

**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 Ammonia Liquor in manufacturing of
Ammonia Liquor**

(Revised January, 2024)



**Central Pollution Control Board
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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 hazardous waste (i.e., Spent Ammonia Liquor) being sent by generators and the quantity being utilized by the authorized industries.
- 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 atleast 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 Ammonia Liquor shall maintain daily records on National Hazardous Waste Tracking System (NHWTS) by CPCB.

Utilization of Spent Ammonia Liquor in manufacturing of Ammonia Liquor

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

Type of HW	Source of generation	Recovery/ Product
Spent Ammonia Liquor (Category: 26.1, 28.1, 29.1 Schedule-I and A-10 Schedule-II of HOWM Rules – 2016)	Generated during manufacturing of dyes & dye intermediate/ Pharmaceutical products/ Pesticide products/ Organic Chemical manufacturing Industry.	Ammonia Liquor for industrial use excluding pharma, fertilizer and food processing.

79.1 Source of Waste:

Spent Ammonia Liquor generated during manufacturing of dyes & dye intermediate/ Pharmaceutical products/ Pesticide products/ Organic Chemical manufacturing industry is categorized as Hazardous waste listed at Category: 26.1, 28.1, 29.1 Schedule-I and A-10 Schedule-II of HOWM Rules – 2016 respectively.

Table 1. Typical Characteristics of Spent Ammonia Liquor

Sr. No.	Parameter	Unit	Result
1.	pH	-	12.50 -12.74
2.	Appearance	-	Colour less - Hazy White - Light Yellow
3.	Purity (By mass)	%	18.42 – 23.5
4.	Specific Gravity (by mass)	%	0.912 - 0.915
5.	Trimethylphosphite (Pesticide)	ppm	BDL
6.	TOC	mg/L	1.218 – 1.83

79.2 Utilization process of Spent Ammonia Liquor:

Spent Ammonia Liquor is transferred to the spent ammonia Process (absorption) tank. The anhydrous ammonia stored in the holding tank is purged in to the absorption tank, and converted into ammonia liquor of required percentage. The spent liquor with lesser percentage of ammonia is converted to desired percentage by purging the anhydrous ammonia.

Unabsorbed ammonia gas from the process tank is scrubbed in water tanks followed by scrubber column as air pollution control device (APCD). Generated dilute ammonia liquor from scrubber and the absorbing water tanks is reused back in the process tank.

79.3 Product Usage / Utilization

1. The product i.e. recovered Ammonia Liquor manufactured by utilizing Spent Ammonia Liquor generated during manufacturing of dyes & dye intermediate/ Pharmaceutical products/ Pesticide products/ Organic Chemical manufacturing industry shall be utilized for Industrial purpose only excluding food, fertilizer and pharma industries.
2. The Product i.e. Recovered Ammonia Liquor shall comply Bureau of Indian Standards (BIS), for further respective utilization.

Utilization of Spent Ammonia Liquor in manufacturing of Ammonia Liquor

3. The unit shall label its product i.e. Ammonia Liquor manufactured by utilizing aforesaid Spent ammonia liquor as *"This recovered Ammonia Liquor has been manufactured by utilizing Spent Ammonia Liquor generated from manufacturing of dyes & dye intermediate/ Pharmaceutical products/ Pesticide products/ Organic Chemical manufacturing industry"*.

