

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 Acid (HCl and H₂SO₄) generated from dye & dye intermediates industries and chemical manufacturing industries as neutralizing agent in Effluent Treatment Plant (ETP)/Common Effluent Treatment Plant (CETP)

(Revised)



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**Central Pollution Control Board
(Ministry of Environment, Forest & Climate Change,
Government of India)
Parivesh Bhawan, East Arjun Nagar,
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Utilization of Spent Acid generated from dye & dye intermediates industries and chemical manufacturing industries as neutralizing agent in Effluent Treatment Plant (ETP)/Common Effluent Treatment Plant (CETP)

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 SoPs on utilisation have been circulated by 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.
 - f. Special Conditions:
 - i. ETPs/CETPs shall be assessed for requirement of spent acid and priority shall be given to utilization of spent H_2SO_4 . Spent HCl shall not be permitted if spent H_2SO_4 generation adequate for utilization in ETPs/CETPs. SPCB/PCC shall also assess generation of spent H_2SO_4 /HCl from dye & dye intermediates and chemical manufacturing industries in the State periodically.
 - ii. There shall be no inter-state movement permitted for utilization of spent acid in ETP/CETP. However, the same may be relaxed in exceptional cases, the subject to examination and recommendation by CPCB.
 - iii. SPCB/PCC should carefully evaluate and ensure proper utilization of spent acids. Any violation found should be dealt with maximum punishment, including cancellation of authorization and levying hefty penalty amount.
- 2) After issuance of authorization, SPCBs shall verify the compliance of checklist and SoP on quarterly basis for initial 2 years; followed by random checks in the 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 / 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 website, periodically. Such updated list shall be sent to CPCB on half yearly basis i.e., by July and January respectively.

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- 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.

49.0 Utilization of Spent Acid:

Type of HW	Source of generation	Recovery/Product
Spent acid (HCl and H ₂ SO ₄) category 26.3 Schedule I & Inorganic acid mentioned at Sl. No. 15 in the foot note of Schedule II of HOWM Rules, 2016	Generated from: <ul style="list-style-type: none"> • Dyes & dyes intermediates industries, and • Chemical manufacturing industries 	As a neutralizing agent in ETP/ CETP

49.1 Source of Waste:

The spent acid (HCl and H₂SO₄) is generated from manufacturing of dyes and dyes intermediate industries and chemical manufacturing industries and is categorized as hazardous waste at S.No. 26.3 of Schedule I of HOWM Rules, 2016 and Inorganic Acids mentioned at S. No 15 in the foot note of Schedule II of HOWM Rules. 2016, which are required to be disposed in authorized disposal facility in accordance with authorization condition, when not utilized as resource recovery.

49.2 Utilization Process

The spent acid is used in wastewater treatment plant (Effluent Treatment Plant/Common Effluent Treatment Plant) as a neutralizing agent (by replacing use of fresh sulphuric/HCl acid). In neutralizing process, pH of alkaline wastewater is reduced by using neutralizing agent. The dosing of neutralizing agent (i.e. Spent Hydrochloric/Sulphuric acid) is done in ETP/CETP in equalization tank/ before flash mixer. 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.

