Guidelines for Applicants

This is one of a series of guidelines to help applicants to the Smart Approved WaterMark, Australia's outdoor water conservation label. Applications to the Smart WaterMark are assessed by an Independent Technical Expert Panel against the following four criteria:

1. **Water Saving -** The primary purpose of the product is directly related to reducing actual water use and where there is a direct correlation between the use of the product and water savings.
2. **Fitness for Purpose -** Supporting documentation (such as instructions and marketing material) helps ensure that users get the best water savings/efficiency from the product.
3. **Meeting Regulations and Standards -** The product is of high quality and meets industry standards, and customer and community expectations.
4. **Environmentally Sustainable -** The product, while satisfying the above three criteria, is environmentally sustainable, and that in making water savings the product will not adversely impact on the environment in other areas.

Guideline 2. Mulches

The Expert Panel needs verifiable independent evidence that the product achieves the water savings claimed in the application (i.e. through independent testing, case studies or comparative reports). Please note, unsubstantiated marketing claims are not regarded as evidence of water saving.

The Smart WaterMark stakeholder web site has further information on the application process including forms, timetables and fee rates at: www.smartwatermark.info

If you have any questions about these guidelines or your application please contact the Smart WaterMark national office. Email: info@smartwatermark.info Landline: +61 (0)2 9223 3322

The Expert Panel does not insist on a specific test to prove the water-saving properties of mulches. However, the following guidelines have been devised so that applicants are aware of the kind of test needed to support your application.

Smart Approved WaterMark is Australia's water saving labelling program for products and services which are helping to reduce outdoor water use. The Smart WaterMark is run by the Water Services Association of Australia, Irrigation Australia, the Nursery and Garden Industry Australia and the Australian Water Association with funding from the Australian Government's Water Smart Australia programme through the Department of the Environment, Water, Heritage and the Arts.

Guidelines for assessing mulches

These guidelines should only be applied to products which are marketed and labelled for commercial sale as mulch. It is appreciated that many products can be used as mulch on gardens such as old newspapers or other recycled materials. The Smart Approved Water Mark scheme will only evaluate applications relating to commercially labelled mulch products.

It is also important to emphasize that these guidelines are written solely for the purpose of helping applicants prepare submissions to the Smart Approved Water Mark scheme. These guidelines are not intended to set out a method for appraising all the characteristics of a mulch.

There is an Australian standard for mulches: ***AS 4454—2003 Australian Standard™ composts, soil conditioners and mulches***. The objective of this Standard is to:

> *"provide manufacturers, suppliers and local government bodies, with the minimum requirements for the physical, chemical and biological properties of composts, soil conditioners, mulches and vermicast as well as labelling and marking, in order to facilitate the beneficial recycling and use of compostable organic materials with minimal adverse impact on environmental and public health, and give users such as growers and consumers assurance of quality."*

Many of the clauses are not relevant to the Smart WaterMark, for example the clauses in the standard dealing with labelling. The standard does, however, describe a test for the "wettability" of mulch and given the purpose of the Smart WaterMark the Panel believes that this is one of two key characteristics of mulch which should be assessed; the other being the capacity to reduce the loss of water through evaporation.

Wettability is important to distinguish commercially marketed mulches from other products which could be used as mulch, for example plastic sheeting or newspapers, which cannot be considered by the Smart WaterMark scheme. Water should be able to percolate through mulches into the soil as well as act as water savers by reducing evaporation – a challenge in some cases if the mulch becomes wet and then potentially wicks moisture back out of the growing media. Accordingly the Expert Panel recommends that any application to the Smart WaterMark for mulch should include evidence that the product meets the wettability test in the Australian Standard (see Appendix).

The ability of mulch to save water, usually through reducing evaporation of water from the soil surface is best assessed through an experiment or test of some kind. The following test has been devised as one way of testing the evaporation reducing characteristics of mulch.

Assessing water-saving capability of mulch: An experimental approach

Aim

To determine if applying mulch saves water loss via evaporation.

Experimental design

2 mulch treatments x 12 replicates = 24 pots

Where mulch treatments = no mulch (i.e., bare soil), mulch + soil

Method

1. Purchase 24 large pots of the same dimensions and that do not contain drainage holes (this is to ensure that water can only be lost via evaporation). Label pots, and record the weight of each.
2. Fill each pot with the same amount of weighed soil or potting mix, making an allowance for the mulch. The allowance for the mulch will vary depending upon the recommended rate or height of application. Record the weight of the pot + soil.
3. Determine the amount of water required to fully moisten the potting mix (e.g., field capacity; details on how to determine are listed below) and then add exactly the same amount of water to the remaining pots. Record the weight of the pots after adding water (Time 1, no mulch).
4. Apply mulch to half the pots (12) using the rate recommended by the manufacturer. Ensure that the same amount of mulch is applied to each of the mulched pots. Record the weight of the pot + soil + mulch (Time 1, plus mulch).

