Evaluation Manual for the Authorisation of Plant protection products and Biocides according to Regulation (EC) No 1107/2009

NL part

Plant protection products

Chapter 5 Fate and behaviour in the environment; behaviour in surface water and sediment

version 2.8: January 2025

ctgb

Board for the Authorisation of Plant protection products and Biocides

Chapter 5 Fate and behaviour in the environment; behaviour in surface water and sediment

Category: Plant protection products

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Changes in the Evaluation Manual

Evaluation manual PPP NL part Chapter 5 Fate and behaviour in the environment; behaviour in surface water and sediment			
Version	**Date**	**Paragraph**	**Changes**
2.0	January 2014		
2.1	October 2016	2.1-2.4	Throughout a division between the assessment for field uses and protected crops is given The Dutch Hoofdlijnenakkoord Zuivering Glastuinbouw has been added
		2.3.3	Procedure for non-standard TWA concentrations added.
		2.3.4.2	New format text concerning monitoring data from pesticidesatlas.nl, new correlation analysis. Additional information concerning WFD versus authorisation threshold added. Role of Ctgb in Emission Reduction Plans specified.
		2.4.1	Non-relevance assessment for surface water metabolites in surface water intended for drinking water is added based on extrapolation of the guidance document on non-relevance of groundwater metabolites.
			Decision tree has been updated to reflect changes in data requirements and changes in assessment framework
			Consequences of change in Activity Decree (expected entry into force date January 2017) have been announced. - For downward spraying spray drift reducing nozzles are replaced with spray drift reducing techniques in order to facilitate the transition to the use of drift reducing technology (DRT) classes. - Requirement of minimum reduction of 75% on the whole field has been added (Activity Decree). The procedure and conditions for the use of 95% spray drift reduction techniques are added - For fruit cultivation it is stressed that the Activity decree requires 75% reduction + 4.5 m crop free zone or 90% spray drift reduction in combination with a 3 m crop free zone

			- The use in hop will be assessed on the basis of the drift values for dormant trees. Activity Decree change is expected to enter into force in January 2017. Conditions under which 95% spray drift reduction can be requested are specified. For the first tier assessment of crops not included in the Activity decree a value of 5.4% is used representing a conventional spraying technique. Application in reed added (100% spray drift)
		Appendix 3	Section added on drinking water assessment for protected crops.
2.2	January 2018	Main text, section 2.3.1	*Greenhouse uses* A purification level of 95% of the waste water will be the basis of the risk assessment for all organic chemical substances. NB This purification requirement is not relevant for plant protection products with active substances belonging to the inorganic compounds (e.g., metals, salts) and micro-organisms. *Closed buildings* Specified that discharge of PPPs and biocides from crop cultivations or treatments in closed buildings is not allowed according to the Activity Decree.
		Appendix 2	Consequences of change in Activity Decree (entry into force January 2018) have been implemented: *Field uses* - Drift values for individual techniques have been replaced with drift values per DRT class, using the deposition values that are derived using the reference techniques per class as established by WPR. During the transitional period laid down in the Activity Decree concerning fruit (some techniques) and lane tree cultivation, Ctgb will take the drift deposition values for these techniques into account when performing the risk assessment. *Greenhouse uses*

			- the use of 0.1% emission modelled as spray drift is not used anymore for organic substances in greenhouses.
		Appendix 2	Other changes with regard to drift values: - clarification that for non-professional use by manual spraying in lane trees and fruit trees the default values for the professional use are used in the absence of spray drift data for hand-held equipment used in upward and sideways spraying.
2.3	April 2018	Appendix 2, Table 1	Corresponding drift percentage (100%) for application in reed has been removed from the Evaluation Manual. The knapsack sprayer (1.2% drift) can be used for risk assessment of applications in reed.
2.4	March 2019	2	Bgb link update
		All paragraphs	Links checked
		2.3.1	In the input parameters listing (field and greenhouse) it is clarified whether the geometric or arithmetic mean value for Kom is applicable, depending on the agreed endpoint.
2.5	September 2020	2.3.2, Appendix 3	Clarification on the summation of PEC values at drinking water abstraction points regarding new and already authorized uses of an active substance.
2.6	August 2021	Appendix 2, developments	Implementation of the Wageningen Drift Calculator, including drift differentiation for downward sprayed crops and an update of the drift database. Other changes to the section on national spray drift values: - Clarification of drift deposition values and mitigation for uses not covered by the agricultural part (3.5) of the Activity Decree - Clarification of the starting position of the assessment for soft fruits etc.
2.7	September 2023	Appendix 2	Specification of the use of DRT classes for DTG 8.1 managed amenity turf
		2.3.1, page 8	Footnote added concerning the reference concentration at which Kom is determined in TOXSWA
		2.3.1, page 9 and 10	Footnote added concerning the interim approach of selecting the date of application in GEM, for soil-bound and for soilless cultivation
2.8	January 2025	All paragraphs, Appendix 2	Change from Activity Decree to Environmental Activities Decree
		2.3.4.2	Footnote added regarding monitoring data

			where the analytical method is not able to measure residues below threshold value
		Appendix I	Change in appendix I regarding the trigger % for calculating exposure concentrations of metabolites formed in sediment
		All paragraphs	Links to guidance and regulations are updated

GENERAL INTRODUCTION

This chapter describes the data requirements for estimation of the behaviour of an active substance in a plant protection product and its metabolites, degradation products and reaction products in surface water and sediment and how reference values are derived in the NL framework (§2 - §2.5).

I BEHAVIOUR IN SURFACE WATER AND SEDIMENT

2. NL FRAMEWORK

The NL framework (§2 - §2.5) describes the authorisation procedure for plant protection products based on active substances, included in Commission Implementing Regulation (EU) No 540/2011.

The plant protection product that contains such substances may be authorised if the criteria laid down in Regulation (EC) No 1107/2009 are met, also taking into account the national stipulations described in the Bgb (Plant protection products and Biocides Decree). The evaluation dossiers must meet the requirements in Commission Regulation (EU) No 283/2013 and Commission Regulation (EU) No 284/2013 of Regulation (EC) No 1107/2009 (see Type of application).

A Member State may deviate from the EU evaluation on the basis of agricultural, phytosanitary and ecological, including climatological, conditions which are specific for that Member State, in this case the Netherlands.

The NL framework describes the data requirements (§2.2), evaluation methodologies (§2.3), criteria and trigger values (§2.4) for which specific rules apply in the national approval framework or when the national framework has been elaborated in more detail than the EU framework.

2.1. Introduction

This chapter describes the procedure to determine estimated or measured concentrations in surface water and sediment following normal agricultural applications (field uses and protected uses (e.g., greenhouse and walk-in tunnels)). Evaluation of the aspect behaviour in surface water and sediment with regard to emission routes to surface water deviates from the EU evaluation methodology for field uses, and a NL-specific methodology is followed.
This is because the Netherlands have their own NL-specific spray drift values data base, based on the geographical and climatological circumstances. A NL-specific scenario for emission to surface water via drainage pipes is not yet available (see section developments).
Emission to surface water via atmospheric deposition is described in *Chapter 6 fate and behaviour in the environment: behaviour in air*.

The following water systems are distinguished in the national risk assessment:

- edge-of-field ditch: relevant for the risk assessment for organisms that depend on surface water and/or sediment (aquatic and sediment organisms, and birds and mammals (through consumption of surface water and secondary poisoning), see also *Chapter 7 Ecotoxicology; aquatic organisms*, and 7. *Ecotoxicology; terrestrial organisms; birds and mammals*. The following further subdivision is relevant for the exposure assessment:
    - Field uses
    - Protected uses (specifically greenhouse uses, for which some national specific choices and options are described)
- Drinking water abstraction points: relevant for the assessment of the drinking water criterion for surface water intended for the production of drinking water (this Chapter).

For the assessment of the emission to the edge-of-field ditch, a decision tree with corresponding explanatory notes is presented in Appendix 1 to this chapter. This decision tree summarises the approval framework for the behaviour in surface water and sediment (edge-of-field ditch).

For the assessment of the drinking water criterion for surface water intended for the production of drinking water, the schematic decision trees are presented in Appendix 3.

The other points described in this chapter are further elaborations of the EU procedure.

2.2. Data requirements

The data requirements for chemical Plant protection products are in agreement with the provisions in EU framework (see §1.2 of the EU part). NL-specific data requirements and further interpretations of the EU data requirements are given in the text below. For the other general chemical parameters of a substance that are required as model input data reference is made to Chapter 2 Physical-chemical properties.

2.3. Risk assessment

The evaluation methodologies for chemical Plant protection products are in agreement with the provisions described in EU framework (see §1.3 of the EU part). NL-specific evaluation methodologies and further elaborations of the EU procedures are given in the text below.

Please note that for non-professional use the dose rate in kg/ha may be corrected to match a maximum acreage of 500 m2.

2.3.1. Edge-of-field ditch

The exposure concentration (Predicted Environmental Concentration (PEC)) is the model-calculated concentration in surface water and sediment. The calculations are based on the maximum specified frequency and the minimum specified interval for the use in question.

The risk assessment procedure differs for the field uses and protected uses.

Field uses

The exposure concentration as result of spray drift is calculated with the TOXSWA programme according to the Bgb (Appendix I). The spray drift values used for exposure assessment used in NL framework are described in various spray drift tables (standard values for risk assessment, based on the aims of the Activity Decree, and values with further mitigation). These tables are included in Appendix 2 to this chapter.

The TOXSWA model (v1.2, GUI 1.0) is used for determination of the concentration of an active substance in a standard ditch by emission via spray drift. All processes and process parameters considered in TOXSWA, including spray drift percentage, are based on research relevant for the Netherlands. This means that the model is tailored to the NL situation. For determination of the PEC, agricultural use in compliance with the prescribed method of application (GAP) is assumed. Loading of surface water and sediment by agricultural use of Plant protection products is only based on drift of spray mist (spray drift).

The most important substance-related input parameters of the TOXSWA model are:

- Geometric mean DT50 for degradation rate in surface water at 20°C (days)
- Geometric mean DT50 for degradation rate in sediment at 20°C (days)

- Arithmetic/geometric mean[1] K_{om}[2] and corresponding arithmetic mean 1/n for suspended organic matter (L/kg) (if not available use K_{om} soil)
- Arithmetic/geometric mean[1] K_{om}[2] and corresponding arithmetic mean 1/n for sediment (L/kg) (if not available use K_{om} soil)
- Saturated vapour pressure (Pa) usually available at 20 or 25 °C
- Solubility in water (mg/L) usually available at 20 or 25 °C
- Molecular mass (g/mol)

A conversion factor of 1.724 is used to translate K_{oc} into K_{om}.

The degradation parameters should be derived in line with FOCUS Guidance Document on Degradation Kinetics (SFO or pseudo-SFO). When no separate degradation half-lives (DegT50 values) are available for the water and sediment compartment (accepted level P-II values), the system degradation half-life (DegT50-system, level P-I) is used as input for the degrading compartment and a default value of 1000 days is to be used for the compartment in which no degradation is assumed. This is in line with the recommendations in the FOCUS Guidance Document on Degradation Kinetics. The other model parameters are applied in accordance with the standard settings of the TOXSWA model.

For a summary of the risk assessment methodology for water and sediment we refer to the decision tree with explanatory notes, presented in Appendix 1 to this chapter. National spray drift values can be applied on the basis of Article 8f of the Bgb.
The loading of surface water and sediment is calculated on the basis of the spray drift percentage values as presented in Appendix 2 to this chapter.

Protected crops
The "EFSA Guidance Document on clustering and ranking of emissions of active substances of plant protection products and transformation products of these active substances from protected crops (greenhouses and crops grown under cover) to relevant environmental compartments" *(in short: EFSA Guidance Document on Protected crops)* has entered into force in the Netherlands as of March 2016.

