

**WAT-G-069**

**EASR Guidance:**

**Permit Activity:**

**The discharge of effluent to the water environment**



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# Purpose

This document provides information and guidance for anyone proposing a new discharge of effluent to the water environment which requires a permit under the Environmental Authorisations (Scotland) Regulations (EASR) 2018. The effluent referred to is described in section 2. It does not cover effluent from Schedule 20 or Schedule 26 activities which is discharged to an off-site wastewater treatment plant for further treatment (i.e. an indirect discharge).

This document sets out how you assess the impact of your discharge on the water environment.

This document also applies if you need to apply to make a change (vary) a permit to discharge effluent. For example, the change could be you are proposing to either add an additional substance to the discharge or increase the quantity of a substance discharged.

This guidance does not cover any other permissions that may be required.

# Understanding the activity

For the purposes of this guidance, effluent includes:

* Non-sewage effluents, such as those from distilleries, mines, food and drink manufacturing and process water from quarries.
* Effluent from EASR Schedule 20 Emissions Activities and Schedule 26 Other Emissions Activities or waste management activities.
  + There may be additional considerations which you need to assess, such as Best Available Technique (BAT) conclusions if you are an EASR Schedule 20 Emissions Activity or a relevant Schedule 26 Other Emissions Activity. If the effluent is from an EASR Schedule 20 Emissions Activity, you must apply for an industrial activities authorisation.
  + If the effluent is from an EASR Schedule 26 Other Emissions Activity, you must apply for an industrial activities authorisation and also a water discharge authorisation. Industrial activities guidance will set out other requirements that need to be taken into account.
  + If the effluent arises from a waste management activity, you may have to apply for a waste management authorisation as well as a water discharge authorisation. If the effluent is from a waste management activity, and the discharge takes place outside of the waste authorisation boundary, you may require a separate discharge authorisation. If the discharge takes place within the waste authorisation boundary, the discharge can be included as part of the waste authorisation.
* Discharges of backwash or chlorinated water from water treatment works. WAT-G-067 EASR Guidance: Permit Activity: Discharges from water treatment works provides information on these discharges.
* Cooling water discharges.
* Discharges from land based fish farm or hatchery.
* Discharges from hot tubs or swimming pools where this activity is not covered by a registration or General Binding Rule (GBR). Information on these discharges is provided in WAT-G-051 EASR Guidance: Permit Activity: Discharge of hot tub or swimming pool effluent where the volume is more than 10m3 per day.

For the purposes of this guidance, effluent does not include:

* Sewage effluent. If you are applying to discharge sewage, you should read WAT-G-057 Permit Guide Discharge of sewage effluent.
* Surface water / run-off[[1]](#footnote-2). If you are applying to discharge surface water / runoff, you should read WAT-G-056 EASR Guidance: The discharge of water run-off from a surface water drainage system from built developments.
* Effluent from EASR Schedule 20 Emissions Activities or Schedule 26 Other Emissions Activities which is discharged to an off-site wastewater treatment plant for further treatment (i.e. an indirect discharge). Contact [PPCpermitting@sepa.org.uk](mailto:PPCpermitting@sepa.org.uk) for further information.
* Marine fish farm operation. If you are applying to operate a marine pen fish farm, you should refer to the Marine pen fish farm webpage.
* Certain types of discharges that do not require a SEPA authorisation. You should refer to the webpage listing Water activities not requiring authorisation.
* Discharges of radioactive substances.

This guidance applies to both discharges to surface waters and groundwater. If you are discharging to a wetland, reedbed or a willow treatment system, Appendix 5 sets out our requirements and provides information on whether the discharge is to surface water or groundwater.

# Do you need to discharge to the water environment?

Before applying to discharge effluent to the water environment, you must consider if you can:

1. Eliminate the need for the discharge. Can you reuse valuable constituents in effluent?
2. Minimise the concentration of substance discharged and the volume discharged e.g. by recirculation.
3. Discharge to the public foul sewer.

Before applying for a permit, you should email us at [waterpermitting@sepa.org.uk](mailto:waterpermitting@sepa.org.uk) to discuss your proposals.

# Discharges where less detailed assessment is required

Certain discharges are relatively low risk and their impact on the environment is well understood. For these discharges you do not need to proceed beyond section 4.

These discharges typically contain small amounts of solids, organic matter, ammonia, phosphorus, detergents, disinfectants and trace amounts of oil.

