# 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 Calcium Hypochlorite (generated during manufacturing of High Strength Bleach Powder) as neutralizing agent in ETP

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**Central Pollution Control Board**
**(Ministry of Environment, Forest & Climate Change, Government of India)**
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**Utilization of Calcium Hypochlorite (generated during manufacturing of High Strength Bleach Powder) as neutralizing agent in ETP**

**Procedure for grant of authorization by State Pollution Control Boards (SPCBs)/Pollution Control Committee (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 same source of generation as specified in SoP.
   b. The utilization shall be same 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. The compliance report shall be submitted to CPCB by July every 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/ISO 17025 accreditation / recognition for monitoring and analysis of prescribed parameters in SoP 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/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.
6) In case of the utilization proposal is not same 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 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.

**78.0 Utilization of Calcium Hypochlorite:**

| Type of HW | Source of generation | Recovery/Product |
|---|---|---|
| Spent Calcium Hypochlorite (Sr. No: 7, Class – B of Schedule – II, HOWM Rules – 2016) | Generated during manufacturing of High Strength Bleach Powder (HSBP) | Used as neutralizing agent in Effluent Treatment Plant (ETP) of inorganic chemical manufacturing industries. |

## 78.1 Source of Waste:

Spent Calcium Hypochlorite generated during manufacturing of High Strength Bleach Powder is categorized as hazardous waste at S. no: 7, Class-B of Schedule-II, HOWM Rules – 2016, which is required to be disposed in authorized disposal facility in accordance with authorized condition, when not utilized as resource recovery.

***Table 1. Typical Characteristics of Spent Calcium Hypochlorite are given below:***

| Sr. No. | Parameter | Unit | Value |
|---|---|---|---|
| 1. | pH | | 10.7 |
| 2. | Calcium | % | 1.53 |
| 3. | Sodium | gm/kg | 1659.66 |
| 4. | Potassium | gm/kg | 11.56 |
| 5. | Sulphate | gm/kg | 2.09 |
| 6. | Hexa Chromium | gm/kg | ND |
| 7. | Chloride | gm/kg | 729.9 |
| 8. | TOC | gm/kg | 0.58 |
| 9. | COD | gm/kg | 86.66 |
| 10. | Cadmium | gm/kg | 0.0024 |
| 11. | Copper | gm/kg | 0.0056 |

| Sr. No. | Parameter | Unit | Value |
|---|---|---|---|
| 12. | Lead | gm/kg | 0.0326 |
| 13. | Iron | gm/kg | 0.0424 |
| 14. | Nickel | gm/kg | 0.0046 |
| 15. | Zinc | gm/kg | 0.0525 |
| 16. | Manganese | gm/kg | 0.0024 |
| 17. | Mercury | gm/kg | <0.0004 |
| 18. | Total Chromium | gm/kg | 0.0004 |
| 19. | Arsenic | gm/kg | <0.0004 |
| 20. | Cyanide | gm/kg | ND |
| 21. | Total Nitrogen | gm/kg | ND |

## 78.2 Utilization Process

Effluent generated from manufacturing process is collected into equalization cum neutralization tank. Spent Calcium Hypochlorite dosing is carried out using venturi so as to neutralize the effluent. Neutralized effluent is mixed for 2.5 hours and then passed through a filter press where the insoluble (Filter cake) are separated to get clear, neutral treated effluent. The filter cake is bagged and stored in the hazardous waste storage area and disposed by co-processing in cement industry / disposed at TSDF site. The treated effluent is transferred to final storage tank from where it is treated in ETP units or sent to CETP for further treatment and final disposal.

