

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 Sodium Salicylate Solution (generated during manufacturing of Perfumery Esters by Hot Esterification Process) and Spent HCl (generated during manufacturing of Chloral) in manufacturing of Salicylic Acid for Industrial Usage (Dyes manufacturing)



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**Central Pollution Control Board
(Ministry of Environment, Forest & Climate Change,
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Utilization of Spent Sodium Salicylate Solution (generated during manufacturing of Perfumery Esters by Hot Esterification Process) and Spent HCl (generated during manufacturing of Chloral) in production of Salicylic Acid for usage in Dye Industries

Procedure for grant of authorization by State Pollution Control Board (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 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 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 Spent Sodium Salicylate Solution and Spent HCl being generated and sent by the units involved in production of Perfumery Esters by Hot Esterification Process and the quantity that can be utilized by the units authorized by SPCBs/PCs as per this SoP.
- 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/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) [HOWM] Rules, 2016 to CPCB and also upload the same on SPCB/PCC website, periodically. Such updated list shall be sent to CPCB.
- 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 (if any generated during utilisation) or its complete utilisation or arrangement for transfer to 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/NAAQ 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 utiliser of Spent Sodium Salicylate Solution and Spent HCl shall maintain daily records on National Hazardous Waste Tracking System (NHWTS).



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108.0 Utilization of hazardous waste (H.W.):

Type of HW	Source of generation	Recovery/ Product
1) Spent Sodium Salicylate Solution (Schedule-II Class B-5 of HOWM Rules – 2016)	Generated during manufacturing of Perfumery Esters by Hot Esterification Process	Manufacturing of Salicylic Acid in production of dyes; excluding food, healthcare and pharma industry.
2) Spent HCl (Schedule-II Class B-15 of HOWM Rules – 2016)	Generated during manufacturing of Chloral	

108.1 Source of Waste:

Spent Sodium Salicylate Solution generated during manufacturing of Perfumery Esters by Hot Esterification Process and Spent HCl generated during manufacturing of Chloral; falls under Class B5 (Aromatic compounds other than those listed in Class A) and Class B15 (Inorganic Acids) respectively of Schedule II of HOWM Rules –2016.

Table 1. Typical Characteristics of spent Sodium Salicylate Solution

S. No.	Parameter	Unit	Result
1.	Appearance	--	Dark Brown Colour
2.	pH	--	8.49
3.	Purity	%	12.51
4.	Other Organic Impurities	%	NIL
5.	Water Content	%	87.3

Table 2. Typical Characteristics of Spent HCl

S. No.	Parameter	Unit	Chloral Result
1.	Appearance	--	Dark Yellow Colour
2.	Purity	%	30.17
3.	pH of 10% solution	--	Negative 0.49
4.	TOC	mg/l	336.8
5.	Density	gm/cc	1.1421
6.	Heavy Metal Content	%	0.2
7.	Water Content	%	68.5

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S. No.	Parameter	Unit	Chloral Result
8.	Other organic impurities	%	Nil

Note: SPCBs/PCCs to check the characteristics of spent sodium salicylate acid and spent HCl 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.

108.2 Product Stage Utilization of Spent Sodium Salicylate Solution and Spent HCl:

Spent Sodium Salicylate solution mixed with Spent HCl in a closed reaction vessel. The mass generated after completion of reaction is filtered, crystallized and centrifuged. The mother liquor is sent to the ETP for treatment. The wet cake is washed and then dried in dryer and packed in bags.

