

KAM-rule 35

Requirements for discharge of hazardous substances and mixtures to sewers

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Introduction

According to the Environmental Licensing (General Provisions) Act (NL: Wet algemene bepalingen omgevingsrecht, Wabo), waste from laboratories and production sites is considered hazardous waste. This hazardous waste has to be collected and is not be discharged to sewers. Other KAM-rules that are relevant to this KAM-rule (35) are displayed in Table 1:

Table 1: Other KAM-rules relevant to KAM-rule 35

No. KAM-regulation and title	Relevance
03 Working safely with hazardous substances	When working with hazardous substances, concerning safety rules
07 Regulation hazardous waste	When the hazardous substance has to be disposed of as hazardous waste in e.g. waste drums
19 Empty chemically contaminated packaging	Overview of water contaminants from category Z (Substances of Very High Concern [SVHC]) ¹

On the site at the Antonie van Leeuwenhoeklaan 9-13, three types of waste water streams are discriminated:

- 1) **Sanitary/household waste water** (this may be discharged).
- 2) **Waste water from laboratories** (may not be discharged, unless it falls under the exceptions as indicated in KAM-rule 03).
- 3) **Waste water that may only be discharged under certain conditions.** This concerns waste water from biological production or waste water from a flow cytometer, when inactivated (e.g. in an autoclave or kill tank), as well as cleaning agents, disinfection agents and boiler water treatment agents as mentioned in appendix 35.2 or those positively evaluated according to the diagram in appendix 35.2.

For the third category of waste water, this KAM-rule offers the application framework. Insight into the aquatic hazard of the substance or mixture is necessary before discharge of the substance or mixture can take place. Based on these insights a so-called decontamination effort can be determined for these substances or mixtures. This is done by using the 'general assessment methodology 2016' (NL: Algemene BeoordelingsMethodiek 2016 [ABM])². To determine the aquatic hazard of substances or mixtures, information is required on the properties of the substances and the composition of the mixtures.

The following requirements in the environmental permit (VOH) of the site determine the admissibility of substances and mixtures for discharge:

- Requirements for discharge regarding various substances (see also appendix 35.1). This concerns aqueous waste streams from samples of e.g. ground and/or drinking water that have been acidified. It is allowed to discharge these acidified samples to sewers, provided that they do not contain SVHCs or other aquatic hazardous substances (see KAM-rule 19 Empty chemically contaminated packaging) and provided that, apart from the acid, no other hazardous substances are contained by / added to the samples.
- Substances that are being discharged in significant quantities (e.g. cleaning agents, disinfection agents and boiler water treatment agents) have to be subjected to an ABM-assessment. Cleaning and disinfection agents for example, are being used in washing machines in the laboratory (for the cleaning of glassware) as well as being used for cleaning laboratories, production rooms and other types of rooms.

In principle, no hazardous substances may be discharged, except for cleaning agents, disinfection agents and boiler water treatment agents that sufficiently degrade in or are removed by the municipal waste water treatment plant.

¹ Note that SVHC is also used within REACH for other substances than according to the method described here

² 'Algemene Beoordelingsmethodiek (ABM) 2016, Methode ter bepaling van de benodigde saneringsinspanning bij lozingen op basis van stoffeigenschaften', Ministerie van Infrastructuur en Milieu, 16 March 2016.

The criteria for classification and the appropriate decontamination efforts are given in the ABM. The decontamination effort (measures at the source by substitution, reuse and process modification, followed by further minimisation by purification of the waste water stream) has to be executed before a discharge of cleaning agent, disinfection agent or boiler water treatment agent takes place. The application of the criteria is explained in the chapter 'Method'.

In the environmental permit and in the Activity Decree (NL: Activiteitenbesluit) the criteria for the site regarding laboratories, production locations and several hazardous substances are laid down. This KAM-rule explains the given restrictions (see appendix 35.1) and the measures to comply with the requirements for discharge.

Objective

The objective of this KAM-rule is that the method for the assessment of environmentally hazardous substances regarding the collection of waste and potential discharge hereof to sewers is known and followed.