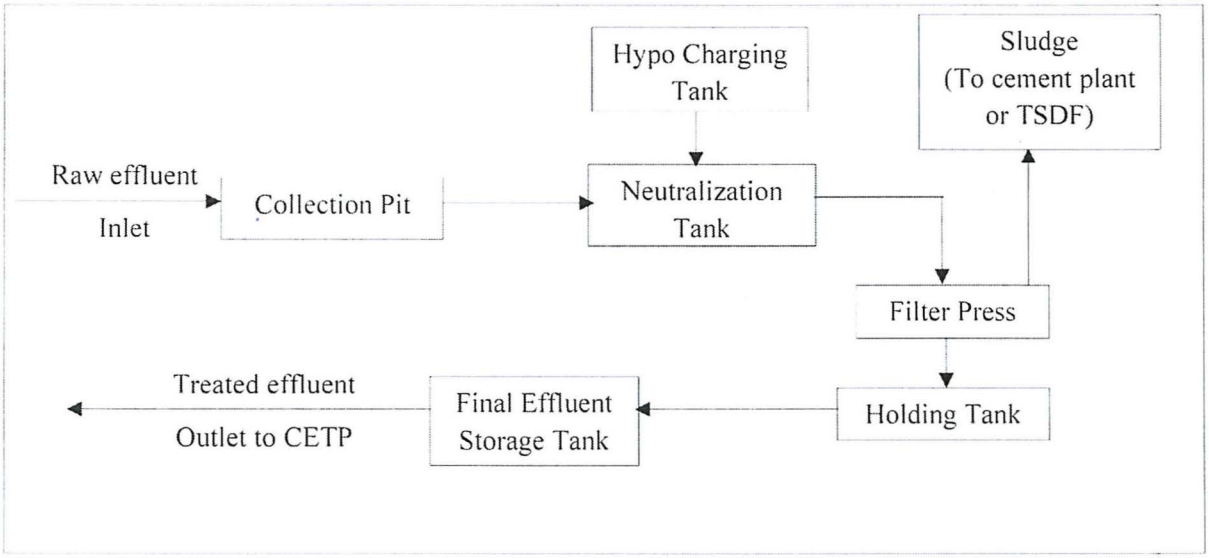


**Figure: 1-*Process flow diagram for utilization of spent Calcium Hypochlorite.***

### 78.3 Product Usage / Utilization

Spent Calcium Hypochlorite generated during manufacturing of High Strength Bleach Powder (HSBP) shall be used in Effluent Treatment Plant (ETP) as neutralizing agent.

### 78.4 Methodology for finalization of quantity and quality of Spent Calcium Hypochlorite (generated during manufacturing of High Strength Bleach Powder) for utilization in ETP as neutralizing agent

1) MoEF&CC vide Office Memorandum No: SO 3518(E) dated 23/11/2016 notified the procedure to issue permission for the "Change in product mix without increase in pollution load". As per this notification, all SPCBs shall have to frame Technical Committee to implement the notification.

2) It is envisaged that wherever scrutiny and assessment are required in this SoP, implementation of this SoP is done through the above committee and in case the said committee has not been constituted then implementation be done through committee constituted for implementation of HOWM Rules, 2016, by the SPCBs/PCCs. Further, the following shall be the responsibilities of Technical Committee while reviewing the application for utilization of spent calcium hypochlorite:

   a) Technical committee shall check characteristics of spent calcium hypochlorite i.e. COD/TOC, Acidity, Heavy Metals and Toxicity generated from the source industry.

   b) The quality of industrial wastewater shall be reviewed so as to evaluate the feasibility of utilization of spent calcium hypochlorite.

   c) The committee shall permit the quantity for utilization of spent calcium hypochlorite for neutralization into ETP based on mass balance, water balance, inlet/outlet standards, and results of Jar test, design criteria of ETP.

   d) The committee shall also consider the effect of dosage of spent calcium hypochlorite in secondary ETP system.

   e) Based on above, the quantity and quality of spent calcium hypochlorite shall be permitted.

### 78.5 Standard Operating Procedure for utilization

This SoP is applicable only for utilization of Spent Calcium Hypochlorite generated during manufacturing of HSBP as neutralizing agent in ETP.

