

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 Aluminum Chloride (generated from manufacturing of CPC Green - 7 and Pigment Phthalocynine Green) as a coagulant in CETP



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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 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.

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77.0 Utilization of Spent Aluminum Chloride:

Type of HW	Source of generation	Recovery/Product
Spent Aluminum Chloride (Sr. No: 10, Class – B of Schedule – II, HOWM Rules – 2016)	During the production of CPC Green - 7 and Pigment Phthalocynine Green	Supplementary resource as coagulant in CETP

77.1 Source of Waste:

The Spent Aluminum Chloride is generated from manufacturing of CPC Green - 7 and Pigment Phthalocynine Green and is categorized as hazardous waste at S. no: 10, Class-B of Schedule-II of HOWM Rules, 2016 which is required to be disposed in authorized disposal facility in accordance with authorization condition, when not utilized as resource recovery.

Table 1. Typical Characteristics of Spent Aluminum Chloride

No.	Parameters	Unit	generated from Pigment Phthalocynine Green	generated from CPC Green - 7
1	Aluminum as Al ₂ O ₃	%	6.3	9.75
2	Aluminum as Al ₂ Cl ₃	%	8.24	12.79
3	Chlorides as Cl	%	6.87	3.74
4	Insoluble Matter	mg/lit	0.01	0.003
5	pH(5% Solution)	--	2.7	2.62
6	Sulphate as SO ₄	%	0.019	0.021
7	Specific Gravity	--	1.09	1.14
8	Sodium	mg/lit	10443	17647
9	TOC	mg/lit	260	210
10	COD	mg/lit	1080	810
Heavy Metals				
11	Cyanides	mg/lit	ND*	ND*
12	Arsenic	mg/lit	ND*	ND*
13	Total Chromium	mg/lit	2.53	0.36
14	Hexavalent Chromium	mg/lit	< 0.02	< 0.02
15	Copper	mg/lit	28.6	1.04
16	Lead	mg/lit	ND*	0.39
17	Mercury	mg/lit	ND*	ND*
18	Nickel	mg/lit	0.56	1.04
19	Zinc	mg/lit	1.42	9.62
20	Cadmium	mg/lit	ND*	0.021
21	Selenium	mg/lit	ND*	ND*

*ND = Not Detected

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77.2 Utilization Process

The Spent Aluminum Chloride is used in wastewater treatment plant Common Effluent Treatment Plant [CETP]) as a Coagulant (by replacing use of fresh Aluminum Chloride). The dosing of coagulant (i.e. Spent Aluminum Chloride) is done in CETP in primary and/or secondary clarifier. Use of spent Aluminum Chloride will save resources and economically beneficial to both CETP as well as Aluminum Chloride generating unit. The effluent goes through screen chamber, collection tank, equalization tank, flash mixer, flocculation tank, primary clarifier, aeration tank, secondary clarifier and treated effluent storage tank. After treatment, the treated effluent may be discharged in accordance with the conditions stipulated in the Consent to Operate issued by respective SPCB/PCC. Typical flow diagram for utilization of Spent Aluminum Chloride in CETP is shown in Figure 1.

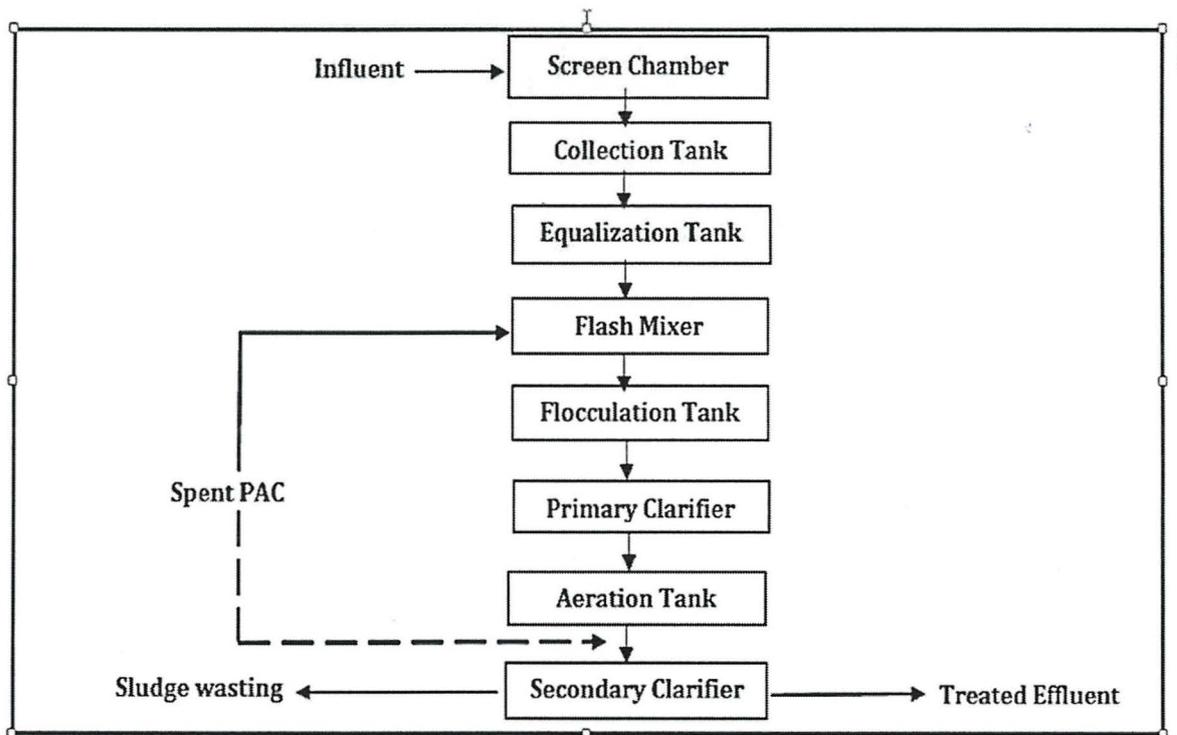


Figure: 1-Process flow diagram for utilization of spent Aluminum Chloride.