For a description of the risk assessment on EU level (substance approval or (inter)zonal authorisation assessment) refer to the EU part of the Evaluation Manual. In principle emission from greenhouses is not a Dutch specific issue. However the GEM model contains several scenarios that are specifically tuned to conditions in The Netherlands. Furthermore several policy choices are made in The Netherlands that may not be the same as requirements of other member states. Hence in this Chapter national deviations from or additions to the guidance document are further elaborated upon.

In the guidance document a subdivision between non-permanent covers, walk-in tunnels, greenhouses and closed buildings is made, each with a different (tiered) exposure assessment.

Non-permanent covers

[1] The same statistic as listed in the List of Endpoints of the active substance should be used in the assessment

[2] In TOXSWA v 1.2 calculations the parameter Cref, the "concentration pesticide at which K_{om} was observed" is set by default to 0.001 mg/L in the TOXSWA 1.2 model. This value is not correct and should be manually replaced by a value of **1 mg/L** by the user. This value is in line with other exposure models and based on the OECD test guidelines for sorption studies.

Use under non-permanent covers is assessed as field use. This means that for the Dutch assessment a TOXSWA 1.2 simulation is required. See field uses for the assessment methodology.

Walk-in tunnels
Walk-in tunnels are to be assessed via EU methodology (see Chapter 6 surface water, EU part). No specific NL scenarios are available.

Greenhouse uses
For the estimation of exposure to surface water resulting from greenhouse uses the Greenhouse Emission Model (GEM) is developed. The Guidance Document on Protected crops mentions two example scenarios ("soil bound chrysanthemum in the Netherlands" and "non-soil bound rose in the Netherlands", both available in GEM).

In the Dutch decision tree and the resulting simulation model GEM several scenarios were developed that are representative for the Dutch situation.

Soil-bound uses (see Wipfler et al., WUR-Alterra report 2388, 2015)[3]
The Guidance Document on Protected crops states that "the models generally used to calculate leaching and drainage from open-field cultivation can equally well be used to calculate leaching and drainage from walk-in tunnels and greenhouses *if appropriate scenarios are available*. […]

Appropriate scenarios are to be established/selected by the notifier and the selection and parameterisation is to be justified, until methodology and scenarios are established and approved by competent bodies. However currently there are no such models available and only example scenarios have been presented in the guidance."

As a tiered approach the walk-in tunnel assessment i.e. up to FOCUS Step 3 Drainage scenarios may be used as a first tier, as is also proposed in the EFSA Guidance Document Appendix D. Refer to the EU part of the Evaluation Manual.

In the second tier the chrysanthemum scenario available in GEM can be used (as also indicated in Table 1 of the Guidance Document), using conservative input parameters.

The most important substance-related input parameters of the GEM model for the soil-bound scenario are:
- First tier: Longest hydrolysis DT50 for degradation rate in water at 20°C within the greenhouse (days), refinement possible in higher tier (e.g., OECD 309, outdoor mesocosms)
- Geometric mean DT50 for degradation rate in soil at 20°C (days).
    - *Please note that in the scenario report it is recommended to adjust the DT50 values obtained*

[3] It has been established that the PEC values simulated by the GEM scenarios are very sensitive to the application date. On the basis of the outcome of a sensitivity analysis, the following interim approach concerning the selection of the date-of-use is appropriate for the soil-bound surface water scenarios: Include the 30th of May (which is the worst-case date-of-use, based on a number of test calculations with two different substances) in the use schedule and include an additional safety factor of 2 on the resulting PEC value. If the GAP contains multiple applications (for example 4 applications with an interval of 7 days), then May 30 must be set as the last date-of-use. If the 30th of May does not fall within the application period of the GAP, applicants should still use this date. If an acceptable risk cannot be demonstrated based on the outcome with the proposed date of the 30th of May and the safety factor of 2, applicants can refine the assessment by submitting an evaluation for all relevant dates-of-use within the GAP period. In that case, the safety factor of 2 can be omitted.

in open field soils by a default factor of 10 in the absence of a thorough dataset to account for the presumably slower degradation in greenhouse soils. The Dutch ministries have decided that this adjustment factor will not be used until more experience has been gained with the model.

- Geometric mean DT50 for degradation rate in surface water at 20°C (days)
- Geometric mean DT50 for degradation rate in sediment at 20°C (days)
- Arithmetic/geometric[4] mean K_{om} and corresponding arithmetic mean 1/n for suspended organic matter (L/kg) (if not available use K_{om} soil)
- Arithmetic/geometric[2] mean K_{om} and corresponding arithmetic mean 1/n for sediment (L/kg) (if not available use K_{om} soil)
- Saturated vapour pressure (Pa) usually available at 20 or 25 °C
- Solubility in water (mg/L) usually available at 20 or 25 °C
- Molecular mass (g/mol)

Further refinement can be made in Tier 3 (substance data and time window) and Tier 4 (crop management i.e. realistic scenarios for other crops than chrysanthemum). The report states that although the soil-bound scenario is based on application by spraying, it can also be used for soil applied plant protection products (PPP) e.g. fungicides.

Soilless uses (see Van der Linden et al, 2015, RIVM report 2015-0128)[5]
For soilless cultivation a simple tiered approach is described in the guidance document - (Appendix D). For the drip irrigation, two simple calculation methods are provided as a conservative approach. For spray applications it is suggested to take into account the amount of condensation water as a total dose per season applied at once (step 1).The model GEM with the soilless scenario in rose is given as highest tier in the EFSA Guidance Document. Refer to the EU part of the Evaluation Manual.

The model GEM also contains additional scenarios to the rose scenario that is mentioned as example scenario in the guidance document. In total there are four available crop scenarios: rose, tomato, sweet pepper and ficus, which were discerned based on the leading emission factors sodium tolerance and transpiration. All greenhouse grown crops of the Dutch DTG list can be chosen in the model and the model will then use the most appropriate crop scenario.

Depending on the applied for use the most appropriate scenario needs to be used.
As various application methods can be used in a greenhouse several substance fate models are available within GEM:
Model A: application by drip irrigation/in nutrient solution.
Model B: spray/fog application to crop grown on shielded slabs (drip irrigation system.
Model C: spray/fog application to crops grown in pots in an ebb/flow system.

[4] The same statistic as listed in the List of Endpoints of the active substance should be used in the assessment

[5] It has been established that the PEC values simulated by the GEM scenarios are very sensitive to the application date. On the basis of the outcome of a sensitivity analysis, the following interim approach concerning the selection of the date-of-use is appropriate for the soilless surface water scenarios: Create 12 simulations (or fewer, depending on the application period of use within the GAP) with the date-of-use set to the 15th of each month; Next, two additional simulations should be performed for the month that results in the highest PEC: a simulation with application starting one week before and one week after the 15th of that particular month. The following information should be reported: highest PEC value (to be used for the risk assessment), application dates used in the simulations and application date resulting in the highest PEC value. Note that a different date may apply to metabolites.

The non-soil bound scenario was developed with the possibility to choose between two temporal percentiles: the 50th and the 90th percentile (see scenario description). This percentile is largely governed by the flow velocity of the receiving ditch. The Dutch Ministries of Economic Affairs and Infrastructure and Environment have chosen to use the 50th temporal percentile and the 90th temporal percentile factor will not be used for national authorisations until more experience has been gained with the model.

The most important substance-related input parameters of the GEM model for the substrate scenarios are:

- The equilibrium sorption coefficient K_{OM} (L kg-1) to substrate (specific for pot plants). In case no specific information is available it is suggested to use the sorption coefficient for soil here.
- Half-life in recirculation water (d) and the temperature at which it was measured. In case no specific information is available it is suggested to use the DegT50 for hydrolysis.
- Molar activation energy (kJ mol-1) for the degradation in recirculation water. It is suggested to use a molar activation energy of 75 kJ mol-1.
- Half-life in the disinfection tank (d) and the temperature at which it was measured. In case no specific information is available it is suggested to use the DegT50 for hydrolysis.
- Half-life on the greenhouse floor (d). In case no specific information is available it is suggested to use 100 d.
- Half-life in substrate (d). In case no specific information is available it is suggested to use the DegT50 for degradation in soil.
- Geometric mean DT50 for degradation rate in surface water at 20°C (days).
- Geometric mean DT50 for degradation rate in sediment at 20°C (days).
- Half-life in greenhouse air (d) and the temperature at which it was measured. It is suggested to use the half-life in air here, when available, otherwise a half-life of 100 d could be used.
- Molar activation energy (kJ mol-1) for the degradation in greenhouse air. It is suggested to use a molar activation energy in air of 45 kJ mol-1.

Due to the implementation of the changed Activity Decree as per January 2018 (repealed by the Environmental Activities Decree in January 2024**)**, in which it is laid down that the wastewater of greenhouses should be purified with at least a reduction of 95%, the assessment for organic chemical substances will take into account the use of 95% mitigation. A list with all purification techniques that comply with this 95% mitigation can be found on IPLO[6] (Informatiepunt Leefomgeving, in Dutch, see BZG list).

If more than 95% purification is needed to achieve an acceptable aquatic risk, the applicant can submit an adequate risk assessment with refinements of substance properties (e.g., realistic degradation or sorption in recirculation systems) and management properties (e.g., waiting periods, recycling of filter rinse water, which should be based on quantitative effects of such management options) using GEM to demonstrate that in combination with 95% reduction this results in an acceptable risk for aquatic organisms.

If more than 95% purification is still required after substance parameter or management refinement Ctgb will judge on a case by case basis whether a more restricted use can be granted.

For further guidance on the use of the model refer to the GEM Manual and further information on the Ctgb website.

Please note that the obligation for 95% purification of waste water is not applicable to inorganic substances such as metals and salts, nor to micro-organisms, according to the

[6] https://iplo.nl/thema/water/afvalwater-activiteiten/agrarische-activiteiten/vaststellen-zuiveringsrendement/#h38290ab3-9436-4b69-69fc-e55de119109d

Environmental Activities Decree.

Closed buildings
For cultivations and treatments in closed buildings, emission to surface water is not assessed on an EU level since there is no established methodology. The Guidance Document on Protected crops does not fill in this data gap. In the absence of an EU harmonised approach, some national approaches for exposure assessment to STP and/or surface water are described in the EU part of the Evaluation Manual. Please note that the Environmental Activities Decree specifically prohibits direct emission of waste water containing plant protection products to surface water for certain closed building types (see § 4.79, Article 4.795 for cultivation in closed buildings, and § 4.65, Article 4.724 – 4.728 for post harvest treatments in closed buildings, and $4.68-$4.72 for washing and sorting of harvested crops). Therefore an assessment of direct exposure to surface water is not required for such uses on a national level.

2.3.2. Drinking water abstraction points

Surface water destined for the production of drinking water should meet the drinking water criterion. For most active substances in plant protection products this drinking water limit is 0.1 µg/L.

Several categories of uses are described below. The general assessment methodology consists of a first tier calculation and a higher tier analysis of monitoring data. The drinking water criterion is a substance related assessment element. Please note that therefore, with regard to the first tier calculations, next to the proposed uses of the application under assessment also the already authorized uses of the same active substance should be considered. The predicted concentrations of all proposed and authorized uses should be summed to evaluate whether the threshold is exceeded. This may include PEC calculations taken from authorization decisions for other products.

Field uses
Agricultural use (professional use)
For the assessment of surface water destined for the production of drinking water at **agricultural use** the methodology developed in the WG “Implementatie drinkwatercriterium” is followed (Adriaanse et al, 2008, Alterra report 1635). The methodology exists of 2 tiers: pre-registration modelling and post-registration monitoring.