1) Spent Calcium Hypochlorite shall be procured only in SPCB/PCC authorized closed tankers mounted over vehicles fitted with requisite safeguards ensuring no spillage of Spent Calcium Hypochlorite.

2) Spent Calcium Hypochlorite shall be stored in designated storage tank under covered storage shed. The storage area of Spent Calcium Hypochlorite shall have leak-proof floor tiles with adequate slope to collect spillage, if any, into a collection pit. The spillage from collection pit shall be transferred to ETP, as the cases may be, through chemical process

pump. Further, storage sheds shall have proper slope and seepage collection pit to collect seepage / floor washing. The collected seepage / floor washing shall be channelized to ETP for further treatment.

3) Spent Calcium Hypochlorite shall be unloaded from the closed tanker to the storage tank through pipelines using dedicated transfer pump.

4) Transfer of Spent Calcium Hypochlorite from storage tank to neutralization tank shall be carried out through mechanical transfer pump with fixed pipeline

5) The unit shall utilize fresh lime to adjust pH within permissible limit, if required.

6) Treatment and disposal of wastewater:

   Wastewater generated from floor-washings, spillages, including the wastewater from filtration shall be treated Physico-Chemically in an ETP or may be sent to CETP for final disposal or be treated further in a captive facility to comply with surface water discharge standards.

   In case of zero discharge condition by SPCB/PCC, the treated waste water from ETP may be managed as per conditions stipulated by the SPCB/PCC.

7) 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.

8) The hazardous wastes generated (if any) 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 generation of the waste in accordance with the authorization issued by the concerned SPCB/PCC.

9) The unit shall ensure that the Spent Calcium Hypochlorite are procured from the industries, which have valid authorization from the concerned SPCB/PCC as required under HOWM Rules, 2016.

10) Transportation of Spent Calcium Hypochlorite 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.

11) Prior to utilization of Calcium Hypochlorite, the unit shall obtain authorization for generation, storage and utilization of Spent Calcium Hypochlorite from the concerned SPCB/PCC under HOWM Rules, 2016.

12) 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.

13) 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.

14) The unit shall provide suitable fire safety arrangements and flame proof electrical fittings.

15) 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.

### 78.6 Record/Returns Filing

1) The unit shall maintain a passbook issued by concern SPCB and maintain details of each procurement of spent acid 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 generation/procurement of spent calcium hypochlorite, date wise utilization of spent calcium hypochlorite, 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.

### 78.7 Standards

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

| | |
|---|---|
| $Cl_2$ | 3 mg/ $m^3$ TWA* (PEL) |

**PEL - Permissible Exposure Limit ;*
**time-weighted average (TWA)- measured over a period of 8 hours of operation of process.*

2) Monitoring of the above specified parameters for fugitive emission shall be carried out quarterly for first year followed by at least annually in the subsequent year of utilization. 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.

3) 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 the common Effluent Treatment Plant (CETP), zero discharge shall be met.

### 78.8 Siting of Industry

Facilities for utilization of Spent Calcium Hypochlorite shall 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.

### 78.9 Checklist of Minimal Requisite Facilities

| Sl. No | Particulars |
|---|---|
| 1. | Dedicated storage tank for storage of spent Calcium Hypochlorite with proper slope & seepage collection pit. |
| 2. | Mechanical transfer pump(s) with fixed pipeline for transportation of spent Calcium Hypochlorite. |
| 3. | Neutralization tank with venturi provision for dosing spent Calcium Hypochlorite. |
| 4. | Online pH Sensor at neutralization tank. |
| 5. | Filter Press |
| 6. | Treated wastewater holding tank. |
| 7. | If required, treated wastewater shall be further treated in captive ETP units or sent to CETP for achieving discharge norms prescribed by concerned SPCB / PCC. Disposal of wastewater shall be as per consent of concerned SPCB / PCC. |

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