

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 Spent Magnesium Chloride solution (generated during manufacturing of Glufosinate -Technical Pesticide) in recovery of Magnesium Chloride Flakes



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**Utilization of spent magnesium chloride solution (generated during manufacturing of
Glufosinate-Technical Pesticide) in recovery of Magnesium Chloride**

**Procedure for grant of authorization by State Pollution Control Boards (SPCBs)/
Pollution 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.
 - f) Monitor closely the quantity of hazardous waste (spent magnesium chloride solution) being sent by generators and the quantity being utilized by authorized facilities in recovery of magnesium chloride.
- 2) After issuance of authorization, SPCBs/PCCs shall verify the compliance of checklist and SOP on quarterly basis for initial 1 year; followed by random checks during subsequent period for at least once a year. The compliance reports may be submitted to CPCB.
- 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.
- 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 EPA notified and OSHA standard respectively, however, SPCBs/PCCs may impose more stringent standards based on the location or process specific conditions.
- 8) SPCBs/PCCs shall ensure that the utilizer of spent magnesium chloride solution shall maintain daily records in National Hazardous Waste Tracking System (NHWTS).



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106.0 Utilization of Spent Magnesium Chloride solution:

Type of HW	Source of generation	Recovery /Product
Spent Magnesium Chloride solution (Category B-10, Note 7 of Schedule-II of HOWM Rules, 2016)	Generated during manufacturing of Glufosinate - Technical Pesticide	Magnesium Chloride Flakes for ultimate utilization in pulp and paper industry, textile industry, cementing material, refrigeration and industrial wastewater treatment pertaining to Magnesium Ammonium Phosphate (MAP) process of CETP

106.1 Source of Waste:

Spent magnesium chloride solution [generated during Diethyl methyl Phosphite (DEMP) preparation an intermediate step of manufacturing Glufosinate-Technical Pesticide] is categorized as hazardous waste at B-10, Note 7 of Schedule-II of HOWM Rules, 2016, which is required to be disposed in an authorized disposal facility in accordance with authorization condition, when not utilized as resource recovery.

Table 1: Typical Characteristics of Spent magnesium chloride solution :

Sr. No.	Parameters	Unit	Results
1.	pH	-	0.77
2.	Purity as MgCl ₂ .6H ₂ O	%	27.16
3.	Water Content	%	71.46
4.	Ammonical Nitrogen	mg/l	44.8
5.	TOC	mg/l	14826.15
6.	COD	mg/l	53200
7.	Chloride	mg/l	194780.02
8.	Sulphate	mg/l	9.15
9.	Cyanide (as Cn)	mg/l	BDL (<0.001)
10.	Pesticides as Glufosinate Ammonium	mg/l	BDL (<0.001)
11.	Iron (as Fe)	mg/l	1.36
12.	Heavy Metals (Cd, Pb, Ni, As, Hg, Cu, Mn, Cr)	mg/l	BDL (<0.001)

Note: SPCBs/PCCs to check the characteristics of spent magnesium chloride solution prior to issuance of authorization, any significant deviation with respect to typical values mentioned in the table above may be examined with respect to the source or may be referred to CPCB.

106.2 Utilization Process

Spent Magnesium Chloride Solution along with hydrogen peroxide and Magnesium Oxide is charged in the reaction vessel for neutralizing the spent Magnesium Chloride Solution.

The treated Magnesium Chloride solution is concentrated by the process of distillation by removing 45% of the water content.

The concentrated Magnesium Chloride solution is fed into the drum flaker, where it undergoes the flaking process. Inside the drum flaker, the solution is spread out as a thin layer on the surface of the rotating drum. The drum flaker is equipped with a cooling water circulation system. The

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cooling water circulation system helps to lower the temperature of the drum, causing the Magnesium Chloride solution to solidify.

The final product i.e. Magnesium Chloride flakes are collected from the drum flaker, after scrapping and transferred to a packaging system where it is packed in the bags and dispatched.