The pre-registration modelling tier (first tier) is based on the model DROPLET that starts with a FOCUS D3 edge-of-field scenario cf. FOCUS 2001 but with Dutch spray drift values.
From the edge-of-field concentration the concentration at the abstraction point is calculated by multiplying with factors accounting for e.g. (i) the relative crop area, i.e. the ratio of the area of the crop and the entire intake area, (ii) market share, reflecting that the active substance is not used on the entire area of a crop, (iii) difference in timing of applications within the area of use, (iv) degradation and volatilisation from the edge-of-field watercourse to the abstraction point and (v) (in very specific case) additional dilution by a lake or incoming river.

The post-registration monitoring tier (highest tier) for the relevant substances, see below for interpretation) consists of an analysis of monitoring data on all abstraction points. A 90th percentile value is calculated for each individual abstraction point.

In fact, for all substances pre-registration modelling is the first tier. However jumping in tiers is possible.
The interpretation of Ctgb of the WG report/decision tree is therefore as follows:

- The analysis of post-registration monitoring data is only relevant for substances that have been indicated (on a yearly basis) as substances of concern by the VEWIN.
- For substances that have been on the market for over 3 years at the time of the assessment and are not included on the list of substances of concern, there is no need to analyse monitoring data or perform model calculations (a standard paragraph is added to the assessment)
- For new substances on the Dutch market (< 3 years) pre-registration modelling is needed. If modelled concentrations exceed the drinking water criterion, first, (spray drift) reducing measures should be proposed. If then the use of the substance is still predicted to exceed the drinking water criterion but with a factor < 5, authorisation could be granted under condition of post-registration monitoring.

For the full text please refer to Alterra report 1635 and the user manual of DROPLET (Van Leerdam et al, 2010, Alterra 2020). A decision tree is presented in Appendix 3.

Agricultural uses (non-professional use)
The developed decision trees and models are not suitable for non-professional (agricultural) use since the area of use cannot be described adequately. Therefore as an approximation a more qualitative assessment following the interim decision tree or RAT factor approach should be used (see Appendix 3) based on the PECsw as calculated with TOXSWA. Alternatively, a DROPLET assessment based on the corresponding professional use may be submitted as a conservative approach.

Non-agricultural uses
For the pre-registration assessment of surface water destined for the production of drinking water after **application to hardened surfaces** a separate methodology was developed by the WG “Implementatie drinkwatercriterium” (Linders et al., 2010, RIVM report 601450021 together with Addendum and calculation tool, Van der Linden, 2016). See Appendix 3 for a short description.

Protected crop uses
The developed decision trees and models are not suitable for protected use since the area of use (greenhouses) is not taken into account in DROPLET. Therefore as an approximation a more qualitative assessment following the interim decision tree should be used (see Appendix 3), based on the PECsw calculated with GEM (or one of the lower tier calculation methodologies for protected crops).

2.3.3. Refinement options for PEC calculations

Options to refine the risk assessment on the exposure side by decreasing the exposure concentrations are:
- Higher tier data on the fate of a substance in the aquatic environment (including sediment) or within the greenhouse,
- Mitigation of the exposure by spray drift reducing technologies (field use) and end-of-pipe water purification measures or management refinements (greenhouse).

Supplementary research to establish the fate of the active substance(s) in representative aquatic (model) ecosystems (including sediment) should be in accordance with the requested use of the product and relevant for the Dutch agricultural and climatologic situation.

Another way to adjust (predicted) exposure concentrations is the prescription of the use of emission mitigating measures/techniques (spray drift for field uses, purification for greenhouses). The spray drift mitigation options are described in Appendix 2 (Drift Tables) for the field uses.

Please note that Ctgb considers that in view of the changed definition in the Activity Decree per 2018 (drift reduction on the whole field instead of only in the 14 meter bordering the surface water body) any additional drift reduction resulting from the authorisation assessment also applies to the whole field (see Appendix 2 for more details on the change in the Activity Decree).
NB The Activity Decree is repealed by the Environmental Activities Decree per January 2024 with no consequences for the requirements regarding drift reduction.

Refined exposure calculations might be combined with a refined adequate risk assessment for aquatic organisms, as included in *Chapter 7. Ecotoxicology; aquatic*. This may include argumentation that a time-weighted average (TWA) concentration is relevant for risk assessment. For the calculation of TWA concentrations for another time window than standard available in the TOXSWA output (i.e., 4, 21 and 28 days) please refer to the working instruction on the Ctgb website.

2.3.4. Use of monitoring data

2.3.4.1. Introduction

Monitoring data are taking into account in the risk assessment, provided that these meet qualitative and quantitative requirements as described below.

An essential condition for the application of monitoring data in the evaluation of the permissibility of Plant protection products is that it must with reasonable certainty be possible to establish a plausible causal relationship between the use in compliance with legal instructions for use and the monitoring concentration of a Plant Protection Product in the environment.

When such a relationship is lacking, monitoring data can have a warning function, making a study into the possible risks desirable. This also means that monitoring data in the context of the evaluation of the permissibility will have to meet a number of quality criteria such as, e.g., regarding the number of measurements, set-up of measurements etc.
Currently two existing types of data sets are taken into account:

1. Surface water quality monitoring from an eco(toxico)logical perspective (water boards, gathered in Pesticide atlas, paragraph 2.3.4.2)

and

2. monitoring data for surface water destined for the production of drinking water (Vewin data, paragraph 2.3.4.3).

Furthermore, general criteria were set up to assess the acceptability of other/additional monitoring data sets not described below (a reference to these criteria is made in paragraph 2.3.4.4).

2.3.4.2. Monitoring data for surface water (ecotoxicological quality)

In principle, monitoring data are higher tier data in the context of a tiered risk assessment. However, monitoring data in surface water are of limited use as refinement for registration purposes, as monitoring may not adequately capture the initial exposure relevant for the aquatic risk assessment. Therefore, the absence of exceedance based on monitoring data cannot be used as such to overrule the predicted concentrations. Furthermore monitoring in surface water is often performed in other waterbodies than in the edge-of-field ditch which is the relevant waterbody for the registration. If however monitoring data show that there is threshold exceedance further assessment is triggered.

Regular screening monitoring data of the various water boards are gathered in the Pesticide Atlas, maintained by CML, part of Leiden University). It is verified that the data in this Atlas comply with the criteria set below for Category 1 data. On a yearly basis Ctgb provides an update of the relevant aquatic thresholds for authorisation to CML. The Pesticide Atlas includes a statistical correlation analysis between concentrations, threshold exceedance and land use that may indicate probable relationships. In this version also the correlation analysis of land use with the environmental quality standards (EQS) of the Water Framework Directive (WFD) is included.

Data from the Pesticide Atlas are used to evaluate potential exceedances of the authorisation threshold and environmental quality standards (MKN in Dutch, data source http://www.rivm.nl/rvs/Normen). These environmental quality standards consist either of the harmonised WFD thresholds (AA-EQS and MAC-EQS) derived according to the Fraunhofer methodology as laid down in RIVM report 601782001 or of an MPC value (which is usually derived on the basis of outdated guidance).

If an exceeding of the authorisation threshold is observed, first an analysis of land use with the exceeding is made by reviewing the correlation analysis on www.bestrijdingsmiddelenatlas.nl. The applicant is requested to submit a further adequate risk assessment when the authorisation threshold is exceeded and a relation with the proposed use is plausible (*i.e.*, when a statistically significant correlation between threshold exceedance and land use is found)[7].

The applicant should then substantiate that the proposed use does not contribute to the exceeding, or submit a proposal for emission reduction. If there is a correlation of exceeding with already authorised uses, this will be mentioned as a signal for future (re-)registrations of the product.

Ctgb is not the responsible authority for the examination of the WFD threshold. WFD thresholds are essentially identical to the MPC-INS which is laid down in the RGB in the way that these thresholds are derived (*i.e.* following the earlier mentioned Fraunhofer methodology). However there has been a status change with regard to the role of this MPC-INS in the authorisation procedure for plant protection products. Until 2011 the MPC-INS was included as an authorisation criterion in the RGB (article 2.10). In 2011 an adaptation of the RGB was made due to the implementation of 1107/2009 EC. It is now laid down in the RGB that Ctgb can calculate the MTR-INS on request (article 8.11).

In the project Decision Tree Water “Terugkoppeling monitoring naar toelating” a plausible cause analysis protocol (De Werd & Kruijne, 2013) was developed that also uses the Pesticide Atlas as data source for monitoring data. As a transitional measure, awaiting the implementation of the work of the working group *Terugkoppeling Monitoring naar Toelating*, Ctgb has until now considered monitoring data in relation to exceedance of EQS values(MPC-INS).

The result of the Working Group has been implemented in the Emission Reduction Plan (ERP) approach. This implementation of the Emission Reduction Plan is steered by the Ministry of Infrastructure and Environment and aims at reduction of the threshold exceedance with regard to the WFD thresholds. Ctgb is not the responsible authority to address any potential exceedance of the WFD thresholds.

[7] In specific cases where the analytical method used is unable to measure residues at levels below the threshold, also the correlation with the concentrations should be regarded (see explanation on the website of the Pesticide Atlas under the header correlatie ‘niet-toetsbare’ stoffen)

When the applicant concludes that the authorisation conditions need to be amended, an application for label change can be proposed. Ctgb will judge whether the proposed emission reduction will be adequate and amend the label accordingly.

Hence, Ctgb continues to report monitoring data in relation to ecological threshold exceedance but will only draw consequences when the authorisation threshold is exceeded and a plausible relation with the relevant land use is present (statistically significant correlation as defined by the Pesticide Atlas).

2.3.4.3. Monitoring data at Drinking water abstraction points (drinking water quality)

The Vewin assembles the monitoring data of all drinking water companies into a data set comprising all drinking water abstraction points in surface water and supplies these data to Ctgb on a yearly basis. It is verified that the data of the Vewin comply with the criteria set below for Category 1 data. Furthermore, the Vewin data are designated by the WG drinking water criterion to be used in the authorisation procedure.

A causal or statistical correlation with land use cannot be made because of the more diffuse source of the surface water reaching the drinking water abstraction points. Therefore the criterion of a plausible causal relation up to specific crops or applications is not applicable to this assessment. However, it should be clear that a substantial part of the source of the substance is agricultural before the monitoring data will affect authorisations of PPP.

2.3.4.4. Additional monitoring data

When an applicant wishes additional monitoring data to be considered in the evaluation, these should meet certain criteria and the monitoring protocol should be discussed with the Ctgb on beforehand. The Ctgb criteria for taking additional monitoring data into account are described in Evaluation Manual version 1.0, G6 water, NL part, 2.3.5.4 (2010).

2.4. Approval

The evaluation of products on the basis of existing active substances already included in Commission Implementing Regulation (EU) No 540/2011 or new substances has been laid down in Regulation (EC) No 1107/2009. Where no European methodology is agreed upon, a national methodology is applied as described in the Plant protection product and Biocides Decree (Bgb).

2.4.1. Criteria and reference values

The concentration in surface water and sediment as determined according to the methods in this chapter are primarily used for assessment of the risk to aquatic organisms. The ecotoxicological criteria and reference values have been laid down in the section Ecotoxicology; aquatic organisms. Furthermore, the concentration in surface water is relevant with regard to the secondary poisoning assessment for fish-eating birds and mammals, see section Ecotoxicology; birds and mammals.

The criterion laid down for surface water intended for drinking water production is that the concentration of any active substance and the metabolites formed from that active substance must be lower than 0.1 µg/L. A separate decision tree is available for this assessment (see Appendix 3).