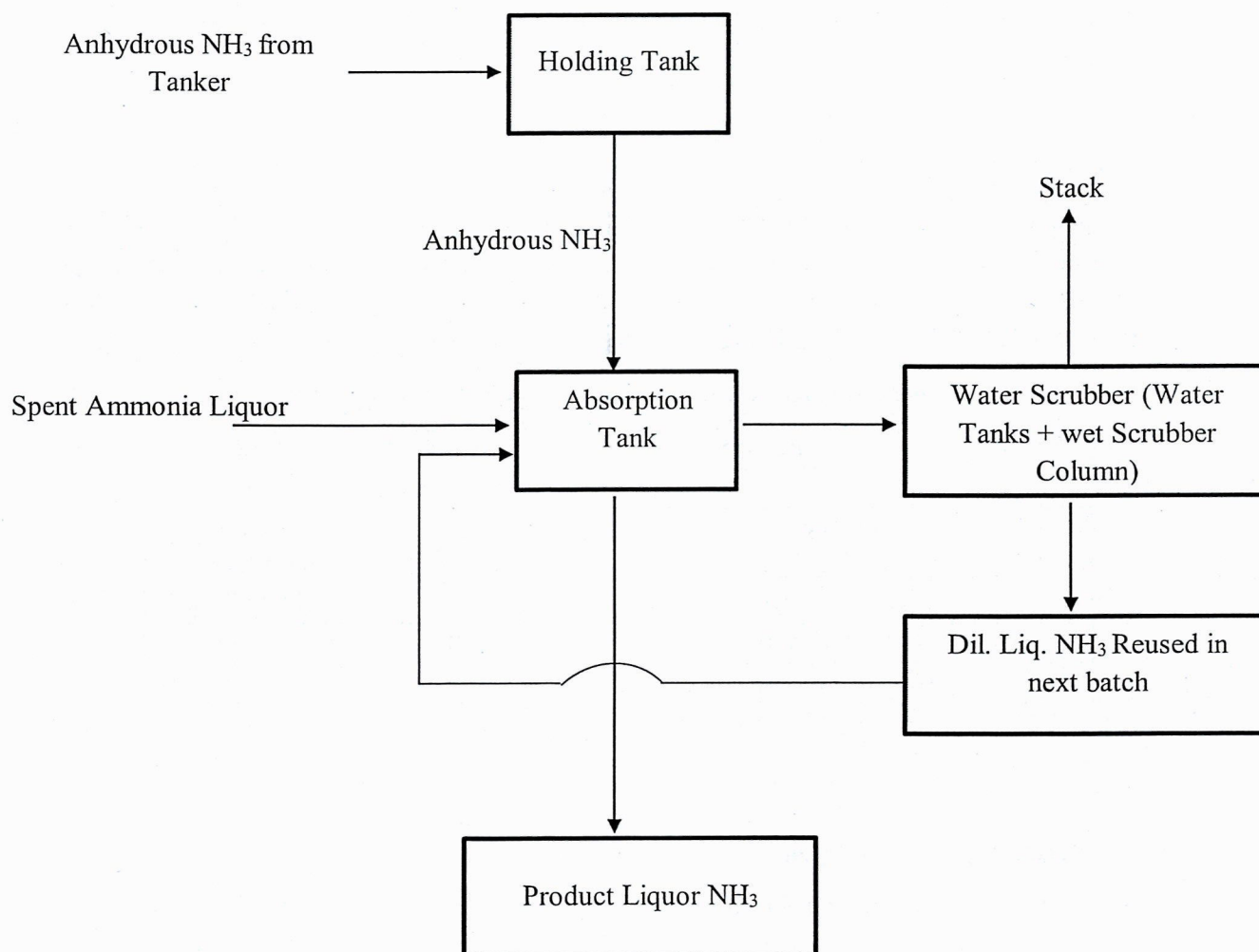


Figure: 1-Process flow diagram for utilization of Spent Ammonia Liquor

79.4 Standard Operating Procedure for utilization of Spent Ammonia Liquor:

This SoP is applicable only for Utilization of Spent Ammonia Liquor (generated during manufacturing of dyes & dye intermediate/ Pharmaceutical products/ Pesticide products/ Organic Chemical manufacturing industry) in manufacturing of Ammonia Liquor.

- 1) Spent Ammonia Liquor shall be procured only in SPCB/PCC authorized barrels/closed tanks mounted over vehicles fitted with requisite safeguards.
- 2) Spent Ammonia Liquor shall be stored in dedicated storage tanks on acid proof brick lined area under covered storage shed within premises. Further, storage sheds shall have proper slope and seepage collection pit to collect seepage / floor washing. The collected

