, well-ventilated covered storage shed(s) within premises.
2.	Mechanized system for - transfer of resin waste from drums (such as drum tilters) - mixing of resin waste with hardener (closed vessel with stirrer)
3.	Lathe machine (s)
4.	The process units shall have proper ventilation (preferably with ventilation ducts above the process units connected to ID fan with exhaust above roof level).
5.	Closed Hot Air Oven with provision of vent over roof top
6.	Covered hazardous waste storage space to store hazardous generated during utilization process
7.	Smoke detector and fire alarm system at resin waste storage and handling area.