In the case of metabolites that are declared non-relevant with regard to groundwater this non-relevance can be extrapolated to surface water intended for the abstraction of drinking water. This is sustained by the Guidance Document (GD) on non-relevant metabolites where it is

stated in the introduction that: "*This guidance document focuses on groundwater, though the general approach may also be applicable for the regional management of* ***surface water resources intended for the abstraction of drinking water*** *in Member States.*"

2.4.2. Decision making

The procedure for taking a decision on approval regarding the risk to aquatic organisms has been elaborated in chapter 7 Ecotoxicology; aquatic.

The criterion laid down for surface water intended for drinking water production is that the concentration of any active substance and the metabolites formed from that active substance must be lower than the drinking water threshold laid down in the Drinking Water Directive (0.1 µg/L for organic substances).

2.5. Developments

The following developments will be implemented in the coming years. For the moment, assessment is based on either the old situation or on interim methodologies as described in this Chapter.

- Introduction of the new model DRAINBOW (Working group Water, "blootstelling waterorganismen"). Aspects that will (or might) change as a result of the Working Group's progress:
    - spray drift data tall fruit dormant and full leaf distinction based on BBCH code instead of fixed date
    - introduction of emission route via drainage from adjacent field
- Dust drift from seed treatments (not NL specific, see EU part of the Evaluation Manual for details)

3. APPENDICES

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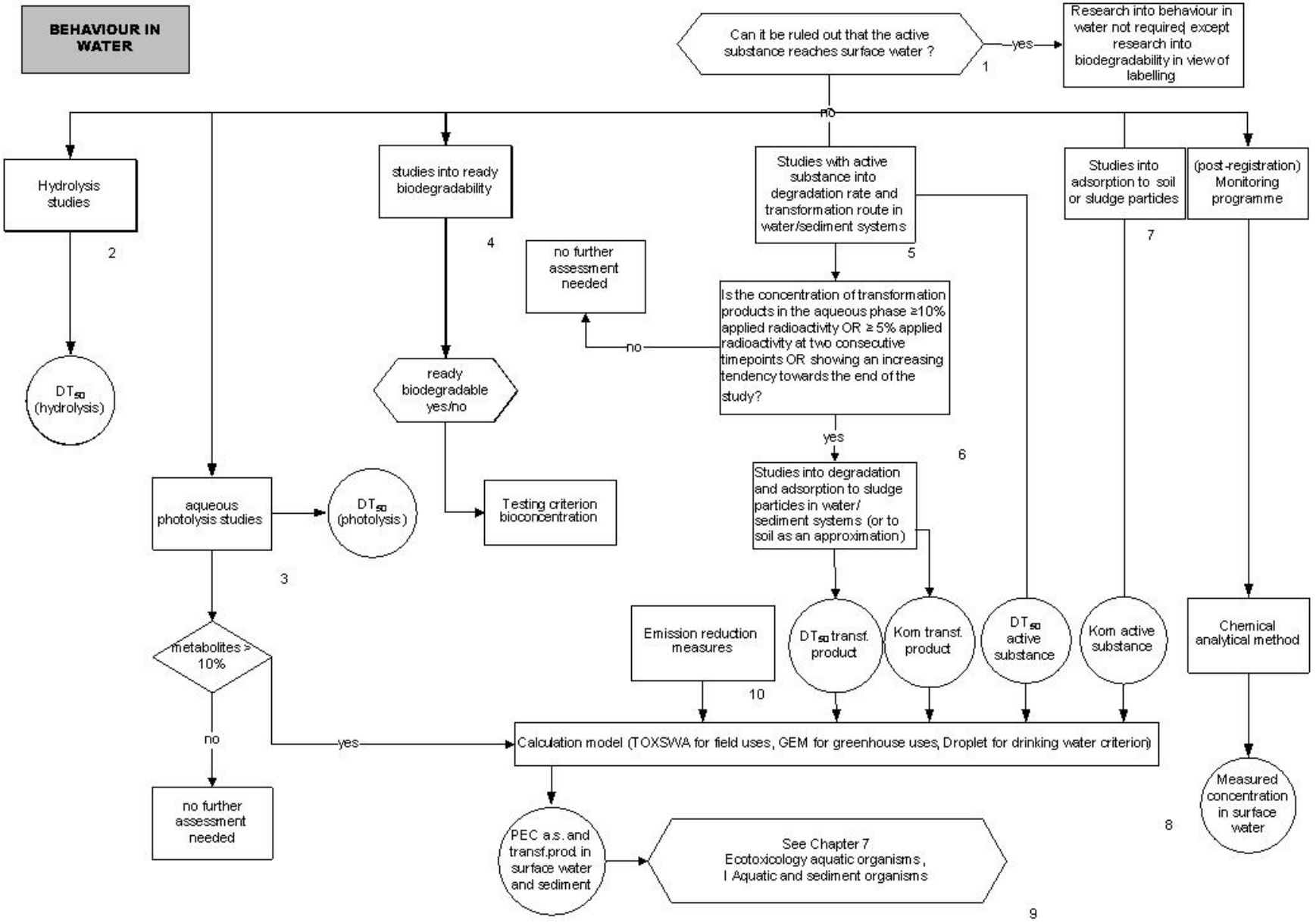
Appendix 1 Explanatory notes decision tree behaviour in surface water and sediment

1) For each active substance, information concerning behaviour in surface water and sediment (283/2013 7.2) must be provided, unless it can be demonstrated that it can be ruled out that the substance reaches surface water and sediment during good (agricultural) use of the product, according to the WG/GA (Statutory Use Instructions/Directions For Use).
2) For the performance of the hydrolysis study, reference is made to question 283/2013 A2.09.1a and 7.2.1.1. This information is used as background information during the assessment.
3) Data on the photochemical degradation (283/2013 A2.09.2a/A2.09.3a and 283/2013 7.2.1.2 and 7.2.1.3) are used as background information in the assessment. Any photolysis metabolites exceeding the trigger of 10% should be assessed.
4) Data on “ready biodegradability” are required for testing the bioconcentration factor. The criterion for bio-concentration is associated with the degree of biodegradability ‘ready biodegradable’ / ‘not ready biodegradable’ of a substance.
5) A study in water must be conducted into the dissipation (disappearance) of the active substance, and the transformation of the active substance into its degradation products (283/2013 7.2.2.). The routes through which the transformation processes take place, and the rates of the transformations must, where possible, be determined.
6) Toxicologically or ecologically relevant degradation products in the aqueous phase are degradation products formed in the aqueous phase of which the laboratory research into the degradation in a water/sediment system at any point in time showed an amount higher than or equal to 10% or 2x5% or increasing towards the study end of the added amount of active substance. For these metabolites, data on the rate of degradation and sorption are required.
   For degradation products in the sediment phase formed in the sediment phase in a water/sediment system showed an amount higher than or equal to 10% or 2x5% or increasing towards the study end of the added amount of active substance exposure concentrations are calculated. Note that the trigger for ecotoxicological assessment remains to be 10% of the added amount of active substance after 14 days. For these metabolites, data on the toxicity for sediment organisms are required.

7) The data obtained on adsorption to soil can be used (see 283/2013 7.1.3) for evaluation of the adsorption of the test substance to suspended solids and sediment.
8) The exposure (Predicted Environmental Concentration (PEC)) is the value calculated by a calculation model, taking into consideration the frequency of application. When calculating the concentration of a Plant Protection Product in surface water and sediment, the relevant emission routes of the product to surface water and sediment should be determined, and the concentration must then be calculated with the appropriate module. For the current Dutch assessment of Plant protection products, the emission route spray drift is considered for field uses (TOXSWA) and emission from greenhouses is addressed in GEM.
9) In the assessment diagram concerning the risk to aquatic organisms, the PEC is related to toxicity data of the different tested aquatic organisms, for which reference is made to the next Chapter 7 Ecotoxicology; aquatic.
10) In a refined exposure assessment, emission reducing measured can be applied to decrease the PEC. Another option for refinement of the exposure assessment is the generation of supplementary data about the fate of the substance in the aquatic environment (including sediment) which may lead to adjustment of the calculated exposure concentration.


BEHAVIOUR IN WATER
Can it be ruled out that the active substance reaches surface water ?
1
yes
Research into behaviour in water not required except research into biodegradability in view of labelling
no
Hydrolysis studies
2
DT50 (hydrolysis)
studies into ready biodegradability
4
ready biodegradable yes/no
Testing criterion bioconcentration
no further assessment needed
Studies with active substance into degradation rate and transformation route in water/sediment systems
5
Is the concentration of transformation products in the aqueous phase ≥10% applied radioactivity OR ≥ 5% applied radioactivity at two consecutive timepoints OR showing an increasing tendency towards the end of the study?
no
yes
6
Studies into degradation and adsorption to sludge particles in water/ sediment systems (or to soil as an approximation)
Studies into adsorption to soil or sludge particles
7
(post-registration) Monitoring programme
aqueous photolysis studies
3
DT50 (photolysis)
metabolites > 10%
no
yes
no further assessment needed
Emission reduction measures
10
DT50 transf. product
Kom transf. product
DT50 active substance
Kom active substance
Chemical analytical method
Calculation model (TOXSWA for field uses, GEM for greenhouse uses, Droplet for drinking water criterion)
PEC a.s. and transf.prod. in surface water and sediment
See Chapter 7 Ecotoxicology aquatic organisms, I Aquatic and sediment organisms
9
Measured concentration in surface water
8

Appendix 2 Spray drift and emission percentages

Framework
National spray drift values can be applied on the basis of Article 8f of the Plant protection products and Biocides Decree (Bgb). Ctgb bases the exposure assessment on average spray drift values determined by WPR (Wageningen Plant Research, formerly WUR-PRI).

Change in Activity Decree (per January 2024 Environmental Activities Decree) and introduction of DRT classes (January 2018).
A major general change affecting the use of spray drift values in the assessment of plant protection products is the Entry into force of the revision of the Activity Decree (Activiteitenbesluit), per January 2018 (per January 2024 Environmental Activities Decree (BAL)), including the introduction of drift reducing technology (DRT) classes. Individual techniques are classified into groups of techniques that comply with a minimum drift reduction. The list of these DRT classes and techniques that fall into these classes is available at IPLO[8] (Informatiepunt Leefomgeving, Dutch version only).

The standard requirement for field applications (downward sprayed crops, fruit culture and lane tree cultivation) is the use of a 75% reducing technique on the whole field irrespective whether these fields are adjacent to surface water.
Furthermore the minimum crop free zone changes from 25 cm to 50 cm for downward sprayed crops (relevant for cereals and grassland).
For fruit culture this standard requirement of 75% reduction should be applied in combination with 4.5 m crop free zone. If a crop free zone of 3 meter is used then techniques with 90% reduction should be applied.
For lane tree cultivation the policy aim is a reduction of 75% of the emission, at a crop free zone of 5 meter.

Users of plant protection products should always comply to the rules of the Activity Decree (per January 2024 Environmental Activities Decree).

Please note that Ctgb considers that in view of the changed definition in the Activity Decree (per January 2024 Environmental Activities Decree) any additional drift reduction resulting from the authorisation assessment also applies to the whole field, in line with the recommendations of the working group Eénduidige voorschriften.

Implementation of the Wageningen Drift Calculator (obligatory for dossiers submitted from January 2022 onwards, accepted from August 2021 onwards)

Description/aim and scope
In 2021 the Wageningen Drift Calculator (WDC) was released by WPR commissioned by the Ministry of Agriculture, Nature and Food Quality.
This tool integrates the drift deposition values from all available Dutch drift measurements of WPR for agricultural crops (downward sprayed arable crops, fruit culture and lane tree cultivation) for the different non-target zones (surface water/aquatic organisms, terrestrial non-target organisms). The full drift dataset has been re-fitted to generate drift curves for each DRT class.