These discharges include small scale discharges (typically less than 10m3/day) from:

* Washing vegetables.
* Cleaning of surfaces with detergents or disinfectants.
* Washing out of stables, catteries and kennels.
* Vehicle washings. However, there is a presumption against allowing a new discharge from vehicle washing as a commercial operation.
* Small scale food and drink manufacturing businesses.
* Washing out of deer larders.
* Concrete washwater.
* Hydrodemolition - the demolition of structures using high pressure water jets.

(Permit level discharges from hot tubs and swimming pool also fall into this category. Further information is provided in WAT-G-051 EASR Guidance: Permit Activity: Discharge of hot tub or swimming pool effluent where the volume is more than 10m3 per day.)

In these cases, you do not need to proceed beyond section 4, but you do need to take steps to protect the water environment. Some examples are set out in section 4.1.

Before applying for a permit, you should email us at [waterpermitting@sepa.org.uk](mailto:waterpermitting@sepa.org.uk) describing the nature of your process, the steps you will take to protect the water environment, the proposed treatment, the frequency and rate of discharge and where possible, the constituents of the effluent.

## **4.1 Example actions required to protect the water environment**

### Protecting water supplies

Don’t discharge near water supplies for human consumption:

* Any soakaway should be at least 50m from a water supply for human consumption.
* Discharges to watercourses should not be immediately upstream of a water supply for human consumption.

### Discharge of disinfectants

* Avoid the use of bleach / sodium hypochlorite.
* Use less toxic “food safe” products such as citric acid/‘eco’ type cleaners in accordance with manufacturer’s guidelines.
* Minimise the quantities used e.g. by spraying, using wipes or wash down with water followed by spraying with disinfectant.
* Remove the active ingredient where possible e.g. de-chlorinate if you are using hypochlorite/bleach. This can be done by leaving the effluent to stand in a vented storage pool or separate holding tank for at least 5 days or until no chlorine or bromine is detectable. If this is not possible, chemicals can be added to de-chlorinate or de-brominate the effluent. It’s good practice to test the effluent prior to disposal to ensure there is no chlorine or bromine in the discharge.
* Discharge to a soakaway. See [Discharges onto vegetated land or to a soakaway](#_Discharges_onto_vegetated) section below.

### Discharges containing detergents

* Minimise the quantities used.
* Use biodegradable detergents if possible.
* Discharge to a soakaway. See [Discharges onto vegetated land or to a soakaway](#_Discharges_onto_vegetated) section below.

### Discharges containing silt

* Allow the solids to settle out or otherwise treat to remove solids prior to discharge.
* It may be appropriate to make a small scale discharge of silty water onto vegetated land to allow silt to filter out.

### Discharges from deer larders

* Take the measures outlined above (e.g. in relation to disinfectants).
* A septic tank would not normally be required.
* Discharge washings to a soakaway with a filter to protect the soakaway from becoming blocked.

### Discharges of concrete wash water

Run-off from concrete operations and concrete wash out water are highly alkaline (high pH) and contain chromium, which can cause water pollution. If being washed on site, trucks, hoppers, mixers and concrete pumps that have contained concrete should be washed out in a contained area, known as ‘concrete wash out areas.’

At sites with concrete wash out areas we would expect the best practice to be followed: isolate, collect, reuse and dispose.

* Isolate. Concrete wash out or batching areas should not drain to any watercourses or drainage channels.
* Collect into a lined container. Wash down water arising from the washing of equipment that has come into contact with concrete must be collected in an impervious container.
* Reuse. Treat the collected liquid to enable recycling/re-use within the concrete wash down area or concrete batching process. Important note: It cannot be used for wheel washes or dust suppression purposes out with the lined reuse area.
* Dispose. Wash water can be sent off-site to a licensed facility for treatment and/or disposal, in accordance with the Duty of Care for Waste.

Only in exceptional circumstances would we be prepared to authorise disposal of wash water on site. In such cases you should:

* Remove suspended solids.
* Lower pH e.g. by using CO2.
* Consider a discharge of silty water onto vegetated land to allow silt to filter out.

### Discharges from hydrodemolition works

* Contain the effluent and remove suspended solids.
* Lower pH e.g. by using CO2.
* Consider a discharge of silty water onto vegetated land to allow silt to filter out.

### Discharge of warm or hot water

* Take steps to cool effluent that has a significantly different temperature to the receiving water, prior to discharge. e.g. leave in a lagoon.