Utilization of Spent Ammonia Liquor in manufacturing of Ammonia Liquor

- seepage / floor washing shall be channelized to Effluent Treatment Plant for further treatment.
- 3) Transfer of Spent Ammonia Liquor from storage tank shall be carried out through dedicated mechanical transfer pump with fixed pipeline.
 - 4) Material transfer / handling in entire utilization process shall be done without manual interventions in closed system.
 - 5) The unit shall provide separate storage tanks for storage of fresh chemicals and hazardous waste. The storage tanks should be at designated place with proper cover and with acid brick lining floors.
 - 6) The unit shall obtain necessary permission from Petroleum & Explosives Safety Organization (PESO) for storage of ammonia.
 - 7) The unit shall provide jacketed process (absorption) tank with water tanks followed by wet scrubber column as air pollution control device (APCD). Process tank shall have temperature sensors and temperature shall be maintained by circulating cooling media in the jacket.
 - 8) The unit shall ensure for measurement of specific gravity of scrubbing water at regular intervals for determination of saturation level.
 - 9) The treated gases shall comply with emission norms prior dispersion into atmosphere through stack. The stack height shall be minimum of 30m from ground level or as prescribed by the concerned SPCB/PCC, whichever is higher.
 - 10) Continuous automatic sensors / detectors for ammonia with alarm/ hooter shall be provided in process area.
 - 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) Treatment and disposal of wastewater generated from floor-washings, spillages, equipment washing, scrubber bleed shall be reused in the process or 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.
 - 13) In case of zero discharge, the treated waste water from ETP may be managed as per conditions stipulated by the SPCB/ PCC. 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.
 - 14) 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. Such storage area shall be covered with proper ventilation.
 - 15) The unit shall ensure that the Spent Ammonia Liquor is procured from authorized industries as required under HOWM Rules, 2016.

Utilization of Spent Ammonia Liquor in manufacturing of Ammonia Liquor

- 16) Transportation of Spent Ammonia Liquor shall be carried out by sender (generator) or receiver (utilizer) only after obtaining authorization from the concerned SPCB under HOWM Rules, 2016. Requisite manifest document shall be followed as laid down under the said Rules.
- 17) Prior to utilization of Spent Ammonia Liquor, the unit shall obtain authorization for generation, storage and utilization of Spent Ammonia Liquor from the concerned SPCB/PCC under HOWM Rules, 2016.
- 18) 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.
- 19) The unit shall provide suitable fire safety arrangements and flame proof electrical fittings.
- 20) 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. The unit shall provide suitable fire safety arrangements and flame proof electrical fittings.

79.5 Record>Returns Filing

- 1) The unit shall maintain a passbook issued by concern SPCB/PCC and maintain details of each procurement of Spent Ammonia Liquor 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 Ammonia Liquor, 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 use NHWTS to manage the manifest, enter daily records of quantity generated, disposed, etc.

79.6 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:

Parameter	Standard
Particulate Matter	50 mg/Nm ³
NO _x	50 ppm
SO ₂	100 ppm
H ₂ S	50 mg/Nm ³
NH ₃	175 mg/Nm ³

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

Parameters	Standards
NH ₃	35 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 zero discharge or no discharge condition stipulated in the consent or non-availability of the common Effluent Treatment Plant (CETP), zero discharge shall be met.

79.7 Siting of Industry

Approximately 25MT of Ammonia Liquor (Purity around 25%) is produced by using approximately 23.5MT of Spent Ammonia Liquor (purity around 18%). Therefore, requisite facilities of adequate size of storage shed and other plant & machineries shall be installed accordingly.

79.8 Size of Plant and Efficiency of Utilisation

Approximately 25MT of Ammonia Liquor (Purity around 25%) is produced by using approximately 23.5MT of Spent Ammonia Liquor (purity around 18%). Therefore, requisite facilities of adequate size of storage shed and other plant & machineries shall be installed accordingly.

79.9 Online detectors/ Alarms/ Analyzers

Continuous automatic sensors / detectors for ammonia with alarm / hooter shall be provided in process area. In case of continuous process operations, online emission analyzers for SO₂, NO_x, NH₃ in the stack shall be installed and the online data be connected to the server of the concerned SPCB/PCC.

Utilization of Spent Ammonia Liquor in manufacturing of Ammonia Liquor

79.10 Checklist of Minimal Requisite Facilities:

Sl. No	Particulars
1.	Dedicated storage tank for storage of Spent Ammonia Liquor with acid proof brick lining and proper slope & seepage collection pit.
2.	Ammonia storage tank approved by Petroleum & Explosives Safety Organization (PESO).
3.	Mechanical transfer pumps with fixed pipeline for transportation and handling of Spent Ammonia Liquor.
4.	Jacketed process (absorption) tank with purging provision in water tanks followed by scrubber column as air pollution control device (APCD). Process tank shall have temperature sensors and temperature shall be maintained by circulating cooling media in the jacket.
5.	Material transfer / handling in entire utilization process shall be done without manual interventions in closed system.
6.	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.
7.	Online analyzers for SO ₂ , NO _x , NH ₃ emission monitoring in the stack, in case of continuous process operations.