[8] https://iplo.nl/thema/water/afvalwater-activiteiten/agrarische-activiteiten/vaststellen-driftreductie-spuittechnieken/#h647850ba-f7e2-5ac2-f373-5128e7199fab

The tool allows for selecting additional DRT classes and additional crop free buffer zones so that tailored refined drift deposition values can be proposed for authorisation for use in the exposure/risk assessment and for inclusion on the label. This hence replaces the former procedure of submitting tailor-made drift reports for specific situations in which a refinement of the generic drift deposition values was required.

For downward sprayed crops, a differentiation in minimum crop free zones and the position of the last nozzle with respect to the last crop row is implemented.

As a result of the implementation of the WDC including the latest drift database, the drift deposition values have changed (and for downward sprayed arable crops also differentiated). Therefore the tables in the Evaluation Manual presenting the default drift deposition values for the various DRT classes to be used in the exposure assessment have been updated for the situation representing the minimum obligatory crop free zone. Further drift reduction options including crop free buffer zones (with steps of (a multiple of) 25 cm) can now be looked up in the WDC.

Please note that currently policy developments take place that will include a decision on the upper limits with regard to crop free (buffer) zone and DRT class that can be used for the authorisation of plant protection products. Awaiting the outcome of those policy developments, the following boundaries are to be taken into account, based on current practice:

- The maximum allowable crop free zone for downward sprayed arable crops is 4 meter, as it is based on expert judgement of Dutch agronomic circumstances and common sense not realistic to assume that wider crop free zones will be applied in Dutch agriculture. See also Assessment of topics with regard to specific agricultural use in the Netherlands | Assessment framework PPP | Board for the Authorisation of Plant Protection Products and Biocides (ctgb.nl) (issue 2).
- The use of DRT97.5 and DRT99 for downward sprayed arable crops for refinement of the exposure to surface water is not accepted at this moment.

Applicability
The drift deposition values included in the WDC are valid for professional uses in crops that are agriculturally cultivated and cannot be applied to other professional non-agricultural uses of plant protection products, nor non-professional use.
The tool provides drift values for the reference/benchmark technique for DRT classes and does not provide drift deposition values for individual techniques.

For professional non-agricultural uses, a default conservative estimate drift deposition value is extrapolated from the conventional technique for downward spraying of agricultural crops in the absence of data. This value can be used as a first step in exposure/risk assessment. However, if refinements of these values is required a substantiation should be provided accounting for the specific application technique and relevant realistic mitigation options for that use. See *explanatory notes section on downward sprayed crops* for further elaboration.

The WDC does not include drift deposition for non-professional uses. For handheld spraying (for non-professional uses, and specific manual applications for professional use) refer to the section on *special applications*.

For further information on the tool, please refer to the WDC manual.

Spray drift values

In Table 1 a general overview of the default spray drift percentages used by Ctgb for all crop types is presented. Spray drift values are different for downward sprayed crops (arable crops) and for upward or sideways sprayed crops (fruit and lane trees).

Regarding downward sprayed field crops, spray drift deposition values based on 75% reduction are only valid for crops covered by the Activity Decree. If applicants wish to apply for other uses (e.g. amenity use and field edges, see section on *special applications*), the spray drift value based on conventional spraying techniques should be used as a conservative default value, and mitigation can be proposed as required.
See explanatory notes for more detail.

Table 1 presents the drift deposition values based on the WDC for standard situations, i.e. using conventional spray drift techniques, except for field crops covered by the Activity Decree (per January 2024 Environmental Activities Decree) where the DRT75 values are given.

Table 1 Spray drift percentages on surface water for standard situations*

Application	Subdivision	Spray drift %	Remarks
Upward and sideways spraying techniques			
Fruit crops (large and soft fruit) – minimum crop free zone 3 meter (NB standard technique – tractor mounted)**	without leaves (dormant)	22.5	See WDC and table 2a Based on data from 1993-2011
	With leaves (full leaf)	12.3	See WDC and table 2a Based on data from 1993-2011
Lane trees – minimum crop free zone 5 m (NB standard technique – tractor mounted)	Spindles (“spillen”, closely spaced)	0.60	See WDC and table 3a Based on data from 1996-2008
	Transplanted trees (“opzetters”, widely spaced)	2.4	See WDC and table 3a Based on data from 1996-2008
	High lane trees	5.8	See WDC and table 3a Based on data from 2005-2011
Downward spraying techniques			

Field crops (including downward sprayed forest trees and hedging plants and flower bulbs/bulb flowers) covered by the Activity Decree (per January 2024 Environmental Activities Decree) and assuming 75% spray drift reduction – tractor mounted	See explanatory notes and Tables 4a/b	Varying between 0.4% and 1.2%	At least 75% spray drift reduction should be applied. See differentiated drift deposition values as in the WDC. Range indicated includes all nozzle positions, all crop stages and all minimum crop free zones (as laid down in the Activity Decree (per January 2024 Environmental Activities Decree)).
Crops and uses not covered by the Activity Decree (per January 2024 Environmental Activities Decree) (downward spraying) – tractor mounted (*i.e.*, not handheld)	See explanatory notes section on downward sprayed crops for details	5.4	Based on report IMAG 97-04[9], conventional technique. *Used as a conservative first tier estimate in the absence of drift measurements*
Special applications	-mud-bank -dry ditch -handheld application (Knapsack)***	100 100 1.2	see explanatory notes
Applications without spray drift	See explanatory notes	0	

* Spray drift-mitigation measures will be discussed in more detail in the explanatory notes below.

** For small fruit (grapes, berries, …) only the **full leaf situation** is used for the exposure assessment, since:

- the use of spray drift values from downward directed spraying is too best-case (inventory report Van de Zande J.C., M. Wenneker, A. de Bruine. 2011. Inventarisatie kleinfruitteelten en afleiden driftdepositie en maatregelpakketten. *PRI report 398)*
- the full leaf values are comparable in order of magnitude with the EU spray drift values for vines (Rautmann)

*** For the application in reed, a knapsack sprayer is deemed applicable as downward spraying technique, with a corresponding drift value of 1.2%. Please note that the full dose rate should be taken into account and thus it is not possible to correct for a minimum acreage of use, as the application will be performed in nature conservation areas for which local effects should also be assessed.

Explanatory notes spray drift percentages

General

[9] Huijsmans, J.F.M. ; Porskamp, H.A.J. ; van de Zande, J.C. 1997. Drift(beperking) bij de toediening van gewasbeschermingsmiddelen. Evaluatie van de drift van spuitvloeistof bij bespuitingen in de fruitteelt, de volveldsteelten en de boomteelt. (IMAG-DLO rapport; 97-04). https://edepot.wur.nl/550162

The proposed spray drift percentages are derived from research by Wageningen Plant Research (WPR).

Below tables present the default drift deposition values for the various DRT classes to be used in the exposure assessment for the situation representing the minimum obligatory crop free zone. Further drift reduction options can be retrieved from the WDC within the boundaries given above for maximum acceptable crop free zone and DRT class.
The additional measures should be realistic and enforceable.

Explanation per crop/application

Fruit crops (including soft fruit, tree nuts and hop cultivation)

Upward and sideways spraying

Large fruit (pome- and stone fruit/top fruit, DTG crop group 3.1)
Standard spray drift percentages are based on a crop-free zone of 3 meter (standard situation, see Table 1). However, the Environmental Activities Decree prescribes that in large fruit a 75% drift reducing technique is compulsory, in combination with a crop free zone of 4.5 m. A crop free zone of 3 meter is only allowed when a drift reducing technique of at least 90% is used.
This drift reduction can be achieved by applying spray techniques of a certain drift reduction class (DRT class). These DRT classes have been defined on the basis of the reduction in the full leaf stage as compared to the conventional standard technique at the evaluation zone relevant for the position of the edge-of-field ditch. For each DRT class a benchmark (reference) technique has been assigned on the basis of their spray drift reduction percentage. Reference techniques for each DRT class are defined in WUR-WPR report 564[10].

An exception to this obligation is the biological cultivation, for which it is allowed to use a crop free zone of 3 meter with a spray drift reduction of 75%. If for a product for which an application for authorisation is made it is clearly indicated on the label (instructions for use) to be applicable for biological cultivation, Ctgb will use the spray drift values relevant for this situation. Any required additional mitigation should then be stated on the label.

See Table 2a for a description of the spray drift deposition values for fruit culture. These values are valid for *fungicide* and *insecticide* treatments.
For completeness (and for the use of default values for non-professional users) also the old standard situation is included. A distinction is made between spray drift values in the dormant stage and in the full-leaf stage. This distinction is now fixed to the date of May 1st. In future, the spray drift curves will be based on BBCH codes (see section on developments in main text).

Soft fruit (berries and grapes, DTG crop group 3.2.2 (excluding cranberry), 3.2.3, 3.2.4)

[10] Zande, J.C. van de, H.J. Holterman, J.F.M. Huijsmans & M. Wenneker. 2019. Spray drift for the assessment of exposure of aquatic organisms to plant protection products in the Netherlands. Part 2: Sideways and upward sprayed fruit and tree crops. Wageningen UR, WPR Report 564, Wageningen. 2019.

Based on an inventory report by WPR[11] it was decided in 2014 that for sideways or upwards sprayed soft fruit (grapes and berries) the large fruit spray drift values are used. For all application periods, only the full-leaf values are used. This is done to acknowledge the difference between large fruit and small fruit as established by Rautmann and Ganzelmeier (basis for EU spray drift values) to some extent.
With regard to the crop-free zone it is concluded in the PRI 398 report that although according to the Environmental Activities Decree the obligatory distance to the ditch for small fruit is only 0.5 m, in practice the distance is about 3 meter. This is in line with the minimum distance set for large fruit. Therefore the use of the spray drift values of large fruit (minimal crop-free zone 3 m) is defensible at this stage.
However it should be noted that for soft fruit the Environmental Activities Decree only prescribes the use of DRT75. Therefore the starting position for the exposure assessment is not a combination of DRT90 and 3 meter crop free zone OR a combination of DRT75 and 4.5 meter crop free zone, as it is for large fruit. Instead for soft fruit that is sprayed upward or sideways the starting point is DRT75 with 3 meter crop free zone. See Table 2a.
As the minimum crop free zone of 3 meter is not explicitly stated in the Environmental Activities Decree, but is the basis for the drift deposition values used for the assessment, the crop free zone should always be specified on the label.

Please note that with regard to spray drift mitigation not all techniques are realistic for application in soft fruit, which is often cultivated under certain types of coverage (please note this also applies to cherry). Applicants should take this into account when proposing the use of certain DRT classes and make sure that an appropriate technique for soft fruit is available in that class. For instance, the use of KWH 3-row sprayers is not feasible for soft fruit like berries.

The use of the full-leaf spray drift values for large fruit also for small fruit must be seen as a transition phase until sufficient actual measurements leading to separate spray drift values for soft fruit are available.

Tree nuts and other fruits (DTG crop group 3.3 and 3.4)
The same issue as for soft fruit is valid for tree nuts and other fruits (DTG crop group 3.3, 3.4): the Environmental Activities Decree only prescribes the use of DRT75. Therefore the starting position for the exposure assessment is not a combination of DRT90 and 3 meter crop free zone OR a combination of DRT75 and 4.5 meter crop free zone, as it is for large fruit.
Therefore also for tree nuts and other fruits the starting point is DRT75 with 3 meter crop free zone, as described above for soft fruit.
However for tree nuts and other fruits both the dormant stage and the full-leaf stage drift deposition values are used. See Table 2a.
As the minimum crop free zone of 3 meter is not explicitly stated in the Environmental Activities Decree, but is the basis for the drift deposition values used for the assessment, the crop free zone should always be specified on the label.