### Discharges onto vegetated land or to a soakaway

* Any discharge should be located more than 10m away from any surface water.
* If you are discharging to soakaway, ensure that the water table is at least 1m below the base of the soakaway. If this is not possible, then as a minimum ensure that the water table is below the bottom of the soakaway to avoid a direct discharge to groundwater.
* The effluent should infiltrate into the ground without running off.
* You should avoid discharging polluting effluent to ground which is composed of sands and gravels.

Netregs has [best practice documents](https://www.netregs.org.uk/environmental-topics/guidance-for-pollution-prevention-gpp-documents/) which include the following activities:

* Stables, catteries and kennels.
* Vehicle washings.
* The dewatering of underground ducts and chambers. These discharges do not require authorisation as long as the discharge is uncontaminated.
* Construction and demolition sites.
* Micro-breweries and micro-distilleries.

# What substances are in the discharge?

You need to identify all individual products and associated substances that could be discharged.

In determining this, you must take into account:

* Any substances added to the effluent as a result of on-site activities.
* The effect of any treatment on the effluent prior to discharge and the creation of any additional chemical by-products.
* Any increase in concentration of substances during your process.

For a new discharge you can determine what may be in the discharge by monitoring / sampling, by assessing what you use and calculating what is likely to be in the discharge or by extrapolation from a similar representative discharge.

If you are proposing to discharge different substances in an existing discharge, you will need to characterise the existing discharge and identify what you are proposing to change. These changes need to identify additional new substances, their quantities and frequency of discharge and any losses (in the process or treatment prior to discharge).

You may need to sample an existing discharge for various reasons such as sampling a different representative discharge, sampling your existing discharge where it’s not known what substances are in it or sampling post start up to confirm the substances in the discharge.

Any analysis should be undertaken by a suitably qualified laboratory, e.g. a UKAS accredited laboratory. The analytical method needs to use an appropriate limit of detection (LOD), normally 10% of the Environmental Quality Standard (EQS).

The number and length of time over which samples are taken needs to be representative of the variability in the discharge. This would normally be at least 12 spot samples, though this is site specific*.*

You need to provide all the data and also the mean, minimum and maximum concentrations.

You should provide a Safety Data Sheet (SDS) (also known as Material Safety Data Sheet (MSDS)) following the standard template ([Globally harmonised system of classification and labelling of chemicals guidance](https://unece.org/transport/standards/transport/dangerous-goods/ghs-rev9-2021)) irrespective of whether it is a product (which can be a combination of chemicals) or an individual chemical. The SDS should provide the constituent chemicals, their [Chemical Abstracts Service (CAS) registry number](https://commonchemistry.cas.org/)s and their respective concentrations.

You should check in the SDS whether your substance is, or is likely to be, persistent, bioaccumulative and toxic and note this in your report. You may need to refer to a chemicals database.

You also need to check if the temperature of the effluent is significantly above or below that in the receiving waters. If this is the case, you should read Appendix 2 which provides further information. If you are not adding any chemicals and your cooling water is uncontaminated, you do not need to read sections 5 to 10.

## Sources of information on substances in your discharge

Information on substances expected in various processes is given below in sections 5.1.1, 5.1.2 and Appendix 1. However, this should not be taken to be a comprehensive list of potential substances and you must undertake an individual assessment of your discharge. For EASR Schedule 20 Emissions Activities, the list of substances emitted is known as an emissions inventory.

In addition, for EASR Schedule 20 Emissions Activities with a water discharge (direct and indirect), reference must be made to the substances listed in Schedule 20, Part 1, paragraph 2.

### 5.1.1 BAT Reference documents (BREFS) for certain industrial activities

Indicative substances in discharges to water from various industries can be found in the [BAT conclusions/BREFs](https://eippcb.jrc.ec.europa.eu/reference/).

For example, chemicals manufacturing processes: [Common waste water and waste gas treatment/management systems in the chemical sector.](https://eippcb.jrc.ec.europa.eu/reference/)  This specifies the parameters for discharges to water in BAT 4.

### 5.1.2 Activities covered by SPRI

Indicative substances in discharges from intensive agriculture, landfill leachates, OCCSs and quarries may be found in the [SPRI smaller-scale activities guidance](https://www.sepa.org.uk/environment/environmental-data/spri/operator-guidance/). This does not cover pH and suspended solids. You need to consider if these should be considered for your discharge.

Indicative substances in discharges from Petroleum, Incineration, Paper and wood production and processing, Cement and lime, Production and processing of metals, Combustion and Chemicals industries may be found in the [SPRI larger-scale activities guidance](https://www.sepa.org.uk/environment/environmental-data/spri/operator-guidance/).

