

Shortlist 2. SWEEP guidelines for sustainable herbicide use on pavements

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User group Shortlist 2: Weed control contractors. **Apply points 1 - 11.**

Objective: To improve the sustainability of weed control practices on paved surfaces through the implementation of the SWEEP guidelines. The guidelines are a result of the integration of legal and regulatory aspects, emission reducing measures and 'good practice'. **Also comply with criteria from SWEEP Shortlist 1.**

Note: There are many types of hard surfaces (an overview is given in www.dob-verhardingen.nl/nl/Publicaties/2005, report of Davies et al., 2005, Hard surfaces and weed infestation). SWEEP focuses on glyphosate because this is the mostly used herbicide on hard surfaces today. SWEEP criteria apply mainly to pavements (slabs, bricks, block stones, etc.) that give fast run off of rain water to surface water. This is illustrated on the drawing below.



1. Herbicide application equipment

- * Only use best practice and preferably selective application techniques, see for details appendix on page 4;
- * Spray equipment must be checked and/or calibrated periodically.
- * Use authorised pesticides only. Always check labels. Avoid any unnecessary use (see also points 6, 7 and 11).

2. Filling and cleaning of equipment

- * Only fill spray tanks on places where there is no risk of runoff (e.g. on half-hardened or unhardened surfaces). When using surface water, use equipment that prevents herbicide product getting into contact with the surface water.

- * Collect empty containers and water used for rinsing of equipment. Discard in compliance with legal regulations.
- * Spray liquid spilled during cleaning or washing of equipment may not enter the environment. Spills are to be handled according to legal regulations.

3. **Sprayer calibration**

- * Calibrate spray equipment to ensure that fine droplets adhere to the weeds (optimal spray volume for glyphosate band spraying is between 70 - 150 l spray solution per ha).
- * Do not spray on weeds wet from rain or dew. The spray solution must not drip (runoff) from the weeds due to excessive moisture on the leaves.
- * Use a shield around the nozzles where possible to reduce droplet drift.

4. **Application criteria**

- * Operators should have a proper training on herbicide use and application.
- * Only apply herbicides at places and moments permitted under SWEEP. Ask the terrain owner for a map of 'emission sensitive places'. Broadly speaking, this means that spraying within a distance of 1 m from the edge of embankments of surface water should be avoided, and that street drains, groundwater protection zones and drinking water collection areas (see SWEEP Shortlist 1) are taken into account.
- * Adjust weed management to brushing operations in the area. Do not spray shortly before and after sweeping.
- * Adjust driving speed during spraying operations in such a way that solution excesses are minimal. Maximum speed at emission-critical places such as drains and water surfaces is 10 km per h. Be very restrictive with herbicides near street drainage systems. The terrain owner/principal stipulates the contractor takes special notice of the boundary conditions. Herbicides may not be sprayed into drains directly. Special restrictions are laid down for the spray lance (careful use and minimal deposition of herbicide wide of weed).

5. **Dosing of glyphosate**

- * Adjust dose and equipment to weed and weather situation.
- * Strive for minimal use. In SWEEP, maximum is 360 g active ingredient (a.i.) per ha hard surface per work round, and maximum 720 gram glyphosate per ha per year.

Dose advice when spraying 70-150 l spray per ha is:

- 1% Roundup Evolution in favourable conditions
- 2% Roundup Evolution in normal conditions
- 3% Roundup Evolution for little sensitive and hardy weeds, and only in exceptional situations.

Favorable conditions: temp.: 15-22 °C, R.H.: > 70 %, good growing conditions, low wind speed, small weeds.

- * On pavements where horizontal run off is not likely, such as course stones underneath rail road tracks, gravel paths, etc., the maximum use rate of glyphosate in SWEEP is 1440 gram a.i. per ha in stead of 720.

6. **Addition of other herbicides or additives to glyphosate**

- * Addition of other products (e.g. 1 % MCPA) or other herbicides to glyphosate only improves the effect in specific situations. Maximum use MCPA in SWEEP is 50 gram a.i. per year.
- * Only spray glyphosate with additives in cases where there is an obvious reason to do so (e.g. hardened weeds). Report any additions to the manager/principal.
- * Hard - calcium rich - water. Soften hard water used for spraying when harder than 12 °D (appr. 2 mMol Ca+Mg) with the same amount of ammonium sulphate.