Hop cultivation (under DTG crop group 1.11.1)
For the sideways and upward application in hop no spray drift deposition values are available. Hop cultivation in The Netherlands is usually 3-4 meter high (Limburg)
For the assessment the values applicable to tall fruit in the dormant stage are used, based

[11] Van de Zande J.C., M. Wenneker, A. de Bruine. 2011. Inventarisatie kleinfruitteelten en afleiden driftdepositie en maatregelpakketten. PRI report 398.

on expert judgement of WPR (personal communication, 2014).
The same issue as for soft fruit is valid for hop as the Environmental Activities Decree only prescribes the use of DRT75. Therefore the starting position for the exposure assessment is not a combination of DRT90 and 3 meter crop free zone OR a combination of DRT75 and 4.5 meter crop free zone, as it is for large fruit. Therefore also for hop the starting point is DRT75 with 3 meter crop free zone. See Table 2a.
As the minimum crop free zone of 3 meter is not explicitly stated in the Environmental Activities Decree, but is the basis for the drift deposition values used for the assessment, the crop free zone should always be specified on the label.

Please note that with regard to spray drift mitigation not all techniques are realistic for application in hop. For instance the use of drift reducing nozzles that lead to very coarse droplets is not recommended, since they will not reach the top of the crop. Applicants should take this into account when proposing the use of certain DRT classes and make sure that an appropriate technique for hop cultivation is available in that class.

Spray drift mitigation techniques and spray drift deposition values
See Table 2a for a description of the spray drift deposition values belonging to the various DRT classes for large fruit when sprayed upward or sideways.

The aim laid down in the Environmental Activities Decree for fruit culture is 75% spray drift reduction when applying a crop free zone of 4.5 meter, or a 90% spray drift reduction when applying a crop free zone of 3 meter.
This drift reduction can be achieved by applying spray techniques of a certain drift reduction class (DRT class). These DRT classes have been established by the TCT in collaboration with WPR within the framework of the Activity Decree (per January 2024 Environmental Activities Decree).
For each DRT class a benchmark (reference) technique has been assigned on the basis of their spray drift reduction percentage. Reference techniques are defined in WPR report 564[12].
The absolute spray drift deposition values for those reference techniques are used for the exposure assessment and are presented in Table 2a.
For applications in which no drift reduction is requested in principle the boundary conditions defined by the Environmental Activities Decree apply. For the assessment for fruit culture this means the use of the spray drift deposition values (dormant/full-leaf stage) of **DRT75 in combination with 4.5 m crop free**, as this covers for the spray drift deposition when using DRT90 in combination with a crop free zone of 3 meter.

Spray drift deposition values for the different drift reducing technique classes are presented in the table below for the standard crop free zones (3 meter and 4.5 meter). If a combination of a DRT class and an additional crop free zone is needed to achieve an acceptable risk then the WDC tool can be further consulted.

Please note that with the entry into force of the revised Activity Decree (per January 2024 Environmental Activities Decree) Ctgb considers that all additional mitigation measures should also apply to the whole field.

[12] Zande, J.C. van de, H.J. Holterman, J.F.M. Huijsmans & M. Wenneker. 2017. Spray drift for the assessment of exposure of aquatic organisms to plant protection products in the Netherlands. Part 2: Sideways and upward sprayed fruit and tree crops. Wageningen UR, WPR Report 564, Wageningen. 2017.

Table 2a: Spray drift values for DRT classes in fruit culture – upward and sideways spraying

Spray drift percentage [%]				
DRT classes	**Crop-free zone of 3 m**		**Crop-free zone of 4.5 m**	
	Without leaves (dormant)	with leaves (full-leaf)	Without leaves	with leaves
Standard orchard sprayer*	22.5	12.3	18.3	9.1
DRT75	11.6**, ***	2.9**, ****	**8.7**	**1.7**
DRT90	3.3	1.5	1.8	0.84
DRT95	1.8	0.58	1.1	0.40
DRT97.5	1.8	0.18	1.1	0.12
DRT99	0.69	0.10	0.35	0.08

* relevant for non-professional use in the absence of drift values for knapsack/ready to use upward-sideways spraying as a first conservative estimate.

** relevant for biological production (see Environmental Activities Decree, Table 4.723d, will be used when relevant)

*** relevant for upward/sideways spraying of hop (under DTG crop group 1.11.1) since the Environmental Activities Decree only prescribes DRT75 for this crop (not under large fruit), in combination with a minimum crop free zone of 50 cm (other crops). In practice the crop free zone in these cultivations will be 3 meter (expert judgement on the agronomic minimum crop free zone), therefore the use of DRT75 in combination with 3 meter CFZ will be the starting point for the assessment. Also relevant for nut trees and other fruits (DTG crop group 3.3 and 3.4) when in dormant stage

**** relevant for soft fruit (grapes, berries etc., DTG crop group 3.2.2 (excluding cranberry), 3.2.3 and 3.2.4) since the Environmental Activities Decree only prescribes DRT75 for these crops (not under large fruit), in combination with a minimum crop free zone of 50 cm (other crops). In practice the crop free zone in these cultivations will be 3 meter (expert judgement on the agronomic minimum crop free zone), therefore the use of DRT75 in combination with 3 meter CFZ will be the starting point for the assessment. Also relevant for nut trees and other fruits (DTG crop group 3.3 and 3.4) when in full leaf stage

Downward spraying

For *herbicide* use in fruit cultivation, downward spraying –complying to a minimum drift reduction of 75%- is applicable. Drift values from WUR-WPR are available[13].
For the herbicide application in orchards the values remain unchanged (not included in the WDC), see Table 2b.

Table 2b: Spray drift values for DRT classes in fruit culture – downward spraying

Herbicide use in orchards (downward spraying) Spray drift percentage [%]			
		3 m crop free zone	**4.5 m crop free zone**
"Zwartstroken" (bare soil surface strip underneath tree)	DRT75	0.010	0.010

[13] Stallinga, H., J.C. van de Zande, A.M. van der Lans, P. van Velde & J.M.G.P. Michielsen, 2012. Drift en driftreducerende spuittechnieken voor onkruidbestrijding in de boomteelt. Referentie techniek en driftreducerende spuitdoppen, Veldmetingen 2010-2011. Wageningen UR Plant Research International, Plant Research International Rapport 454, Wageningen.

	DRT90	0.007	0.007
"Grasstroken" (grass surface area in orchard up till 0.50 m from edge of surface water)	DRT75	0.014	0.014
	DRT90	0.008	0.008

As in practice it cannot be excluded that this application is performed using normal tractor mounted spraying equipment, a specific restriction sentence should be stated when the risk assessment is based on these specific drift deposition values. For further guidance on the formulation of restriction sentences, see the DRT working instruction on the Ctgb website.

There are no specific drift rates for non-professional use in fruit crops.

Lane trees

Upward and sideways spraying

For the growth of lane trees, separate spray drift percentages are used based on research by WPR. A distinction is made between the growth of "spillen" (spindles; closely spaced trees) and "opzetters" (transplanted trees; widely spaced trees) because of the differences in tree shape, and the resulting differences in spray drift emission. Spindles form dense rows (plant distance 30 cm), whilst transplanted trees are planted further apart (1 m plant distance), are taller, and often have bare lower trunk.

See Table 3a for a description of the spray drift deposition values for lane tree cultivation. These values are valid for fungicide and insecticide treatments (sideways and upwards).
The aim laid down in the Environmental Activities Decree for lane tree cultivation is 75% spray drift reduction. This drift reduction can be achieved by applying techniques of a certain spray drift reduction class (DRT class). These DRT classes have been established by the TCT in collaboration with WPR within the framework of the Activity Decree (per January 2024 Environmental Activities Decree).
For each DRT class a benchmark (reference) technique has been assigned on the basis of their spray drift reduction percentage. Reference techniques are defined in WPR report 564[14].
The absolute spray drift deposition values for those reference techniques are used for the exposure assessment and are presented in the below table.
For applications in which no spray drift reduction is requested the boundary conditions defined by the Environmental Activities Decree apply. For the assessment for lane trees this comes down to the use of the spray drift deposition values of DRT75.

Please note that currently there are no DRT75 techniques approved for spindles and transplanted trees, only for high lane trees. This means that for spindles and transplanted trees the farmer should in practice use DRT90, since it is obliged to comply with the Environmental Activities Decree. For risk assessment, however, the following approach applies, since it cannot be excluded that DRT75 techniques will be developed in the (near) future:

[14] Zande, J.C. van de, H.J. Holterman, J.F.M. Huijsmans & M. Wenneker. 2019. Spray drift for the assessment of exposure of aquatic organisms to plant protection products in the Netherlands. Part 2: Sideways and upward sprayed fruit and tree crops. Wageningen UR, WPR Report 564, Wageningen. 2019.

- The initial assessment can be based on the values for the standard application technique and the standard crop-free zone. If this leads to an acceptable risk, then no restriction is required on the label.
- If a DRT90 technique is required to arrive at an acceptable risk, then this technique should be stated on the label, since it is more than the requirement from the Environmental Activities Decree.
- If a higher reduction is required (*i.e.*, a higher DRT class and/or additional crop-free zone) then this should also be on the label.

If more than 75% drift mitigation is required to achieve an acceptable risk, this will always lead to a restriction sentence.

Spray drift deposition values for the different drift reducing technique classes are presented in the table below, when available. If a combination of a DRT class and an additional crop free zone is needed to achieve an acceptable risk then the WDC tool can be further consulted.

Please note that with the entry into force of the Activity Decree (per January 2024 Environmental Activities Decree) Ctgb considers that all additional mitigation measures should also apply to the whole field.

Table 3a: Spray drift values for DRT classes in lane tree cultivation – upward and sideways spraying

Spray drift percentage [%]	
DRT classes	**Crop-free zone of 5 m (as obligated by the Environmental Activities Decree for upward and sideways sprayed tree nursery crops)**
Type of lane trees (stage) – upward and sideways spraying	
High lane trees (>5 meter)	
standard sprayer *	5.8
DRT75	1.7
DRT90	-
DRT95	0.33
Transplanted trees	
standard sprayer *	2.4
DRT75	-
DRT90	0.13
Spindle trees	
standard sprayer *	0.60
DRT75	-
DRT90	0.06

* relevant for non-professional use in the absence of drift values for knapsack/ready to use upward-sideways spraying as a first conservative estimate. Also relevant for spindle trees and transplanted trees as starting point of the assessment, in the absence of a technique of the class DRT75

Downward spraying

For *herbicide* use in lane trees, downward spraying –complying to a minimum drift reduction

of 75%- is applicable.
For the herbicide application in lane tree cultivation the values remain unchanged (not included in the WDC), see Table 3b.

Table 3b: Spray drift values for DRT classes in lane tree cultivation – downward spraying

Herbicide use in lane trees (downward spraying)		
soil surface underneath trees and up till 0.50 m from edge of surface water	DRT75	0.014
	DRT90	0.008

As in practice it cannot be excluded that this application is performed using normal tractor mounted spraying equipment, a specific restriction sentence should be stated when the risk assessment is based on these specific drift deposition values. For further guidance on the formulation of restriction sentences, see the DRT working instruction on the Ctgb website.

Field Crops including downward sprayed forest trees and hedging plants, and flower bulbs –covered by the Environmental Activities Decree (section $4.64)

Downward spraying

With the entry into force of the revision of the Activity Decree (2018, repealed by the Environmental Activities Decree in January 2024) the use of a 75% spray drift reducing technique on the whole field has become obligatory. Individual techniques are classified into groups of techniques that comply with a minimum drift reduction. For each DRT class a benchmark (reference) technique has been assigned on the basis of their spray drift reduction percentage. Reference techniques for downward spraying are defined in WPR report 419[15].

Spray drift reducing techniques, classified according to drift reduction classes by the TCT (Technische Commissie Techniekbeoordeling), are listed on IPLO[16] (Informatiepunt Leefomgeving, Dutch version only).