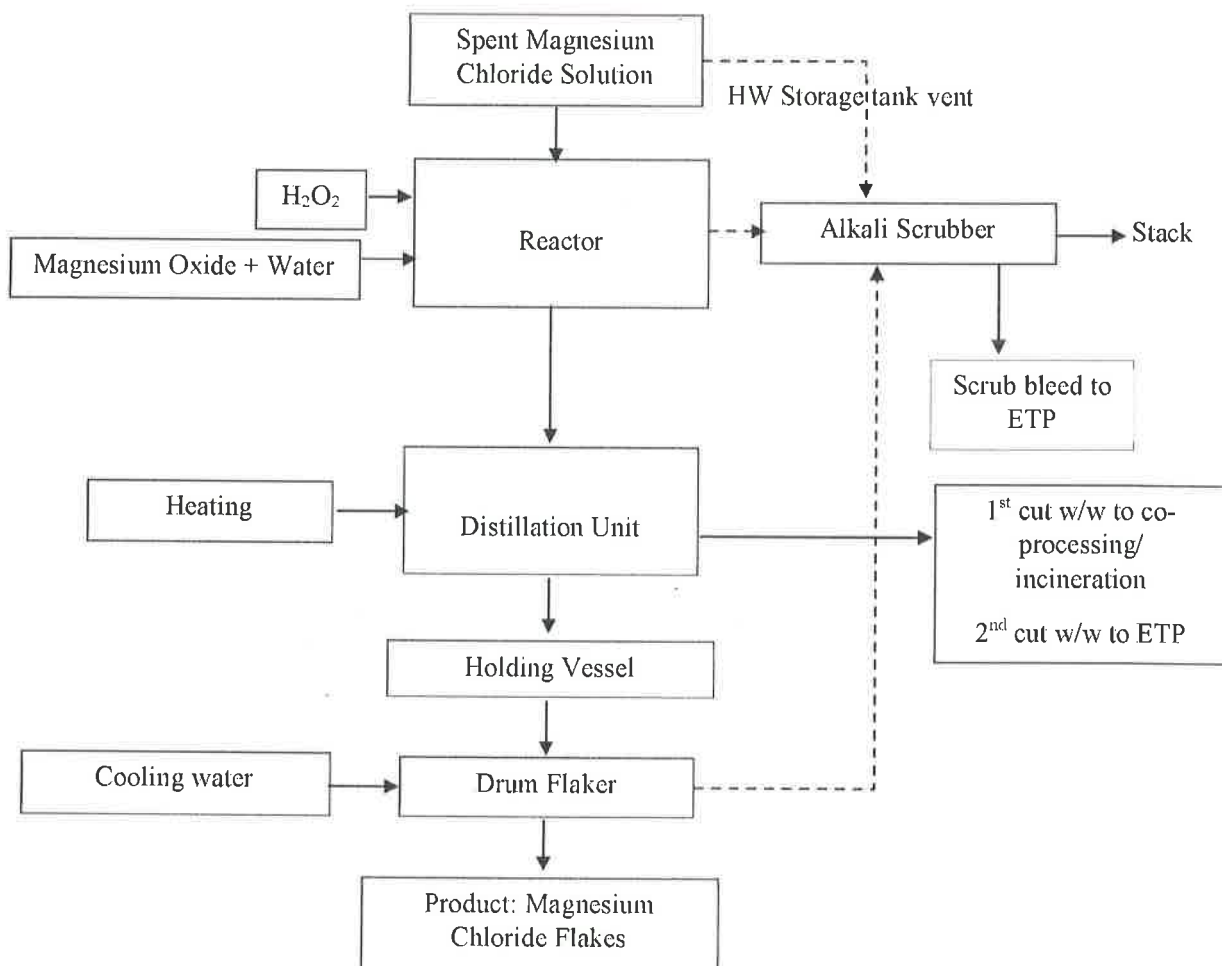


Figure-1.: Process flow diagram for utilization of Spent Magnesium Chloride solution

106.3 Standard Operating Procedure for utilization of spent Magnesium Chloride solution

This SoP is applicable only for utilization of spent Magnesium Chloride Solution (generated during manufacturing of Glufosinate-Technical Pesticide) in recovery of Magnesium Chloride Flake.

- 1) The Spent Magnesium Chloride solution shall be procured only in SPCB/PCC authorized tankers mounted over vehicles fitted with requisite safe guards ensuring no spillage of the hazardous waste.
- 2) The Spent Magnesium Chloride solution shall be stored in SPCB/PCC authorized storage tanks. The unit shall install storage tanks above the ground, under cool, dry, well ventilated covered storage shed(s) within premises, as authorized by the concerned SPCB/PCC under HOWM Rules, 2016.

As per

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Further the storage area of Spent Magnesium Chloride solution shall have leak proof acid resistant floor tiles with brick lined dyke and adequate slope to collect spillage, if any, into a collection pit. The spillage from collection pit shall be channelized to ETP for treatment.

- 3) The unloading and transfer of Spent Magnesium Chloride solution shall be carried out through a dedicated mechanical transfer pump with fixed pipeline in a closed system. There shall be no manual handling of the hazardous waste.
- 4) The unit shall use hydrogen peroxide during the utilization process to reduce TOC in hazardous waste i.e. spent $MgCl_2$ to improve the product quality.
- 5) Adequate alkali scrubbing system shall be provided to the vent of storage tank, reactors and drum flaker followed by stack of adequate height.
- 6) The treated gases/ fumes shall comply with emission norms prior to dispersion into atmosphere through stack. The stack height shall be minimum of 30 m from ground level or as prescribed by the concerned SPCB/PCC, whichever is higher.
- 7) Treatment and disposal of wastewater (if any):

Wastewater generated from floor-washings, spillages, storage tank washing, scrub bleed, etc. shall be treated Physico-Chemically in an ETP to comply with surface water discharge standards or may be sent to CETP for final disposal as prescribed by SPCB/PCC.

The first cut of wastewater generated from the distillation column shall be sent for co-processing or incineration and second cut of wastewater shall be sent to ETP.