### 5.1.3 Other discharges

[Appendix 1](#_Appendix_1_Other) also provides information on substances that may be present in discharges from other sectors.

# What is the concentration of substances in the discharge?

You need to determine the concentration of each substance in the discharge and provide details of how you determined this. This should include details of quantity and concentration of substances added during the process. This should also cover the concentration of any substances created as by-products during the process.

You need to tell us the concentration of biochemical oxygen demand (BOD), ammoniacal nitrogen, reactive and total phosphorus in your discharge if they are likely to be present in your discharge.

If the effluent contains sewage, please provide the population equivalent.

If you are discharging metals, you should provide results for both total and dissolved concentrations. You may also wish to supply additional data for the relevant supporting parameters, should the EQS be a bioavailable standard.

For EASR Schedule 20 Emissions Activities and Schedule 26 Other Emissions Activities, you may need to provide additional information.

If you are sampling a discharge, you need to ensure that any analysis is undertaken by a suitably qualified laboratory, e.g. a UKAS accredited laboratory. Alternatively, you may need to provide calculated data or estimated data based on another representative discharge.

The analytical method needs to use an appropriate minimum reporting value (MRV), normally 10% of EQS.

We normally require at least 12 samples, though this is site specific. The number and length of time over which samples are taken needs to be representative of the variability in the discharge.

You need to provide all the data, ideally in a spreadsheet and also the mean, 95%ile, minimum and maximum concentrations. These statistical parameters may be needed to compare against the Environmental Quality Standards.

A worked example on how to determine the concentration in your discharge is provided in Appendix 3.

# What is your discharge flow?

You need to provide the mean and the maximum discharge flow in m3/day and the maximum rate of flow of effluent in litres/second. This must be representative of the process. You must describe the variability of the flow regime. Intermittent can be short term e.g. discharging for only a few minutes or longer term e.g. over a number of months.

# Does the effluent discharge to soakaway?

If the effluent discharges to a soakaway then you should read and follow WAT-G-068, [Hydrogeological Guidance to Apply for a Licence to Discharge Effluent to a Soakaway](https://www.sepa.org.uk/media/rmwh0obh/hydrogeological-guidance.docx). You do not need to read any further sections of this document. You should submit the information from sections 5, 6 and 7 and the information required in the above hydrogeological guidance in a report with your application including all your assumptions and calculations.

If you are not discharging to a soakaway, you should read sections 9 and 10.

# Do the substance concentrations in the discharge exceed the EQS or predicted no effect concentration (PNEC)?

## Identify the Environmental Quality Standard (EQS):

You need to determine if there is a relevant EQS for the substance. You can find a list of EQSs for surface waters in WAT-G-072, EASR Guidance: Environmental standards for discharges to surface waters. You must use the relevant EQS, whether freshwater or marine.

For some substances, the EQS in surface water depends on the location of the discharge. For these substances, where the discharge is to a watercourse or freshwater loch, SEPA will determine the EQS. These substances, where you do not need to provide an EQS are:

* Biochemical oxygen demand (BOD).
* Ammonia.
* Dissolved and total phosphorus.
* Copper.
* Nickel.
* Manganese.
* Zinc.

For these substances you only need to provide us with the concentration and the discharge flows.

If there is no EQS available, then you will need to derive a predicted no effect concentration (PNEC). The approach to be followed is described in Appendix 4. You should contact us beforehand to discuss.

You should check in the SDS to see if each substance has the potential to bioaccumulate or persist. This helps you choose the relevant data for the PNEC derivation and assess the relevance of any degradation within your discharge and within the environment.

## Compare the concentration in your discharge against the Environmental Quality Standard (EQS) or Predicted No Effect Concentration (PNEC)

You should compare the predicted or measured concentration of the substance in your discharge against the EQS. If the substance has both an annual average (AA) and a maximum allowable concentration (MAC) or 95%ile EQS, you need to compare against both the AA and MAC or 95%ile EQSs, in order to assess long and short-term impacts.

If you are proposing to include any Priority Hazardous Substances (PHS) in your discharge and the concentration is greater than 1/10th of the EQS, we will not grant your permit if you are discharging to a surface water because there is a requirement to cease discharges of these substances.

If you are proposing to include any priority substances (PS) in your discharge and the concentration is greater than 2 x EQS, we will be unlikely to grant your permit if you are discharging to a surface water because there is a requirement to progressively reduce pollution from these discharges.

You can find out whether your substance is a PHS or PS in WAT-G-072, EASR Guidance: Environmental standards for discharges to surface waters.