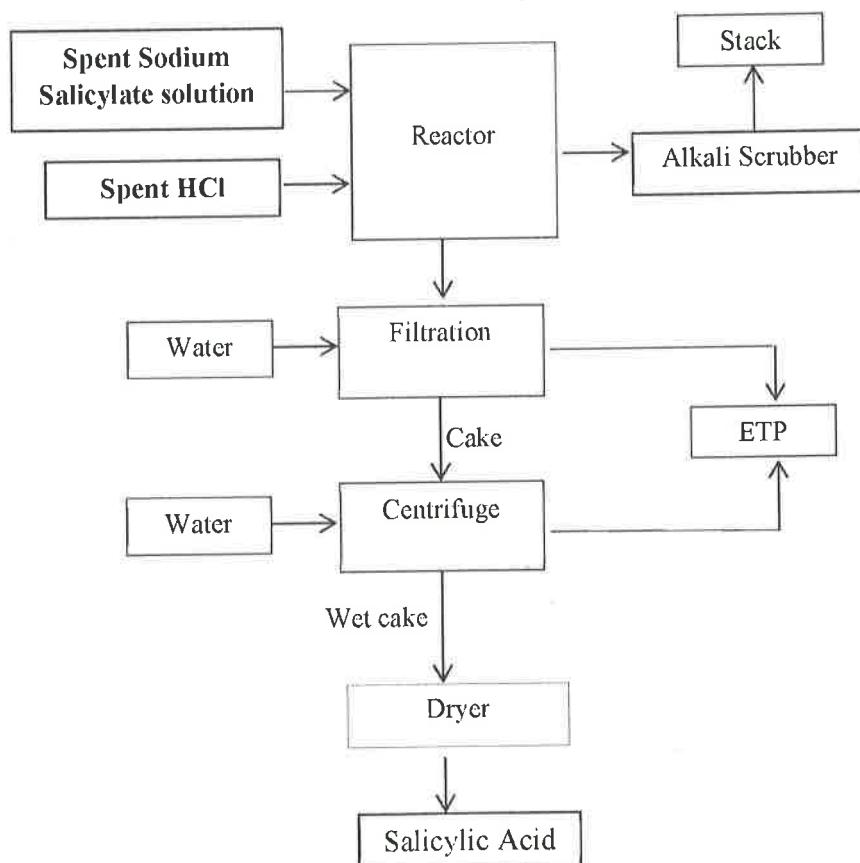


Figure: 1-Process flow diagram for utilization of Spent Sodium Salicylate Solution and Spent HCl

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108.3 Standard Operating Procedure for utilization of Spent Sodium Salicylate Solution and Spent HCl:

This SoP is applicable only for Utilization of Spent Sodium Salicylate Solution (generated during manufacturing of Perfumery Esters by Hot Esterification Process) and Spent HCl (generated during manufacturing of Chloral) in manufacturing of Salicylic Acid for usage in production of dyes (excluding pharma, healthcare and food industry).

- 1) The utilizer shall procure Spent Sodium Salicylate Solution only in SPCBs/ PCCs authorised vehicles fitted with leak proof HDPE containers or teflon lined containers / tanks with requisite safeguards ensuring no spillage. Spent HCl shall be transported in HDPE containers or rubber lined steel tanks.
- 2) The unloading, storage, transfer and handling of Spent Sodium Salicylate Solution and Spent HCl during entire utilization process shall be carried out through dedicated mechanical transfer acid proof pump with fixed pipeline in closed system. Manual handling shall be strictly prevented.
- 3) The utilizer shall store Spent Sodium Salicylate Solution and Spent HCl separately in suitable dedicated storage tanks such as HDPE or rubber lined steel tank, placed over acid proof brick lined dyke covered under storage shed within the premises. Further, storage sheds shall have proper slope and seepage collection pit to collect spillage/ floor washing. The collected spillage/ seepage / floor washing shall be channelized to Effluent Treatment Plant for further treatment through chemical process pump.
- 4) The unit shall provide separate storage tanks for storage of chemicals and the storage tanks should be at designated place with proper cover and with acid brick lining floors.
- 5) The unit shall provide the reactors, and storage tanks of Spent Sodium Salicylate Solution and Spent HCl be connected to adequate alkali scrubbing system.
- 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:

Wastewater generated from floor-washings, spillages, reactor washing, scrubber bleed including the wastewater from filtration, shall be treated Physico-Chemically in an ETP so as to comply with inlet standards prescribed in case of CETP or be treated in captive ETP having adequate treatment facilities such as Advanced oxidation process to comply with surface water discharge standards as stipulated in the Consent issued by the SPCBs/PCCs. If the treated water not meeting the concerned SPCB prescribed standards, then forced evaporation method like MEE shall be adopted.