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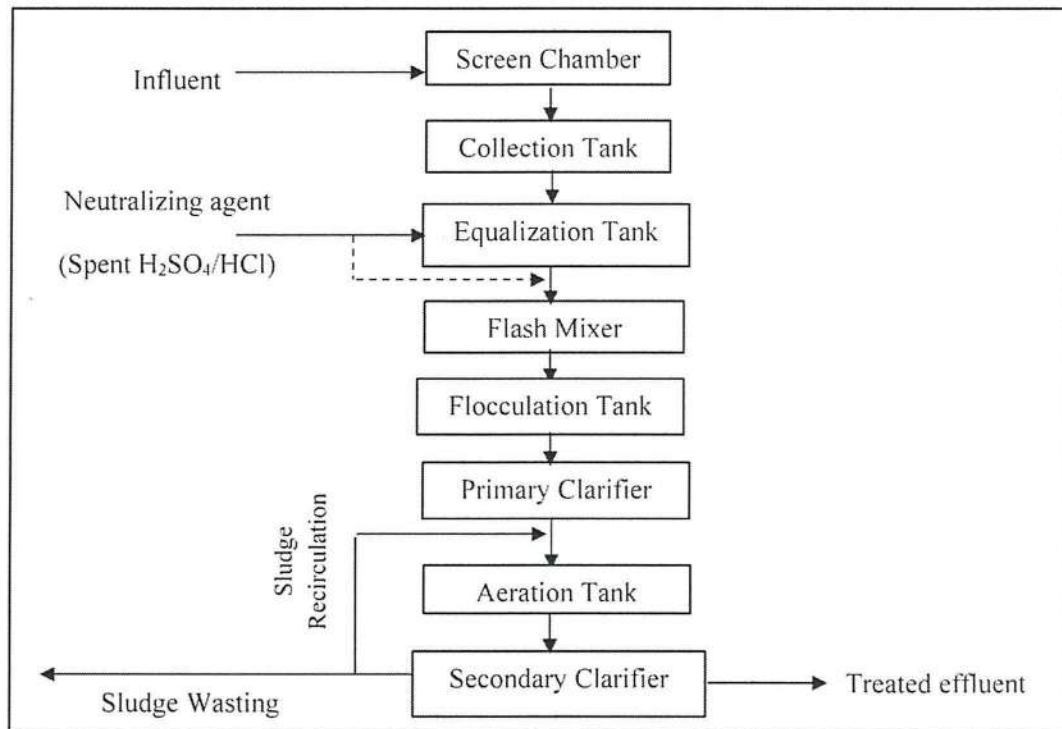


Figure 1: Typical flow diagram for utilization of spent H_2SO_4/HCl acid in ETP/CETP.

49.3 Product Usage / Utilization

The spent (HCl and H_2SO_4) acid shall be utilized in wastewater treatment plant (i.e. ETP/CETP) as a neutralizing agent in equalization tank/ before flash mixer.

49.4 Methodology for finalization of quantity and quality of Spent Acid for utilization in ETP/ CETP 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/PCCs 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 hydrochloric/sulphuric acid:
 - a) Technical committee shall check characteristics of spent acid 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 acid.

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- c) The committee shall permit the quantity for utilization of spent acid for neutralization into ETP/CETP based on mass balance, water balance, inlet/outlet standards, and results of Jar test, design criteria of CETP/ ETP.
- d) In no case, the spent acid having parameters (except pH) exceeding the inlet or design norms of ETP/CETP, whichever is stringent, shall be permitted for utilization. Further, the norms for the heavy metals and pesticides shall not exceed following:

No.	Parameters	CETP Inlets Norms (mg/l)
1	Arsenic	0.2
2	Total Chromium	2
3	Hexavalent Chromium	0.1
4	Copper	3
5	Lead	0.1
6	Mercury	0.01
7	Nickel	3
8	Zinc	5
9	Cadmium	2
10	Pesticides	Absent
11	Cyanide	0.2

49.5 Standard Operating Procedure for utilization

This SoP is applicable only for utilization of spent acid (HCl & H₂SO₄) generated during manufacturing of dyes and dyes intermediate industries and chemical manufacturing industries as neutralizing agent in ETP/CETP.

- 1) The spent acid shall be transported in SPCB/PCC authorized tankers mounted on vehicles fitted with requisite safeguards ensuring no spillage of the same.
- 2) There shall be a designed space for unloading of spent acid into the storage tank. The receiving 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. Alternatively, storage tanks for spent acid may be kept below the ground provided it has HDPE liner system beneath the tank and leachate collection system below HDPE liner. In the event of leachate detection in the leachate collection system, corrective measures shall be taken immediately.
- 3) The unit shall install storage tank under cool, dry, well ventilated covered storage shed(s) within premises. As authorized by the concerned SPCB/PCC under HOWM Rules. 2016, so as to eliminate rain water intrusion.