# 10. Assessment of impact on the environment

## 10.1 Discharges to watercourses or freshwater lochs

Discharges to freshwater lochs are discouraged. If you want to discharge to a freshwater loch you should contact us to discuss your proposals.

You should submit the information from sections 5, 6, 7 and 9 in a report to SEPA with your application including all your assumptions and calculations.

Once you have submitted the above information, we will undertake modelling to assess the impact of the discharge on the receiving water.

For discharges to watercourses, we will apply numeric discharge standards if the concentration after dilution is >1/20 EQS.

We will also assess if the discharge will pose a risk to bathing and shellfish waters. This is normally only required where the discharge contains high levels of pathogens. Our guidance WAT-G-070, EASR Guidance: Discharges to and near bathing and shellfish waters sets out our approach.

We will also consider the risk to nearby abstractions for human consumption. If your discharge is close to and upstream of an abstraction for human consumption, we may not grant your authorisation.

Finally, we will consider the risks to areas protected for notable natural features or biodiversity in line with WAT-G-008 EASR Guidance: Assessment of impact on protected areas from inland water activities.

## 10.2 Discharges to coastal and transitional waters (sea or estuary)

If you are intending to discharge to coastal or transitional waters, you should follow the guidance in [WAT-G-066,](https://scottishepa.sharepoint.com/:w:/r/sites/IntegratedAuthorisationFramework/Shared%20Documents/WS06_Water_Activities/Guidance%20docs/Point%20Source/Discharge%20of%20effluents%20to%20surface%20water/241017_Assessing_impacts_in_coastal_%26_transitional_waters_v4.docx?d=w2cbc366210e84cfb84ed686477c87e68&csf=1&web=1&e=bhjdb5) EASR Guidance: Permit Activity: Assessing the impact of a discharge on coastal and transitional waters. This requires you to submit a pre-application method statement to use setting out how you to intend to undertake the modelling, as well as information on how to do the modelling and our criteria for the extent of the mixing zone.

There are 2 stages to determining the concentration at the edge of the mixing zone - determining the initial dilution of the effluent (between the outfall and the surface boil) and then the secondary dilution (between the surface boil and the edge of the mixing zone).

You should submit with your application the information from sections 5, 6, 7 and 9 along with the modelling required in [WAT-G-066,](https://scottishepa.sharepoint.com/:w:/r/sites/IntegratedAuthorisationFramework/Shared%20Documents/WS06_Water_Activities/Guidance%20docs/Point%20Source/Discharge%20of%20effluents%20to%20surface%20water/241017_Assessing_impacts_in_coastal_%26_transitional_waters_v4.docx?d=w2cbc366210e84cfb84ed686477c87e68&csf=1&web=1&e=bhjdb5) EASR Guidance: Permit Activity: Assessing the impact of a discharge on coastal and transitional waters in a report to SEPA. You should include all your assumptions and calculations.

We will consider the risks to areas protected for notable natural features or biodiversity.

# 11. Ensure your discharge has appropriate treatment and the system is maintained

* Your treatment system must be adequately designed, sized and maintained so that the effluent does not have a significant adverse impact on the water environment. You should try and remove as much of the polluting matter as possible.
* If you are using a mechanical treatment system you need to provide details of how any mechanical failures will be detected. For example, this might include the use of telemetry systems or alarms.
* You must regularly check your treatment system to ensure it is operating correctly. You must rectify any indications of failure such as poor-quality effluent, leaks, warning lights, power or pump failures as soon as possible.
* You must maintain the system so that it is in good working order.

# Appendix 1: Substances that may be present in discharges from various sectors

The guidance below suggests substances that may be present in discharges from different sectors. However, this should not be taken to be a comprehensive list of potential substances and you must undertake an individual assessment of your discharge.

## Oil and gas decommissioning

* Suspended Solids.
* pH.
* Hydrocarbons.
* Mercury.
* Cadmium.
* Antifoulants.
* Copper.
* Aluminium.
* Zinc.
* Iron.
* Lead.
* Arsenic.
* Chromium VI.
* Perfluorooctane sulfonic acid and its derivatives (PFOS).
* Polychlorinated Biphenyls (PCBs).

## Potable water

Refer to WAT-G-067 EASR Guidance: Permit Activity: Discharges from water treatment works

### Water treatment works backwash

* pH.
* Aluminium/polyelectrolyte residuals.
* Iron.
* Granulated active carbon residues from the commissioning of granular active carbon plants.

### Service reservoir overflows

* Chlorine.