In case of zero-discharge condition, the treated water from ETP may be managed as per conditions stipulated by SPCB/PCC:
- 8) Organic waste/ reactor residues generated during the utilization process shall be disposed of in Common Hazardous Waste Incinerator Facility (CHWIF).
- 9) The hazardous wastes (ETP sludge, etc.) generated from the utilization process shall be 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 the generation of the waste in accordance with the authorization issued by the concerned SPCB/PCC. Such storage area shall be covered with proper ventilation.
- 10) It shall be ensured that the Spent Magnesium Chloride solution is procured from the industries, which have valid authorization from the concerned SPCB/PCC as required under HOWM Rules, 2016.
- 11) Transportation of Spent Magnesium Chloride solution 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 documentation shall be followed as laid down under the said Rules.
- 12) The unit shall not sell the recovered product to any trader and concerned SPCB/PCC shall ensure the same. The Magnesium Chloride flakes recovered from spent Magnesium Chloride solution shall be directly given to actual end users only. The names of end-users shall be reported to SPCBs/PCCs.
- 13) Prior to the utilization of Spent Magnesium Chloride solution, the unit shall obtain authorization for storage, utilization and disposal of Spent Magnesium Chloride solution from the concerned SPCB/PCC under HOWM Rules, 2016.
- 14) The unit shall maintain proper ventilation in the work zone and process areas. All personnel



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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.

- 15) 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.
- 16) The unit shall provide suitable fire safety arrangements and flame proof electrical fittings.
- 17) 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.

106.4 Product Usage/Utilization

1. Final product i.e. recovered $MgCl_2$ may be permitted in pulp and paper industry, textile industry, in cementing material and in refrigeration subject to meeting the quality criteria as defined in IS: 254-1973 and in industrial wastewater treatment pertaining to Magnesium Ammonium Phosphate (MAP) process of CETP.
2. Final product i.e. recovered $MgCl_2$ derived utilizing Spent Magnesium Chloride solution shall in no case be utilized as raw material/or permitted for production of food & food processing, pharma & fertilizer sector.
3. The unit shall label its product i.e. Magnesium Chloride Flakes prepared by utilizing aforesaid spent Magnesium Chloride Solution as "*This Magnesium Chloride Flakes has been prepared by utilizing spent Magnesium Chloride Solution generated during production of Glufosinate Technical Pesticide*".

106.5 Record>Returns Filing

- 1) The unit shall maintain a passbook issued by concern SPCB/PCC and maintain details of each procurement of spent Magnesium Chloride solution 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 Spent Magnesium Chloride solution, 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 an annual return in Form-4 as per Rule 20 (1) and (2) of HOWM Rules, 2016, to concerned SPCB/PCC.

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- 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.
- 5) The unit shall use NHWTS to manage the manifest, enter daily records of quantity generated, disposed, etc.

106.6 Standards

- 1) Source emissions from the stack connected to vent of storage tank, reactor and drum flaker shall comply with the following Emission standards or as prescribed by the concerned SPCB/PCC, whichever is stringent:

Parameters	Standards
Particulate Matter	150 mg/Nm ³
HCl	35 mg/Nm ³
TOC	20 mg/Nm ³

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

Parameters	Standards
HCl mist	7 mg/m ³ #
Chlorine	3 mg/m ³
Sodium Hydroxide	2 mg/m ³ *TWA

**TWA- Time weighted average*

- 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.

- 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 (if any) 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 (i) zero discharge as per consent or (ii) non-availability of common Effluent Treatment Plant (CETP), the unit shall achieve zero discharge by setting up adequate captive treatment facility.

106.7 Siting of Industry

Facilities for utilization of Spent Magnesium Chloride solution 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. This may not be applicable to the facility already engaged in the recovery of Magnesium Chloride and have obtained CTE/CTO.

106.8 Size of Plant and Efficiency of Utilization



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13069 MT (28%) Magnesium Chloride Solution is utilized for recovering 7540 MT Magnesium Chloride Flakes.

Therefore, requisite facilities of adequate size of storage shed and other plant & machineries shall be installed accordingly.

106.9 Online Detectors / Alarms / Analysers

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

106.10 Checklist of Minimal Requisite Facilities

Sr. No.	Particulars
1.	Storage tanks of adequate capacity to store waste stream. Such storage tank shall be placed above the ground and contained with low rise parapet/bund wall and acid proof floor with slope to collect spillages, if any, in to collection pit.
2.	Cool, dry well-ventilated covered sheds for magnesium chloride solution storage tanks, product storage tanks and process activities within premises and dedicated hazardous storage area for temporary storage of hazardous waste generated during utilization process.
3.	Mechanical transfer pumps with fixed pipeline for transferring magnesium chloride solution.
4.	Jacketed reactors, distillation unit/concentrator for concentration of magnesium chloride solution.
5.	Drum flaker equipped with cooling water circulation system
6.	In case of continuous process operations, online emission analyzers for HCl and TOC in the stack shall be installed and the online data be connected to the server of the concerned SPCB/ PCC.
7.	Dedicated storage tank for storing concentrated wastewater generated from the process.
8.	Adequate alkali scrubbing system shall be provided with the reactors and drum flaker followed by stack of adequate height.
9.	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.