Responsibilities

The following applies to this KAM-rule:

- The line manager is responsible for the implementation of and compliance with this KAM-rule within his own organisational unit.
- The employee is demonstrably familiar with this KAM-rule and follows the method as described.

Method

The ABM-assessment discriminates in the categories Z, A, B or C, which results in the decontamination effort for the substance to be discharged.

Z	Substances of Very High Concern (SVHC): set of substances that are most hazardous to humans and the environment;
A	Not readily biodegradable aquatic harmful substances;
B	Readily biodegradable aquatic harmful substances;
C	Substances that occur naturally in local surface water.

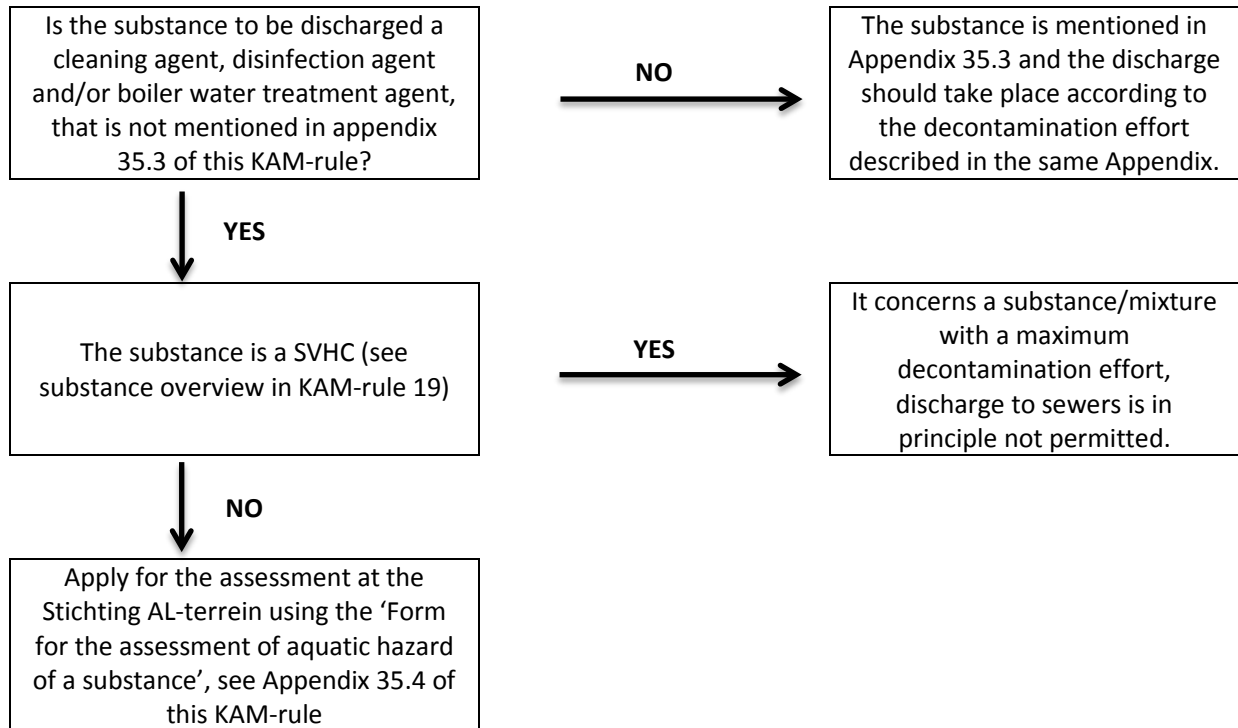
This classification is based on the physical, chemical and toxicological properties (in the ABM 2016, the biodegradability is the starting point of the assessment). The requirements for determining the category of a substance are given in appendix 35.2, as well as the required information and the flowchart for classification.