The first tier assessment is based on the obligatory use of a 75% spray drift-reducing technique on the whole field (see Article 4.723c of the Environmental Activities Decree).

In practice, crops are separated in the Environmental Activities Decree into two main groups based on their minimal obligatory crop-free zone (see Table 4.732d of the Environmental Activities Decree): 150 cm for the intensively sprayed crops, and 50 cm for cereals, grassland and remaining crops.

If further spray drift reduction than 75% is necessary to meet the ecotoxicological threshold

[15] Zande, J.C van de, H.J Holterman & J.F.M Huijsmans. 2012. Spray drift for the assessment of exposure of aquatic organisms to plant protection products in the Netherlands. Part 1: field crops and downward spraying . WUR-PRI Report 419, Wageningen. Table 4, page 18.

[16] https://iplo.nl/thema/water/afvalwater-activiteiten/agrarische-activiteiten/vaststellen-driftreductie-spuittechnieken/#h647850ba-f7e2-5ac2-f373-5128e7199fab

values, the use of refined drift deposition values can be proposed. Those refinements can exist of further drift mitigation by using higher (i.e. more reducing) DRT classes or a crop free buffer zone or a combination of both. If a combination of a DRT class and an additional crop free zone is needed to achieve an acceptable risk then the WDC tool can be further consulted.

Spray drift deposition values for the different drift reducing technique classes are differentiated for two standard crop free zones (1.5 meter for intensively sprayed crops and 0.5 meter for all other crops). A further distinction is made on the basis of the position of the last spraying nozzle with respect to the last crop row, which can be positioned at 25 cm inside the crop, exactly above the last crop row, or 12.5 cm outside the crop, depending on the specific cultivation characteristics. Finally, there are two different drift deposition curves available for two contrasting crop situations: bare soil/short crop (early BBCH stages, crop height < 20 cm) and established crop (higher BBCH stages, crop height ≥ 20 cm). For each arable crop in the DTG list the WDC contains an entry for the BBCH stage at which the transition of the bare soil/low crop stage to the established crop stage takes place. Depending on the crop stage the values from the applicable drift curve should be selected. In cases in which the application window exceeds the boundary at which the crop height is 20 cm, the most conservative drift deposition value of the two drift curves should be used for the assessment.

Spray drift deposition values for the different drift reducing technique classes are presented in Table 4a (bare soil/short crop stage) and 4b (established crop stage).

Table 4a: Spray drift values for DRT classes in arable crops– downward spraying, bare soil/short crop stage (< 20 cm)

DRT class	Last nozzle position	Other crops (default cfz 50 cm)	Intensively sprayed crops (default 150 cm)
DRT75	-25 cm (i.e. inside crop)	0.60	0.40
DRT90		0.39	0.26
DRT95		0.19	0.05
DRT97.5		*PM*	*PM*
DRT99		*PM*	*PM*
DRT75	0 cm	0.71	0.43
DRT90		0.45	0.28
DRT95		0.31	0.06
DRT97.5		*PM*	*PM*
DRT99		*PM*	*PM*
DRT75	+12.5 cm (i.e. outside crop)	0.79	0.44
DRT90		0.49	0.29
DRT95		0.39	0.07
DRT97.5		*PM*	*PM*
DRT99		*PM*	*PM*

Table 4b: Spray drift values for DRT classes in arable crops– downward spraying, established crop stage (≥ 20 cm)

DRT class	Last nozzle position	Other crops (default	Intensively sprayed

		cfz 50 cm)	**crops (default 150 cm)**
DRT75	-25 cm (i.e. inside crop)	0.87	0.51
DRT90		0.47	0.17
DRT95		0.16	0.06
DRT97.5		*PM*	*PM*
DRT99		*PM*	*PM*
DRT75	0 cm	1.1	0.56
DRT90		0.67	0.21
DRT95		0.29	0.06
DRT97.5		*PM*	*PM*
DRT99		*PM*	*PM*
DRT75	+12.5 cm (i.e. outside crop)	1.2	0.59
DRT90		0.80	0.24
DRT95		0.41	0.06
DRT97.5		*PM*	*PM*
DRT99		*PM*	*PM*

Please note that if the use of 90% or higher spray drift reduction techniques is necessary to achieve an acceptable risk to aquatic organisms in the authorisation procedure for intensively sprayed crops, the label should explicitly state that this is to be used in combination with a 1.50 meter crop free zone. This is to prevent confusion for the user, since on the basis of equivalence (‘gelijkwaardigheidsbepaling’) currently drift reducing techniques of 90% or more can also be used to decrease the minimum crop free zone from 1.50 meter to 1 meter (on the basis of granting by the competent authority for law enforcement). This is however not allowed when on the basis of the risk assessment DRT90 is needed in combination with the default value of 1.5 meter crop free zone. See Table 4.732d of the Environmental Activities Decree for a listing of the intensively sprayed crops for which a standard crop free zone of 1.50 m applies.

Please note that with the entry into force of the Activity Decree (per January 2024 Environmental Activities Decree) Ctgb considers that all additional mitigation measures should also apply to the whole field.

Field crops and uses not covered by the Environmental Activities Decree (non-agricultural uses; not handheld)

Downward spraying

Several uses that can be applied for in authorisation applications do not fall within the scope of the Environmental Activities Decree (section $ 4.64).
For those uses a conservative first tier estimate in the absence of drift measurements is used, based on the value for a conventional downward spraying technique in agriculture as an approximation (*i.e.*, 5.4% spray drift).
However, if for these uses further mitigation is required a substantiation should be submitted in which proposed drift deposition values are relevant for the used techniques in the pertinent use and underpinned by experimental data or statements. DRT classes cannot be used, unless it is demonstrated that the proposed DRT class contains a relevant and custom application technique for that use. Such a substantiation (*e.g.*, to use DRT classes) is not required for uses within DTG 8.1, see below.

This concerns the following DTG crop (sub) groups:
7.6 (Marsh and water plants)

8.2 (Woody plantings)
8.3 (Herbaceous plantings)
9 (forestry)
10 (Uncultivated land)

- *please note that a small part of this use group, i.e., temporarily uncultivated land ('braakliggend land', under 10.1 temporarily uncultivated terrain) is included in the Environmental Activities Decree section $4.64*

11 (Water courses) – for direct application to 11.3 (*Water courses which contain water*) and 11.5 (*Ponds)* a drift deposition of 100% should be used
12 (Reed and osier crops) – note that for reed an drift deposition value of 1.2% is to be used (see Table 1)
13 (Refuse heaps).

Specifically for DTG subgroup 8.1 (managed amenity turf), it was verified by Ctgb with the enforcement agencies that the DRT classification system, as used for agricultural uses, could be applied equally well as long as the used techniques meet the requirements that are stated in the technical information leaflets for the DRT techniques.
Therefore, the drift deposition refinements for field crops covered by the Environmental Activities Decree can be followed for crops falling under DTG subgroup 8.1 (lawn, playground, sports field (including golf courses), and grassy verges).

With regard to any necessary buffer zones, Ctgb recognizes that for amenity use this would rather be a spray-free zone than a crop-free zone. Hence if exposure mitigation consists also of buffer zones (next to DRT classes) a different way of organising the restriction sentence is required.

Please note that even the use of DRT75 should already be mentioned on the label, since this is not an obligation from the Environmental Activities Decree for sports fields and other managed amenity turf uses.

Additionally, as users in the amenity sector may not all be aware of the agricultural section in the Environmental Activities Decree, a footnote that specifically mentions an explanation on the label referring to the website containing information on the DRT list and the information leaflets should be added for ease of reference. Overall, a drift reduction restriction sentence for DTG 8.1 should be constructed. For further guidance on the formulation of restriction sentences, see the DRT working instruction on the Ctgb website.

Greenhouse Applications
For all greenhouse uses a pseudo-spray drift value of 0.1% was used in the past to account for all types of emission. From March 2016 onwards the Greenhouse Emission Model (GEM) should be used instead for organic substances. See main text of this chapter.
NB The use of the 0.1% overall emission, modelled as spray drift, has therefore become obsolete, but it may still be used for the assessment of emission for ***e.g.***, micro-organisms (see Evaluation Manual for Biopesticides).

Special Applications (field)
For mud-banks and dry-ditch beds, a default spray drift value of 100 % applies.

Handheld application
Downward spraying
Drift deposition values for downward spraying with handheld equipment are extrapolated from a specific spraying technique, which is often used in specific regions (i.e. on small parcels in the Boskoop region (tree nursery crops, forest trees and hedging plants)), ***i.e.***, a hand-held spray boom sprayer with a crop free zone of 0.50 m.
Spray drift values for knapsack application (*rugspuit*) are determined in field experiments which are reported in the following report: IMAG Nota 98-31[17].

These spray drift values are used for assessments of handheld applications by non-professional users. However, in some cases also in professional uses handheld application is performed. In principle the same values apply (for downward spraying), provided that it concerns a fully handheld sprayer. It is explicitly stipulated in the Environmental Activities Decree that the exemption to the obligation to apply 75% spray drift reduction is only valid for a fully handheld sprayer. See article 4.723c, sub 3 and the explanatory text[18].

Professional applications:

- For professional applications with knapsack application (*rugspuit*) a drift percentage of 1.2% applies.
    - Drift reduction is possible by applying a protection shield or a 50% nozzle; the drift is then reduced to 0.6% (based on a crop-free zone of 0.50 m).

Applicants should note that these values are only valid when it concerns a fully handheld sprayer. It is explicitly stipulated in the Environmental Activities Decree that the exemption to the obligation for professional users to apply at least 75% spray drift reduction is only valid for a fully handheld sprayer. See article 4.723c, sub 3 and the explanatory text[19].

[17] Driftreductie in de lage boomteelt bij een bespuiting met een handgeduwde spuitboom, een afgeschermde spuitboom en een dichte afscherming op de perceelsrand, IMAG nota 98-31

[18] https://zoek.officielebekendmakingen.nl/stb-2020-400.pdf

[19] https://zoek.officielebekendmakingen.nl/stb-2020-400.pdf

This means that for all partially handheld spraying equipment, the DRT75 obligation is in place and such techniques should be classified. This also applies to the handheld spraying boom (*handgedragen/handgetrokken spuitboom*) from which the above drift deposition values are extrapolated.

Non-professional applications

- Handheld equipment will particularly be relevant for applications by non-professional users. A drift percentage of 1.2% applies when using a knapsack (*rugspuit*).
    - When a small spraying can (*e.g.,* ready-to-use bottle) is used a value of 0.5% is used. This value is half of the value used for hand held equipment without mitigation (see above).

Note that for non-professional applications drift reduction measures are not prescribed, because these measures cannot be enforced and it is questionable if users really apply these measures.

Sideways or upward spraying
Note that the above values for handheld equipment are only to be used for handheld use in downward sprayed crops. If application is made sideways or upwardin fruit culture or lane tree cultivation, these values do not apply.

In the absence of estimates for drift deposition values in fruit culture and lane tree cultivation for the use of a knapsack or small spraying cans a conservative value is used on the basis of the standard techniques for these crops. Refer to Tables 2a and 3a above.

Applications without spray drift
A spray drift percentage of 0% applies for:
1) Enclosed spaces (indoor uses, not greenhouses and walk-in tunnels):
    a. storage cells and
    b. shower rooms and comparable enclosed spaces;
2) witloof/chicory (forcing)
3) Specific field applications:
    a. application of granules using a specially mounted granule sprinkler,
    b. drenching,
    c. dipping,
    d. foaming,
    e. placing of bait,
    f. injection of soil/plant,
    g. treatment of plant base
    h. smearing,
    i. jointing,
    j. treatment of furrow,
    k. dosing pistol or comparable apparatus, and
    l. seed treatment.