### Service reservoir cleaning and scour water

* Chlorine.
* Suspended solids.

### Sludge settlement overflow

* pH.
* Dosing chemicals – Iron, Aluminium, Polyelectrolyte residuals.

## Land based fish farms or hatcheries

* Biochemical oxygen demand (BOD).
* Ammonia.
* Suspended solids.
* Phosphorus.
* Antifoulants.
* Anaesthetics.
* Antimicrobials.
* Antiparasitics.
* Disinfectants.

## Discharges from hydrogen production plants

The process concentrates the abstracted water approximately four-fold, so the quality of the discharge will be heavily influenced by the feedwater.  Water treatment chemicals could also have been added.

## Discharges from airports containing de-icers

* De-icers / Antifreeze e.g. glycol (high Biochemical oxygen demand) or urea).
* Hydrocarbons.
* Suspended solids.
* Metals.

## Cooling water

* High temperature.
* Possible chemical additions.
* Antifoulants.

## Food processing

* Cleaning and disinfection products.
* pH.
* Suspended solids.
* Biochemical oxygen demand.
* Ammonia.

## Brewing effluent

* Cleaning and disinfection products.
* Copper.
* Zinc.
* Biochemical oxygen demand.
* Ammonia.

## Distilling effluent

* Copper.
* Zinc.
* Biochemical oxygen demand.
* Ammonia.
* Lead.
* Suspended solids.
* pH.

## Abandoned mine discharges

* Iron.
* Suspended solids.
* pH.
* Trace metals.
* Sulphate.
* Chloride.
* Aluminium.
* Dosing chemicals – Iron, Aluminium, Polyelectrolyte residuals.

## Quarry discharges

* Indicative substances in discharges from quarries may be found in the [SPRI smaller-scale activities guidance](https://www.sepa.org.uk/environment/environmental-data/spri/operator-guidance/).
* Suspended solids.
* pH.
* Dosing chemicals – Iron, Aluminium, Polyelectrolyte residuals.
* Hydrocarbons / oils.

## Shipyards or dry docks

* Suspended solids.
* Copper.
* Antifoulants.
* Algicides.
* Fluoranthene.
* Anthracene.
* Polycyclic aromatic hydrocarbons (PAHs).

# Appendix 2: What to do if your effluent has a different temperature to the receiving water

If your effluent is a significantly different temperature to that of the receiving water, you should provide information on:

* The temperature of your effluent. We normally require at least 12 samples, though this is site specific. The number of samples and length of time over which samples are taken needs to be representative of the variability in the discharge.
* The discharge rate and any variation on this over time.
* If you haven’t any discharge rate data, you must provide a conservative means of estimating the discharge rate. For example, for distillery discharges, the discharge rate could be based on maximum daily abstraction volume (m3 /day).
* Any information on the temperature of the receiving watercourse.

For discharges to watercourses and freshwater lochs, SEPA will use this information to determine if the discharge is likely to breach the environmental temperature standards.

For discharges to tidal waters, you should undertake modelling to demonstrate that the temperature standards are met WAT-G-066 EASR Guidance: Permit Activity: Assessing the impact of a discharge on coastal and transitional waters.

# Appendix 3: An example of how to determine the concentration in your discharge

To calculate the concentration in a discharge it is often easier to map out the process, and to describe the dilutions in a simple box model or diagram.

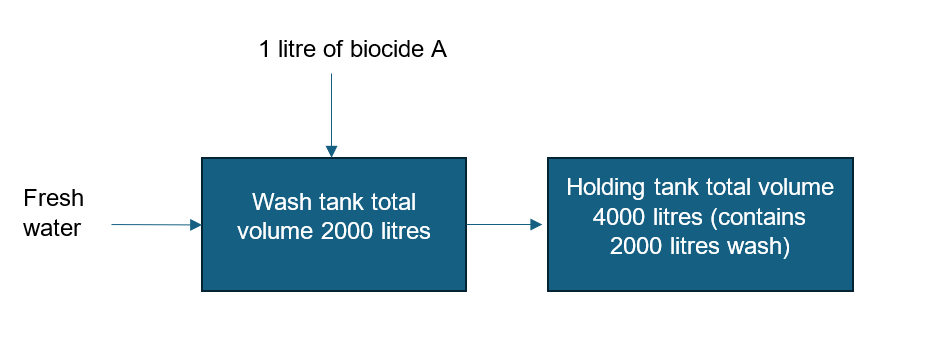
A plant uses Biocide A to clean pipework. The Biocide A product comes as a concentrate and contains Active Ingredient B at 1% w/v and has a relative density of 1 g/cm3 or 1000 kg/m3 (i.e. the same as freshwater).