Before cleaning agents, disinfection agents and boiler water treatment agents are allowed to be discharged to the sewer, an ABM-assessment has to be carried out by a waste water expert. Before discharge can take place the following steps have to be taken, in case the substance involved is not classified according to appendix 35.3:

- 1) The user fills out the complete form as displayed in 35.4 ('Form for the assessment of the aquatic hazard of the substance'). The form has to be sent to the Stichting AL-terrein (secretaris@stichting-alt.nl) including the Material Safety Data Sheet (MSDS);
- 2) The Stichting AL-terrein evaluates if the form contains sufficient information. The user is informed if an ABM-assessment can be executed with the information provided for or if further information is needed.
- 3) If sufficient information has been received, the Stichting AL-terrein will send the information to a waste water expert who will evaluate the aquatic hazard of the substance using an ABM assessment;
- 4) The assessment and results of the ABM-assessment are communicated to the user. The substance is classified into one of the categories Z, A, B or C.

Depending on the result of the ABM-assessment the user takes measures and/or provisions corresponding with the category, as determined in appendix 35.2

Flow chart assessment aquatic hazard



Terms and abbreviations

Subject	Elaboration	Explanation
ABM	General assessment methodology i.e. an assessment for determining in which category (Z, A, B or C) a certain hazardous substance falls and which decontamination effort is required.	Method to evaluate substances and mixtures based on the aquatic hazard of the (mixtures of) substances.
Z-category	Substances of Very High Concern (SVHC): A set of substances that are most hazardous to humans and the environment (e.g. polycyclic aromatic hydrocarbons, dioxins, mercury and its compounds).	Use of these substances has to be terminated. http://www.rivm.nl/rvs/stoffenlijsten/zeer_zorgwekkende_stoffen (Click on the diverse documents and links on this website for additional information. In Dutch)
A-category	Not readily biodegradable aquatic harmful substances.	Use of these substances has to be terminated.
B-category	Readily biodegradable aquatic harmful substances.	Discharge of these substances has to be prevented as much as possible.
C-category	Substances that occur naturally in local surface water.	For these substances the need for taking emission reducing measures has yet to be determined.
KAM-rules	Kwaliteit, Arbo- & Milieuregels (rule for Quality, Occupational Health and Safety and Environmental protection.).	
Line manager	The responsible supervisor.	
Site	Site at the Antonie van Leeuwenhoeklaan 9-13 (A.K.A. AL-site, PSP or USP(B).	USP(B): Utrecht Science Park (location Bilthoven).
VOH	Vergunning op Hoofdzaken (Permit on essentials), that is the environmental permit with conditions the entire AL-site must meet.	Environmental Permit that includes the discharge rules and the ABM-test.
Wabo	Wet algemene bepalingen omgevingsrecht (Environmental Licensing (General Provisions) Act).	Legislation concerning the environmental permit. This permit is a single integrated permit for nature and environment, building, discharge to sewers, etc.

Appendices

- Appendix 35.1:** Requirements for discharge to sewers
- Appendix 35.2:** ABM-assessment: evaluation of substances (Z, A, B or C)
- Appendix 35.3:** List with cleaning agents, disinfection agents and boiler water treatment agents, buffer fluids and other substances that have already been assessed
- Appendix 35.4:** Form for the assessment of the aquatic hazard of the substance or mixture

Appendix 35.1: Requirements for discharge to sewers

The organisations on the site use a common sewer. Discharged waste water ultimately leaves the AL-site via three sample pits. These sample pits are located at the site borders. The environmental permit contains strict discharge requirements for these three sample pits, with regard to heavy metals³, BTEX⁴ and VHCs⁵, see tables A and B below.

Table A. Maximum content in any sample

Measuring point	Parameter	Maximum (in µg/l)
M01, M02 & M03 ⁶	Heavy metals	1 000
	BTEX	10
	Sum of halogenated aliphatic hydrocarbons (NL: VGK)	10
	Sum of mineral, plant and animal fats and oils	200 000

Table B. Maximum content in a volume-proportional day sample

Measuring point	Parameter	Maximum (in µg/l)
M01, M02 & M03	Heavy metals	500
	BTEX	5
	Sum of halogenated aliphatic hydrocarbons (NL: VGK)	5

In order to comply with these discharge requirements for the mentioned substances, the following measures are taken:

- Use of alternative substances (that are less hazardous to the environment) where possible;
- If no alternatives are available, quantities used are reduced to a minimum;
- When used, discharge of these substances to sewers should be prevented as much as possible. This also applies to residues and to the cleaning of (auxiliary) materials (e.g. glassware).