Developments

Distinction bare-full leaf situation in fruit
Change of date distinction to BBCH/growth stage distinction for fruit (WG water). This will be implemented upon instruction from the ministries to use the new Dutch exposure surface water model DRAINBOW.

Appendix 3 Decision tree Drinking Water Criterion

Several categories of uses are described below. The general assessment methodology consists of a first tier calculation and a higher tier analysis of monitoring data. The drinking water criterion is a substance related assessment element. Please note that therefore, with regard to the first tier calculations, next to the proposed uses of the application under assessment also the already authorized uses of the same active substance should be considered. The predicted concentrations of all proposed and authorized uses should be summed to evaluate whether the threshold is exceeded. This may include PEC calculations taken from authorization decisions for other products.

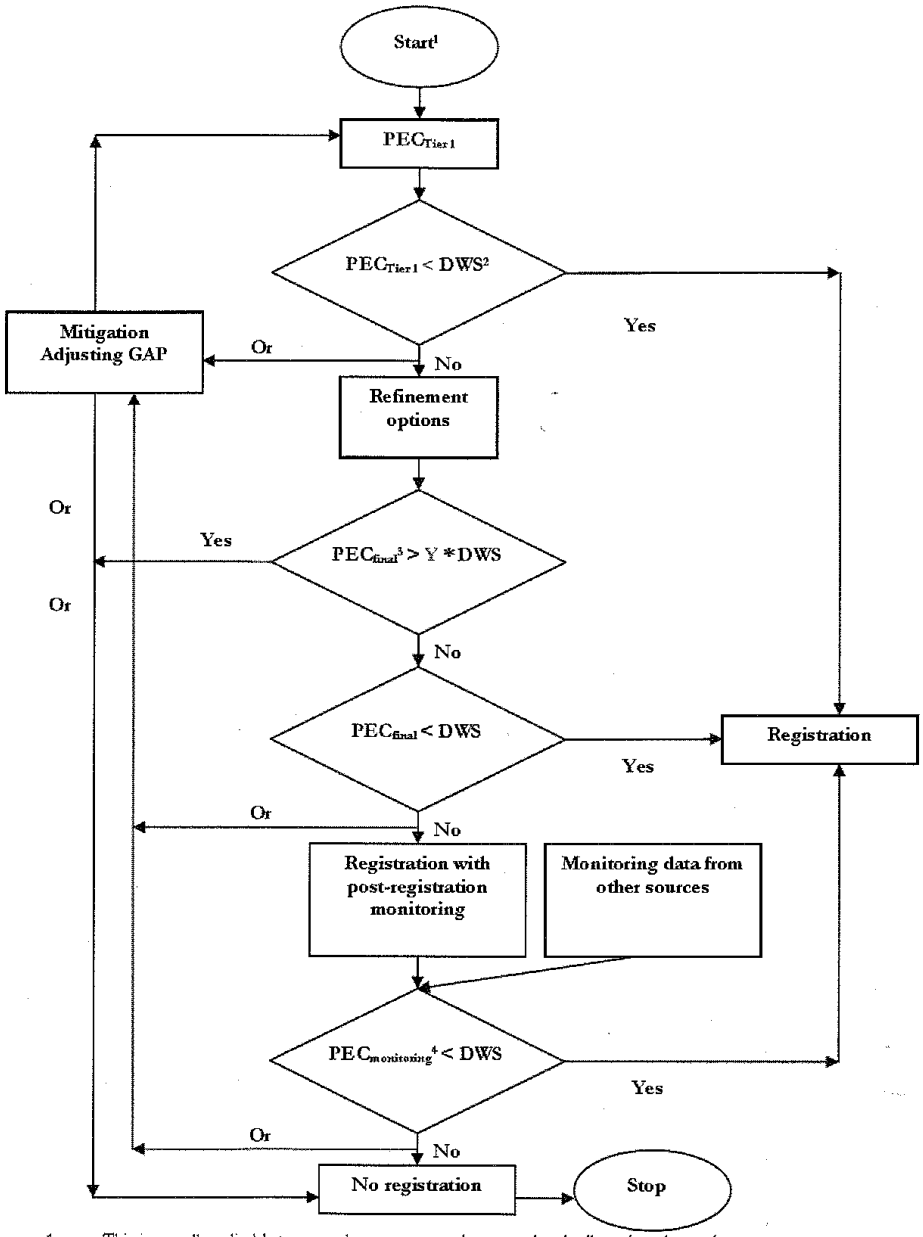
FIELD USES

PROFESSIONAL USE

1. AGRICULTURAL CROP TREATMENTS

For the assessment of the drinking water criterion, Ctgb uses the decision tree as developed by the Working Group Implementation Drinking Water Criterion (see Alterra report 1635) from January 2010 onwards.

The decision tree from the report is presented below.



1 = This is as well applicable to new substances as to substances already allowed on the market
2 = DWS is the Drinking Water Standard; in the Netherlands this is 0.1 µg/L at the moment when the report was issued
3 = In case no refined assessment has been applied the PEC_{final} is $PEC_{Tier\ 1}$
4 = Before making a decision it has to be analysed whether the substance is of Dutch origin or not

Tier I calculation:

The equation to calculate the substance concentration in the surface water at the abstraction points ($PEC_{Tier\ I}$) reads:

$$PEC_{TierI} = \sum_{all}^{crops} ((PEC_{FOCUS_NL,D3} \cdot f_{corrFOCUSscen}) f_{use_intensity}) \cdot f_{timing} \cdot f_{dissipation} \cdot f_{add_dilution}$$

With:

$PEC_{Tier\ I}$ PEC in surface water at location where it is abstracted for drinking water preparation (µg/L)

$PEC_{FOCUS_NL,D3}$ global maximum PEC edge-of-field for the FOCUS D3 scenario based upon Dutch spray drift deposition data (µg/L)

$f_{corrFOCUSscen}$ correction factor for implicit choices concerning contributing areas made in FOCUS D3 scenario (-)
$f_{use_intensity}$ factor considering the use of the substance (-)
f_{timing} factor considering the difference in timing of application within the area of use (-)
$f_{dissipation}$ factor considering the dissipation from the edge-of-field watercourse to the abstraction point (-)
$f_{add_dilution}$ factor considering additional dilution, e.g. by considerable water flows entering the intake area, or by lakes via which water travels to the abstraction point

Further detailed explanation of these terms is given in Adriaanse et al, 2008, Alterra report 1635.

Tier II evaluation of monitoring data:
The quality criteria to which monitoring data should comply are elaborated in paragraph 5.2.6 of Alterra report 1635. The procedure of evaluation of monitoring data described applies to post-registration monitoring data but can be extrapolated to the evaluation of existing (VEWIN) monitoring data (paragraph 5.3) since no clear guidance is given there.

In short, the procedure is as follows (for details see Alterra report 1635). Ideally the monitoring data should comply with the following criteria (set up for post-registration monitoring purposes for new substances):

-13 measurements should be available for each drinking water abstraction point each year for the calculation of a 90-percentile value for each calendar year
- if (due to exceptional circumstances) less than 13 measurements per year are available, the maximum value should be taken and should be below 0.1 µg/L
- if 12 measurements are available per year, the maximum value should also be taken and should be below 0.15 µg/L (explained in note *b* on page 68 of the report)

However, Ctgb considers that it is the responsibility of the water quality managers to decide whether to monitor a specific substance. Hence, any missing data for one or more specific abstraction point(s) for a potentially problematic substance cannot lead to a request for additional information from the applicant.

The 90-percentile value over a 5-year period is to be calculated for each abstraction point. If the 90-percentile over the 5-year period exceeds the threshold, an adequate risk assessment should be provided.

Next to the 90-percentile for 5 years, an analysis per year can be done if sufficient data are available. If the 90-percentile value for one year exceeds the threshold, a problem analysis should be provided.

No overall 90-percentile over the various drinking water abstraction points is calculated. Each individual abstraction point should meet the drinking water limit.

The Ctgb uses the possibility of jumping to higher tiers for the assessment of the drinking water. This means that in practice three categories of substances are distinguished:

1. **New substances** on the Dutch market (< 3 years authorised in NL): A Tier I PEC is calculated according to the methodology in Alterra report 1635. A Tier II cannot be performed yet as there are no monitoring data for new substances. If Tier I fails (with

less than a factor 5 exceeding), post-registration obligation will be imposed in order to collect Tier II data for future evaluations of the substance. *(if the VEWIN during the authorisation period indicates that the substance is regarded as a substance of concern on the basis of new, adequate and sufficient monitoring data the substance will move to the third category)*

2. Old (> 3 years authorised in NL) **substances of no concern**: if there are no indications from the VEWIN that the substance is a potential problem for drinking water production, then no Tier I calculations are deemed necessary. The substance meets the drinking water criterion based on the Tier II information (as the available VEWIN monitoring data indicate no problems). *(if the VEWIN during the authorisation period indicates that the substance is regarded as a substance of concern on the basis of new, adequate and sufficient monitoring data the substance will move to the third category)*

3. Old (> 3 years authorised in NL) **substances of concern**: the VEWIN indicated that the substance is a potential problem for drinking water production by including it on a yearly updated list on the basis of monitoring data. In this case, Tier II is used directly (jumping of Tier I) the available monitoring data of the VEWIN of the most recent 5 years at all drinking water abstraction points will be analysed on the basis of the criteria set out in the Alterra report.

The list of substances of concern is yearly updated by VEWIN and published on the VEWIN website (http://www.vewin.nl/probleemstoffen).

For further details refer to Alterra report 1635.

2. NON-AGRICULTURAL USE (USE ON HARDENED SURFACES)

Alterra report 1635 only provides guidance for agricultural applications (direct emission to edge-of-field ditches). For the specific use on hardened surfaces, an assessment methodology is provided to the Ctgb (Linders et al., 2010, RIVM report 601450021 together with Addendum and calculation tool, Van der Linden, 2016.

This methodology takes into account, among other parameters, the ratio of hardened surfaces and total area, the fraction treated area, and flow velocity in the catchment area. This methodology is used for new substances (< 3 years on the Dutch market, in analogy with the agricultural use) with proposed uses on hardened surfaces.

For substances that have been on the Dutch market for more than 3 years the above described procedure in Alterra report 1635 is followed, i.e. evaluation of monitoring data.

NON-PROFESSIONAL USE

1. AGRICULTURAL CROP TREATMENTS

The developed decision trees and models described above are not suitable for non-professional (agricultural) use since the area of use cannot be described adequately.

Therefore the interim decision tree of the Ctgb, as laid down in C-163.5, still applies as a first tier in those situations for new substances (< 3 years on the Dutch market). For full text of C-163.5 see Evaluation Manual version 1.0.

In the interim decision tree, in short, the PIEC in the edge-of-field ditch according to

TOXSWA is used as a basis for further calculations. A dilution factor of 10 and a travelling time of 14 days is taken into account to predict the concentration at the drinking water abstraction point. The applicant may also submit a RAT factor approach.

2. NON-AGRICULTURAL USE (USE ON HARDENED SURFACES)

For non-professional use on hardened surfaces, the above approach for non-professional agricultural crop treatments is not entirely applicable. Therefore a qualitative assessment is performed on a case-by-case basis.

For substances that have been on the Dutch market for more than 3 years the above described procedure in Alterra report 1635 is followed, i.e. evaluation of monitoring data.

PROTECTED CROPS

PROFESSIONAL USE

The developed decision trees and models described above are not suitable for greenhouse uses since the area of use is not available in DROPLET. Therefore the assessment is made analogously to the interim decision tree.

The PIEC in the edge-of-field ditch according to GEM (or a lower tier result) is used as a basis for further calculations. A dilution factor of 10 and a travelling time of 14 days is taken into account to predict the concentration at the drinking water abstraction point.

NON-PROFESSIONAL USE

A qualitative assessment is performed on a case-by-case basis.