77.3 Product Usage / Utilization

The Spent Aluminum Chloride shall be utilized in CETP as a coagulant before primary and/or secondary clarifier.

77.4 Methodology for finalization of quantity and quality of Spent Aluminum Chloride for utilization in CETP as coagulant

- 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.

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- 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 aluminum chloride:
 - a) Technical committee shall check characteristics of spent aluminum chloride with reference to COD, Heavy Metals and Toxicity from the source industry.
 - b) The quality of industrial wastewater shall be reviewed so as to evaluate the feasibility of utilization of Hazardous waste.
 - c) The committee shall permit the quantity for utilization of Hazardous waste into CETP based on mass balance, water balance, inlet/outlet standards, results of Jar test, and design criteria of CETP.
 - d) Copper shall be removed from the spent aluminum chloride at source of generation (i.e. less than 200 ppm). The rest parameters shall be as mentioned in CETP's Consent to Establish (CTE) and/or Consolidated Consent & Authorization (CC&A).
 - e) In case, if parameters are exceeding the inlet or design norms of CETP, such cases may be referred to CPCB to prepare specific SOP.
 - f) The adequacy certificate/ treatability report of final treated effluent complying prescribed standards in Consent to Operate issued under Water Act shall also be assessed prior to granting authorization.
 - g) The general conditions shall be complied as mentioned in this SOP.
 - h) Based on the recommendation of the Technical Committee. SPCB shall grant authorization to unit under Rule 9 to utilize spent Aluminum Chloride as a Coagulant in CETP.
 - i) Online continuous emission/effluent monitoring system (OCEMS) for, BOD,-COD, TSS, TOC, pH or as specified in the consent shall be provided and if OCEMS results exceeds the limits prescribed by the SPCB/PCC during operation then spent aluminum chloride dosing shall be aborted immediately.

77.5 Standard Operating Procedure for utilization

This SoP is applicable only for utilization of spent aluminum chloride generated during manufacturing of CPC Green - 7 and Pigment Phthalocynine Green as a coagulant in CETP (in liquid form only).

- 1) The Spent Aluminum Chloride shall be transported in acid proof tankers mounted on vehicles fitted with requisite safeguards ensuring no spillage, as authorized by SPCB/PCC.
- 2) There shall be a designated space for unloading of Spent Aluminum Chloride into the HDPE storage tank. The receiving storage tank shall be placed above the ground and

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contained with low raise parapet/bund wall & concrete/acid proof floor with slope to collect spillages, if any, into collection pit. The spillage from collection pit shall be transferred to CETP.

- 3) There shall be no manual handling of the Spent Aluminum Chloride. It shall be transferred through fixed mechanical transfer pump & pipelines from storage tank.
- 4) The unit shall utilize fresh Poly Aluminum Chloride to adjust pH within permissible limit, if required.
- 5) Treatment and disposal of wastewater:

Wastewater generated from floor-washings, spillages, including the wastewater from filtration shall be treated Physico-Chemically in CETP for final disposal to comply with surface water discharge standards.

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

- 6) 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.
- 7) 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.
- 8) The unit shall ensure that the spent Aluminum Chloride are procured from the industries, which have valid authorization from the concerned SPCB/PCC as required under HOWM Rules, 2016.
- 9) Transportation of spent Aluminum Chloride 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.
- 10) Prior to utilization of spent Aluminum Chloride, the unit shall obtain authorization for generation, storage and utilization of Spent Aluminum Chloride from the concerned SPCB/PCC under HOWM Rules, 2016.
- 11) 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.
- 12) 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

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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.

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

77.6 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 Aluminum Chloride, date wise utilization of spent Aluminum Chloride, hazardous waste generation and its disposal, etc. shall be maintained including analysis report 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.

77.7 Standards

- 1) Treated effluent shall comply with CETP standards prescribed in Consent to Operate issued under the Water (Prevention and Control of Pollution) Act, 1974 by the respective SPCB/PCC.
- 2) Effluent monitoring for specified parameters shall be carried out quarterly. The monitoring shall be carried out by NABL accredited or ISO17025 /EPA approved laboratories and the results shall be submitted to the concerned SPCB/PCC on a quarterly basis.

77.8 Siting of Industry

Facilities for utilization of Spent Aluminum Chloride 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.

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77.9 Checklist of Minimal Requisite Facilities

Sl. No	Particulars
1.	There shall be a designated space for unloading of Spent Aluminum Chloride into the storage tank. The storage tank shall be placed above the ground and contained with low raise parapet/bund wall with slope to collect spillages, if any, into collection pit.
2.	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).
3.	Mechanized system for transfer of Spent Aluminum Chloride from tanker to storage tank and storage tank to dosing tank.
4.	Dedicated hazardous waste storage area for temporary storage of hazardous waste generated during utilization process.
5.	Online pH sensor shall be installed at the outlet of primary and/or secondary treatment unit.
6.	Online continuous effluent monitoring system (OCEMS) for BOD, COD, pH, TOC, TSS or as per consent condition.