1L of concentrated Biocide A product is added to a 2000L wash tank and it is filled with freshwater. The water in the wash tank then circulates around the plant cleaning pipework and is collected in a holding tank (with a 4000L capacity). The wash tank is then refilled once with freshwater, and this is used to rinse the system and again is collected in the holding tank. Once cleaning is complete, the holding tank is discharged.

To calculate the concentration of Active Ingredient B in the effluent you should follow the steps below.

## Step 1: Calculate the initial dilution (wash)

**Figure 1: Diagram of initial dilution (wash)**

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1L Biocide A concentrate contains 10g of Active Ingredient B (10g (w) of B on 1000ml (v) of Biocide A or 1% w/v).

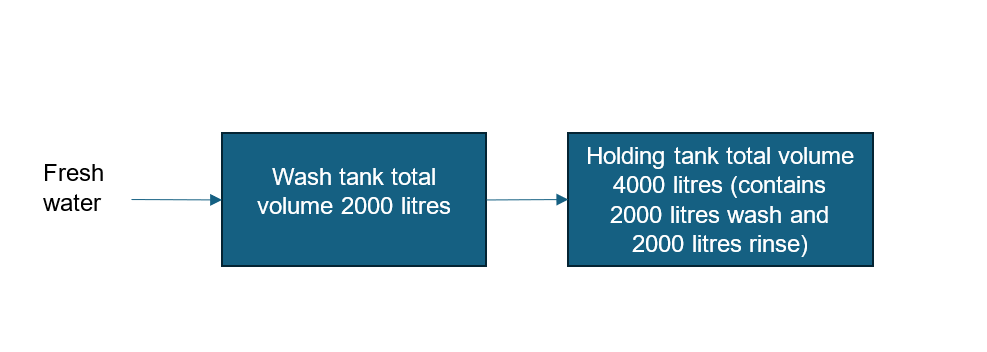
Initial dilution in the wash tank (diluted product).

= 1L Biocide A concentrate + 1999L water.

= 10g of Active Ingredient B in 2000 L.

## Step 2: Calculate the secondary dilution (rinse)

**Figure 1: Diagram of secondary dilution**



Secondary Dilution in the holding tank (diluted product (wash water) plus rinse water)

= 2000L diluted product (wash water) + 2000L of rinse water.

= 10 g of Active Ingredient B in 2000L wash water + 2000L of rinse water.

= 10 g of Active Ingredient B in 4000L.

= 0.0025 g/L or 2.5 mg/L.

Alternatively, you can calculate the total dilution first.

= 1L (product) + 1999L (wash) + 2000L (rinse) = 4000L.

Weight of active ingredient B.

1% of 1L (or kg) = 10 g in 1L (1000g) of product.

10 g in 4000L = 10000mg in 4000L or 2.5 mg/L.

If the product density is different from freshwater (ie > or < 1) or the wash or rinse water is sea water for instance or there are temperature differences between the discharges, then it would be necessary to account for those in the calculation.

SEPA must be able to check and verify any data submitted. Therefore, all documents must be fully referenced and as a minimum, study summaries must be provided, and all relevant documentation should be supplied. It is recommended that in addition to any report, dilution information is supplied on a spreadsheet to allow all formulae used and calculations to be easily and quickly checked.

# Appendix 4: How to derive a PNEC

WAT-G-072 EQS for discharges to surface waters.docx lists a broad range of SEPA environmental standards, although not all regulatory standards are included in WAT-G-072 EQS for discharges to surface waters.

Where a chemical does not have a standard listed in WAT-G-072 EQS for discharges to surface waters.docx, or where additional data to inform a regulatory standard is available, a PNEC (Predicted No Effect Concentration or QS, Quality Standard as it is called in the WFD TGD, CIS-27) may be required. A PNEC is a surrogate for an EQS, where one isn’t available. The key difference between a PNEC and a formal EQS is that an EQS is subject to wider consultation and can take other factors, including policy and societal factors into account.