³ Heavy metals: Chromium, Copper, Lead, Nickel, Silver, Zinc.

⁴ BTEX: Benzene, Toluene, Ethylbenzene en Xylene.

⁵ VGK (Volatile Halogenated Hydrocarbons: Sum of Dichloromethane; 1,1-dichloroethane; trichloromethane (chloroform); 1,2-dichloroethane; 1,1,1-trichloroethane; tetrachloromethane; trichloroethylene; 1,1,2-trichloroethane; tetrachloroethylene; cis-1,2-dichloroethylene; trans-1,2-dichloroethylene.

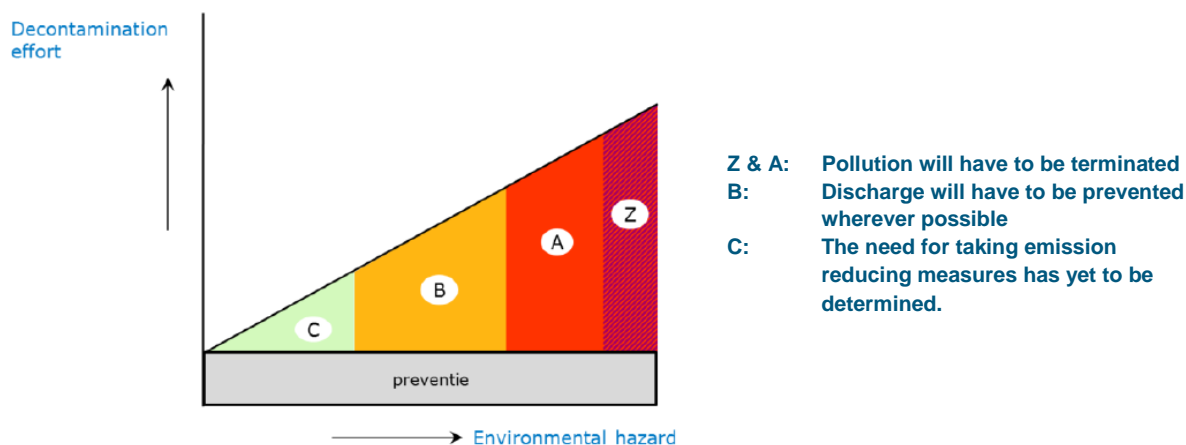
⁶ M01: sample pit Antonie van Leeuwenhoeklaan, M02: sample pit Brandenburgerweg, M03: sample pit main entrance.

Appendix 35.2: ABM-assessment: evaluation of substances (Z, A, B or C)

ABM-assessment

To ensure proper implementation of the water quality policy it is considered necessary to have insight into the aquatic hazard of substances and/or mixtures to be discharged. The more hazardous a substance or mixture the more effort to decontaminate the discharge is required. This is schematically indicated in figure 1.

Figure 1: General relationship between decontamination effort and the aquatic hazard level of substances



The aquatic hazard of a substance depends on a large number of intrinsic properties, such as toxicity (acute or chronic), biological degradability and bioaccumulative potential (also based on the n-octanol/water partition coefficient (log Kow)), carcinogenicity, mutagenicity and reprotoxicity. According to the General Assessment Method (ABM) the substance is classified into one of the following four categories based on these data:

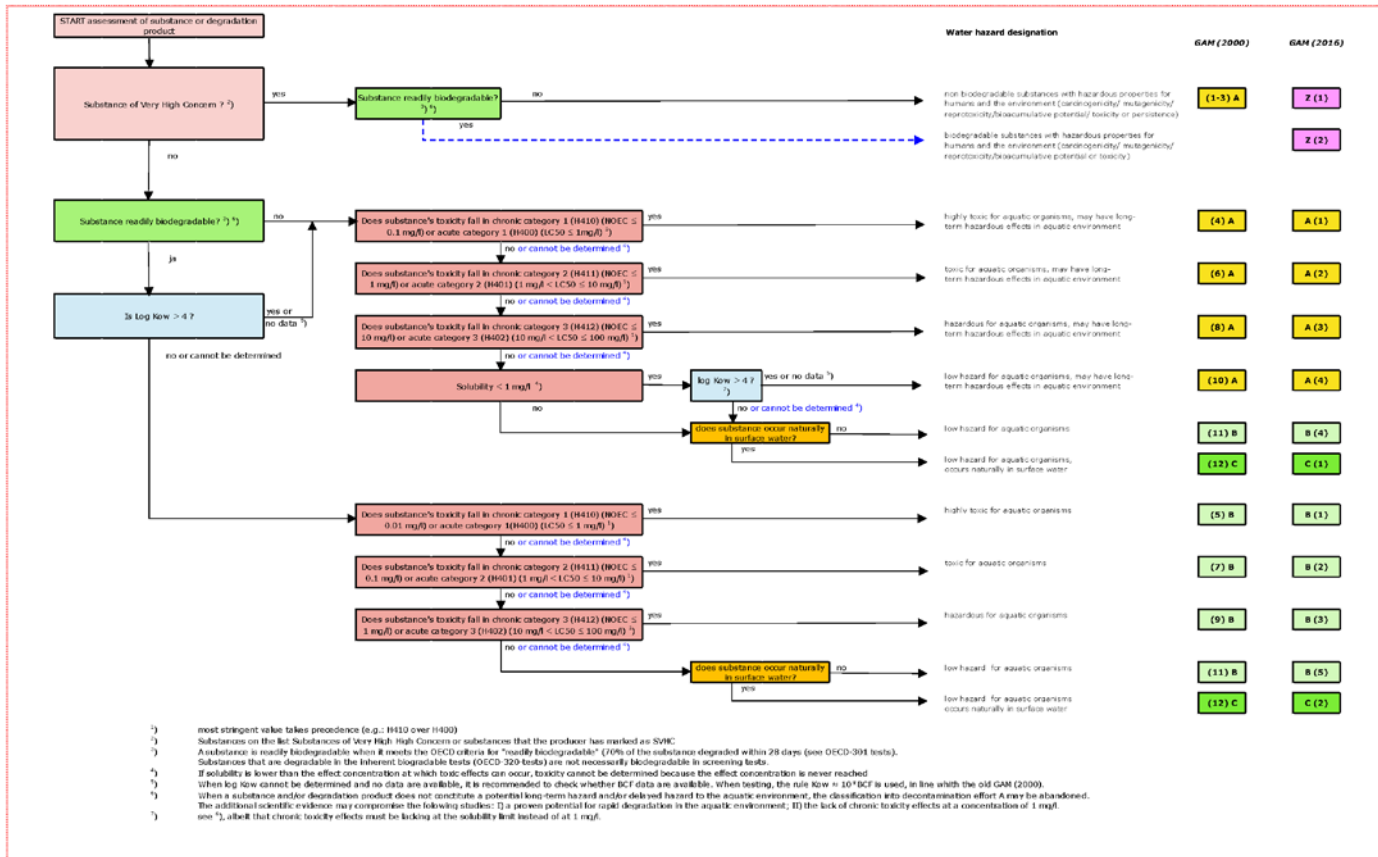
- Z: Substances of Very High Concern, SVHC, set of substances that are most hazardous for humans and the environment);
- A: not readily biodegradable aquatic harmful substances;
- B: readily biodegradable aquatic harmful substances;
- C: substances that occur naturally in local surface water.

Figure 2 indicates the assessment scheme used for the ABM.

Carcinogenicity, mutagenicity and reprotoxicity (among others by hormone disrupting effects) are not indicated in this scheme as a separate assessment criterion, but are classified into the category SVHC.

For the ABM a worst case approach is followed. If no data on specific properties is available, the worst case classification is used: either the most toxic category, or the property not readily biodegradable or log Kow > 4.