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



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- 8) 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.
- 9) The hazardous wastes generated (namely Filter cake, other chemical sludge, other residue etc) 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. The floor of the storage shed shall have proper slope to collect leachate, if any, and collection pit and chemical process pumps to transfer leachate from the collection pit to ETP / reaction tank.
- 10) The unit shall ensure safety measures such as safety valves to appropriate equipment where, high pressure process may involve.
- 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) The unit shall ensure that the Spent Sodium Salicylate Solution and Spent HCl is procured from authorized industries as required under HOWM Rules, 2016.
- 13) Transportation of Spent Sodium Salicylate Solution and Spent HCl shall be carried out by sender (generator) or receiver (utilizer) only after obtaining authorization from the concerned SPCB under Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016. Requisite manifest document shall be followed as laid down under the said Rules.
- 14) Prior to utilization of Spent Sodium Salicylate Solution and Spent HCl, the unit shall obtain authorization for collection, storage and utilization of Spent Sodium Salicylate Solution and Spent HCl from the concerned SPCB/ PCC under Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016.
- 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) 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.

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

108.4 Product Usage / Utilization

- 1) The Recovered Salicylic acid (produced by utilizing spent Sodium Salicylate Solution and Spent HCl) shall be used in industrial use (dye industry) only by excluding food, healthcare and pharma industries.
- 2) The Product i.e. Salicylic Acid shall comply Bureau of Indian Standards (BIS), or other regulatory standards for further respective utilization, as applicable.
- 3) The unit shall label its product i.e. Salicylic acid prepared by utilizing aforesaid Spent Sodium Salicylate Solution and Spent HCl as *“This Salicylic Acid has been manufactured by utilizing spent Sodium Salicylate Solution and Spent HCl during manufacturing of Perfumery Esters and Chloral respectively”*.

108.5 Record>Returns Filing

- 1) The unit shall maintain a passbook issued by concern SPCB/PCC and maintain details of each procurement of Spent Sodium Salicylate Solution and Spent HCl 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 Sodium Salicylate Solution and Spent HCl, 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.
- 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 ensure the management of daily records of quantity generated, utilised & disposed through NHWTS.

108.6 Standards

- 1) Source emissions from the stack connected to reactors/ process unit shall comply with the following Emission standards or as prescribed by the concerned SPCB/PCC, whichever is stringent:

PM	150 mg/Nm ³
HCl (acid mist)	35 mg/Nm ³

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

VOC (as iso-amyl alcohol)	360 mg/m ³ TWA * (PEL)
HCl	7 mg/m ³ TWA * (PEL)

PEL - Permissible Exposure Limit.

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

- 3) Monitoring of the above specified parameters for Source emissions and Work zone 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.
- 4) 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 (i) zero discharge as per consent or (ii) non-availability of the common Effluent Treatment Plant (CETP), the unit shall achieve zero discharge by setting up adequate captive treatment facility.

108.7 Siting of Industry

Facilities for utilization of Spent Sodium Salicylate Solution and Spent HCl 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.

108.8 Size of Plant and Efficiency of Utilisation

1 MT of Salicylic Acid is produced by using 8.06 MT of Spent Sodium Salicylate Solution and 1.16 MT of Spent HCl. Therefore, requisite facilities of adequate size of storage shed and other plant and machineries shall be installed accordingly.

108.9 Checklist of Minimal Requisite Facilities:

Sl. No	Particulars
1.	Dedicated lined storage tanks for storage of Spent Sodium Salicylate Solution and Spent HCl; acid proof brick lining and proper slope & seepage collection pit in the storage tank area and tanker / container unloading area.
2.	Cool, dry well-ventilated covered sheds for Spent Sodium Salicylate Solution and Spent HCl, product storage tanks and process activities within premises.
3.	Dedicated hazardous storage area for temporary storage of hazardous waste generated during utilization process.
4.	Mechanical transfer pumps with fixed pipeline for transportation and handling of Spent Sodium Salicylate Solution and Spent HCl. Manual handling shall be strictly avoided.



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5.	Safety valve and vent to the hazardous waste (Sodium Salicylate Solution and Spent HCl) storage tanks and connect the vents to an adequate scrubbing system
6.	Reactor, Nutsche filter, crystallizer, dryer, and ETP.
7.	An adequate exhaust / venting arrangement in working area
8.	Adequate alkali scrubbing system to the reactors and storage tanks of Spent Sodium Salicylate Solution and Spent HCl
9.	Wastewater generated from process, floor washing, spillage, reactor washing, scrubber bleed including wastewater from filtration shall be treated in ETP (with advance oxidation system as required) (if not connected with common CETP) (Installation of MEE in case of ZLD requirement is prescribed by SPCB).
10.	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.