There are many sources of PNECs, however not all PNECs are derived in the same way, nor is the information on which they are based always available for review. SEPA do not generally accept PNECs directly as derived in other chemicals regulations as the methodologies and assessment factors used vary slightly from regime to regime. Detailed guidance on how to derive an EQS/PNEC is provided in [Technical Guidance Document No. 27: Technical Guidance for Deriving Environmental Quality Standards](https://circabc.europa.eu/sd/a/ba6810cd-e611-4f72-9902-f0d8867a2a6b/Guidance%20No%2027%20-%20Deriving%20Environmental%20Quality%20Standards%20-%20version%202018.pdf) prepared by a collaborative framework known as the Common Implementation Strategy for the Water Framework Directive, sometimes referred to as CIS-27.

Should you be required to derive a PNEC, we recommend discussing this with SEPA in advance.

There are several chemical databases that can provide useful substance data (e.g. Iuclid), however, all data used should be assessed for reliability and relevance. CIS-27 recommends the Criteria for Reporting and Evaluating ecotoxicity Data (CRED)[[2]](#footnote-3) approach is used for laboratory study data, and we recommend Criteria for Reporting and Evaluating Exposure Datasets (CREED)[[3]](#footnote-4) is used for environmental monitoring and field studies. However, where a study has already been assessed as part of a regulatory approval in the UK or Europe (e.g. as part of a marketing and authorisation review for plant protection products or biocides), SEPA will accept the use of the relevance and reliability score for that study, as assessed during that regulatory assessment. The assessment of relevance and reliability is key to ensuring the quality and suitability of the data in the risk assessment and derivation of standards.

Where a product containing a mixture of ingredients is used, product specific ecotoxicity studies may be available. While PNECs are usually substance specific, these product data can be useful in understanding the effects on test organisms from interaction of any substances within the product. While product level PNECs are unusual, the data for products can be useful supporting information when agreeing of an appropriate assessment factor.

SEPA require all information used to derive a PNEC to be verifiable. Therefore, all information used should be appropriately referenced (including indicating the section and/or page number) and study summaries should be provided as a minimum. All calculations should be shown, assumptions stated, and justifications fully explained.

# Appendix 5: Wetlands, reedbeds and willow treatment systems

A wetland, reedbed or willow treatment system should normally be lined to stop effluent percolating into the ground. If the ground has a percolation rate of more than 140 secs/mm, the ground will restrict percolation and a liner may not be required.

If the system is used in the winter and is lined or the ground has a percolation rate of more than 140 secs/mm, you must have an overflow which discharges to a soakaway or a surface water. This discharge needs to be authorised by SEPA. You will need to provide details of the type of liner, method of construction, construction quality assurance and maintenance plans.

If the system is lined or the ground has a percolation rate of less than 140 secs/mm and is only used in the summer, you will either need to:

* Include an overflow which discharges to a soakaway or a surface water. This discharge needs to be authorised by SEPA. You will also need to provide details of the type of liner, method of construction, construction quality assurance and maintenance plans; or
* Demonstrate to SEPA that the evapotranspiration and the area of the treatment system is sufficient to prevent overtopping. In these cases, no authorisation from SEPA is required.

If your system is not lined, the discharge to the treatment system will be treated like a discharge to a soakaway.

# Glossary

A full list of terms is available in the main Glossary.

# Disclaimer

Whilst every effort has been made to ensure the accuracy of this guidance, SEPA gives no warranty, covenant or undertaking (express or implied) regarding the fitness for purpose of, or any error, omission or discrepancy in this guidance. Reliance on its contents and the contents of any websites that are linked to or from this guidance is entirely at the user’s own risk. SEPA is not liable for any loss or damage that may come from using this guidance. This includes:

* any direct, indirect and consequential losses
* any loss or damage caused by civil wrongs, breach of contract or otherwise

SEPA reserves the right to depart from this guidance and take appropriate action as it considers necessary or appropriate. Operators are responsible for ensuring that they are compliant with the law. If necessary, independent legal / specialist advice should be sought.

1. Except for any discharge of water run-off from a quarry or borrow pit constructed before 1 January 2022. This is not covered by EASR General Binding Rule (GBR) 10C and may be authorised by permit. This permit would also include any effluent used in a process, such as washing aggregate. [↑](#footnote-ref-2)
2. Moermond, C.T.A., Kase, R., Korkaric, M. and Ågerstrand, M. (2016) CRED: Criteria for Reporting and Evaluating ecotoxicity Data. Environmental Toxicology and Chemistry, 35 (5), 1297–1309. [↑](#footnote-ref-3)
3. Merrington, G., Nowell, L. H., & Peck, C. (2024). An introduction to Criteria for Reporting and Evaluating Exposure Datasets (CREED) for use in environmental assessments. Integrated Environmental Assessment and Management, 20(4), 975–980. [↑](#footnote-ref-4)