Further, the storage area 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/CETP, as the cases may be, through chemical process pump.

- 4) There shall be no manual handling of the hazardous wastes (spent acid). Acid proof pump shall be used for transfer of spent acid through pipelines to the spent acid dosing tank.

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- 5) The treated effluent shall be discharged in accordance with the conditions stipulated in the Consent to Operate issued by respective SPCB /PCC under the Water (Prevention and Control of Pollution) Act, 1974.
- 6) 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.
- 7) It shall be ensured that the spent acid is procured from the industries who have valid authorization for the same from the concerned SPCB/PCC as required under HOWM Rules, 2016.
- 8) The hazardous wastes generated (such as ETP sludge) 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. Such storage area shall be covered with proper ventilation.
- 9) SPCBs/PCCs shall ensure synchronization of generation and utilization of spent acid and the same shall be reflected in respective authorization specifying name and quantity.
- 10) Transportation of spent acid shall be carried out by sender or receiver (utilizer) only after obtaining authorization from the concerned SPCB/PCC under HOWM Rules, 2016.
- 11) Prior to utilization of spent acid, the unit shall obtain authorization for generation, storage and utilization from the concerned SPCB/PCC under HOWM Rules 2016.
- 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 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.
- 13) 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.

49.6 Record>Returns Filing

- 1) The unit shall maintain a passbook issued by concern SPCB and maintain details of each procurement of spent acid shall be entered:
 - Address of the sender
 - Date of dispatch
 - Quantity procured
 - Seal and signature of the sender
 - Date of Receipt in the premises



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- 2) A log book with information on source and date of generation/procurement of spent acid, quantity, date wise utilization of spent acid, hazardous waste generation and its disposal, etc. shall be maintained including analysis report of 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 HOWM Rules, 2016.
- 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.

49.7 Standards

- 1) Fugitive emission in the storage area shall comply with following standards:

Acid Mist (H₂SO₄) : 1.00 mg/m³ TWA* (PEL)
 Acid Mist (HCl) : 7.00 mg/m³ #Ceiling limit

**PEL - Permissible Exposure Limit, # - Ceiling Limit*

**time-weighted average (TWA) - measured over a period of 8 hours of operation of process.*

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.

- 2) Treated effluent shall comply with prescribed CETP standards notified under the Environment (Protection) Act, 1986, vide notification no. S.O. 4(E) dated 01/01/2016 or standards prescribed in Consent to Operate issued under the Water (Prevention and Control of Pollution) Act, 1974 by the respective SPCB/PCC, whichever is stringent.
- 3) Fugitive and 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.

49.8 Siting of Industry

Facilities for utilization of spent acid shall 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.

49.9 Checklist of Minimal Requisite Facility

Sl. No	Particulars
1.	Storage tank(s) of adequate capacity to store spent acid of at least two weeks requirement. Storage tank(s) shall be placed above the ground and contained with low raise parapet/bund wall with slope to collect spillages, if any, into collection pit. Alternatively, storage tanks may be below the ground provided it has HDPE liner system beneath the tank and leachate collection system below HDPE liner.
2.	Cool, dry well- ventilated covered storage shed(s) for spent acid storage tanks within premises.

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3.	Mechanized system for transfer of spent acid from tanker to storage tank and storage tank to spent acid dosing tank.
4.	Adequate ETP/CETP so as to comply with standards/conditions prescribed by the concerned SPCB/PCC.
5.	Dedicated hazardous waste storage area for temporary storage of hazardous waste (i.e. primary sludge and secondary sludge) generated during utilization process.
6.	Automatic online dosing pump at Neutralization tank for dosing of Spent Acid.
7.	Online pH Sensor at the outlet of neutralization tank.