Figure 2 : General assessment method for substances



⁷⁾The GEM uses a worst-case approach. If no information on specific substance properties is available, a worst-case scenario is applied: either the most toxic class or NGT readily biodegradable or log Kow > 4

Appendix 35.3 List with cleaning agents, disinfection agents and boiler water treatment agents, buffer fluids and other substances that have already been assessed

Substance (or mixture) name	Category	Indication aquatic toxicity
Actisan	A (1)	Highly toxic for aquatic organisms, may have long-term hazardous effects in aquatic environment
Actril	B (5)	Low hazard to aquatic organisms
Arginine	B (5)	Low hazard to aquatic organisms
Glycerol	B (5)	Low hazard to aquatic organisms
Glycine	B (5)	Low hazard to aquatic organisms
Halapur	B (1)	Highly toxic for aquatic organisms
Halamid	B (2)	Toxic for aquatic organisms
Hepes	B (4)	Low hazard to aquatic organisms
CIP 100	B (3)	Hazardous for aquatic organisms
CIP 150	B (1)	Highly toxic for aquatic organisms
CIP 200	B (2)	Toxic for aquatic organisms
CIP 220	B (3)	Hazardous for aquatic organisms
Taski 100 (Sani 100 QS)	B (3)	Hazardous for aquatic organisms
Taski (Sprint) 200 (NC Conc E1a)	B (3)	Hazardous for aquatic organisms
Uniforte (Taski Jontec Uniforte plus F22.2)	B (3)	Hazardous for aquatic organisms
Taski Bruco (Accel Z94)	B (3)	Hazardous for aquatic organisms
Taski Eternum	B (5)	Low hazard to aquatic organisms
Taski Clonet	B (3)	Hazardous for aquatic organisms
Tris (trometamol)	B (5)	Low hazard to aquatic organisms
Actual	B (3)	Hazardous for aquatic organisms
Aqua stabil	A (3)	hazardous for aquatic organisms, may have long-term hazardous effects in aquatic environment
Sigma clean	B (1)	Highly toxic for aquatic organisms
Igepal CA-630	A (1)	Highly toxic for aquatic organisms, may have long-term hazardous effects in aquatic environment
Igepal CO-210	A (1)	Highly toxic for aquatic organisms, may have long-term hazardous effects in aquatic environment
Neodisher Alka 240	B (4)	Low hazard to aquatic organisms
Nalco 2584	B (3)	Hazardous for aquatic organisms
Lubron 113	B (5)	Low hazard to aquatic organisms
Lubron 401	B (3)	Hazardous for aquatic organisms
Lubron ASC	B (1)	Highly toxic for aquatic organisms
Lubron DM	B (1)	Highly toxic for aquatic organisms
Suma BAC D10	B (2)	Toxic for aquatic organisms
Suma Multi D2	A (3)	hazardous for aquatic organisms, may have long-term hazardous effects in aquatic environment
Suma Inox D7.1	A (4)	low hazard for aquatic organisms, may have long-term hazardous effects in aquatic environment
Suma Select A7	A (3)	hazardous for aquatic organisms, may have long-term hazardous effects in aquatic environment
Suma Alu oven rinse	B (3)	Hazardous for aquatic organisms
Suma Tab D4	A (1)	Highly toxic for aquatic organisms, may have long-term hazardous effects in aquatic environment
Floorguard 30	B (4)	Low hazard to aquatic organisms
Cosa CIP 92	A (2)	toxic for aquatic organisms, may have long-term hazardous effects in aquatic environment

Appendix 35.4 Form for the assessment of the aquatic hazard of the substance or mixture

Name organization	<input type="checkbox"/> BBio <input type="checkbox"/> InTraVacc <input type="checkbox"/> RIVM <input type="checkbox"/> Microeos <input type="checkbox"/> Cipla <input type="checkbox"/> PSP <input type="checkbox"/> _____
Laboratory/center/department	
User of the substance	
Trade name and name of the chemical substance	
Composition of the substance (if applicable)	
Building and room numbers of the substance use	
Annual substance consumption (kg or liters per year)	
Anticipated annual quantity in the sewer (kg or litres per year)	
Reasons for use and method of use (e.g. dissolving in water and cleaning floors)	
Required by law or regulation, or any other authority (e.g. European Pharmacopoeia) including motivation	
Research and results focused on alternative substance use (substance less harmful to the aquatic environment)	
Safety Data Sheet *	

* Provided by the supplier of the substance. Can be sent separately to the Stichting AL-terrein (secretaris@stichting-alt.nl).