7. Weather forecast: spraying, yes or no?

* Do not spray herbicides if the forecast indicates > 40% chance of rain with a precipitation of more than 1 mm within the next 24 hours. A longer period may be agreed upon. A weather forecast of 12.00 o'clock on the day before the day on which spraying is intended, may be used. Consult a local, up-to-date and certified weather forecast, such as the Dutch DOB weather fax (see www.dob-verhardingen.nl/nl/DOB+Producten/DOB-weerfax.htm). For improved application technology (weed wipers, Weed IT MAKII) the 24 h rain free period can be shortened to 6 or 15 h, to be decided per country).

* Furthermore to forecasts, radar images of clouds and telephone advisory services may be used to check whether there are changes in compared to the forecast and whether this has consequences for operations. Radar images of a certified weather station are given on, e.g., www.mlhd.nl. Deviations should be recorded (via print of radar pictures or description with course, date and times).

* It is to be recommended to offer the contractor/foreman alternative work for 'unfavourable spraying days' or allow a non-chemical means of weed control.

8. Perennial weeds

* Better control of perennial weeds is obtained by autumn application of glyphosate. Apply dosage of 3 % of glyphosate only in the period when the transport of fotosynthesis products inside the plants is towards the roots.

9. Weed wiping

* When using a weed wiper or other precision application technology for herbicides, apply dosage levels as given in the specification of the applicator. Apply a 6 h dry period between application and (expected) rain fall.

10. Registration

* Record notes in a registration log on a daily basis as indicated in shortlist 1 (which methods,

when, where, working hours, weather, used kg product per working area).

* Also report any deviations from the desired operational method.

* Report the recorded data via internet or in writing (by fax or otherwise) to the terrain owner/principal within two weeks after the operation.

11. Others, e.g. non-glyphosate herbicides and non-chemical methods

* On pavements where horizontal run off is not likely, maximum use rates apply in SWEEP (see point 5 of Shortlist 2).

* MCPA and SWEEP: Maximum 50 gram a.i. per year spot treatment against troublesome weeds on slabs, bricks and block stones.

* Glufosinate ammonium and SWEEP: Maximum 720 gram a.i. per year on slabs, bricks and block stones and only as substitute for glyphosate.

* Other herbicides, no criteria available in SWEEP.

* Do not use MCPA or glufosinate ammonium in groundwater protection zones because the risk of infiltration of these products is high. There is no specific restriction on glyphosate for these areas, but it is recommended to avoid any unnecessary use in these areas.

* Non-chemical methods broadly speaking should not be applied more than 4 times per year (see Shortlist 1). For non-chemical methods, no weather restrictions apply. Brushing may benefit from rainy conditions.

Appendix.

Table 1. Overview of best practice herbicide application technology

General description	Specification of technique	Main SWEEP criterion
Vehicle mounted equipment		
Sprayers, combined with weed sensors	Weed IT™, Weedseeker™, SelectSpray™, or comparable techniques	Only if 24 h weather forecast predicts less or equal 40 % rain probability.
Improved weed sensor sprayer combination	Weed IT™ model 2006 MKII, or comparable techniques	Only if 15 h weather forecast predicts less or equal 40 % rain probability.
Weed Wiper	Greentouch™, Rotofix™, or comparable techniques	Only if 6 h weather forecast predicts less or equal 40 % rain probability and in specific zones
Controlled Droplet application, ULV technology	Mantis™, Micron™, or comparable techniques	Only if applied selectively and only 24 h weather forecast predicts less or equal 40 % rain probability.
Hand carried equipment		
Spray Lance	Many brands, models/types on market	Only if 24 h weather forecast predicts less or equal 40 % rain probability.
Controlled Droplet application, ULV technology	Mantis™, Micron™, or comparable techniques	Only if 24 h weather forecast predicts less or equal 40 % rain probability.
Wiper	Selector™, or comparable	Only if 6 h weather forecast predicts less or equal 40 % rain probability and in specific zones