5. Place all pots in full sun and in the absence of shade. Ensure that pots do not receive any additional water from nearby sprinklers or from rainfall during the measurement period. **As** much as possible all pots should be kept under identical conditions and should be arranged randomly to minimise any bias due to position.
6. Reweigh and record the weight of all pots 1 week after starting the experiment (Time 1).

Calculations

1. Calculate water loss from each of the pots as follows:

   For pots without mulch

   Water loss (g) = Weight of pot+soil+water (time 0)–Weight of pot+soil+water (time 1)

   For pots without mulch

   Water loss (g) = Weight of pot+soil+water+mulch (time 0)–Weight of pot+soil+water+mulch (time 1)
2. Calculate the mean water loss (and standard deviation) for each treatment.
3. Calculate the water savings using the results by comparing the water loss from the no mulch treatment with the mulched treatments.

Presentation of Results

Tabulate the amount of water lost for each treatment and each replicate, for example

Pot No	Treatment	Replicate	Water loss (g)
1.	Plus mulch	1	
2.	Plus mulch	2	
3.	Plus mulch	3	
4.	No mulch	1	
5.	No mulch	3	
6. etc	No mulch	3	

Calculate, and record, the mean and standard deviation for each mulch treatment, plus the water savings achieved by applying the mulch.

Notes

1. Ideally the experiment would be repeated a number of times by adding the same amount of water to the surface of each pot, reweighing (time 1) and then allowing the pots to stand for 1 week before reweighing (time 2). It would be ideal to carry out the test in a controlled environment.
2. The exact size of the pots are not important however the same pot dimensions should be used for each of the replicates and the using larger pots increases the likelihood of detecting changes in water loss.
3. It is important that the soil used is exactly the same in all pots. The texture of the soil or potting mix may also affect the sensitivity of the test. For example, sandy soils are more prone to drying than say a clay soil, the effectiveness of the mulch may be more detectable in the short-term when a sandy soil is used. A sandy loam soil or free draining potting mix may also be considered, however the use of a peat is not recommended.
4. The field capacity of the soil is described as the state of the soil 'after rapid drainage has effectively ceased and the soil water content has become relatively stable'. Various techniques ranging in sophistication can be used to determine field capacity; however the simple method proposed here is adequate. To determine the field capacity of the test soil, fill a container (e.g., 250 mL) with drainage holes with the soil of interest. Add water evenly to the surface of the soil, and Ccntinue to so until water drain from the base of the container. Cover the pot so as to avoid surface evaporation, and allow to stand indoors for 24 hours. After 24 hours, determine the gravimetric water (g H2O g-1 dry soil) content of the soil UNDER the surface 3–5mm. This is the gravimetric water content at which the test soil is at field capacity. Use the gravimetric water content of the soil at field capacity to calculate the amount of water needed raise the soil water content of testing pots to field capacity (water required (g) = gravimetric water content water (g H2O g-1 dry soil) times the dry weight of soil in testing pot (g)).
5. Weighing pots after 1 week is arbitrary. The tester may choose an alternative time frame based on the purpose of their product, and expected period between watering. For example in Perth, home owners are allowed to water 2 days per week, whereas in other capital cities hand watering has been banned. The tester should rationalise the timing of their weighing.

APPENDIX

METHOD FOR THE DETERMINATION OF WETTABILITY

(Normative)

D1 SCOPE

This Appendix sets out a method for determining the ease with which composted or pasteurized fine mulches and soil conditioners may be re-wet once they have dried out.
NOTE: Table 3.1 specifies the compliance requirements.

D2 PRINCIPLE

Water is applied to dried mix and the time taken for all water to soak into the product is determined.

D3 REAGENT

D3.1 Deionized or distilled water

D4 APPARATUS

The following apparatus is required:

a. An oven capable of heating a sample of product to 40 ±2°C and validated for time to constant mass.
   NOTE: Constant mass is achieved when, after the initial drying period, successive drying over 1 h periods gives rise to a weight loss of not more than 1% of the initial weight loss.
b. Sieve with apertures of 16 mm.
c. Stopwatch.
d. Three vessels of any material of minimum depth 25 mm and no less than 80 mm across.
   NOTE: Small plastic dishes and aluminium pie dishes have been found to be suitable.
e. Measuring cylinder or dip pipette capable of delivering a volume of 10 mL.

D5 PROCEDURE

The procedure shall be as follows:

a. Remove all particles larger than 16 mm from the product using a sieve (D4(b)).
b. Pack the less than 16 mm fraction firmly into vessels (D4(b)) to a minimum depth of 20 mm and dry in the same vessel to constant mass at 40 ±2°C.
c. Make a small depression (approximately 50 mm diameter and 5 mm deep) in the centre of the product.
   NOTE: This depression should be made in a reproducible manner by an object with a smooth, hemispherical end. The rounded end of a standard light globe has been found suitable.
d. Add 10 mL deionized or distilled water (D3.1) to the centre of this depression using a measuring cylinder or dip pipette (D4(e)).
e. Check regularly to determine whether the water has soaked into the product. The water is regarded as being soaked-in when it is not possible to detect any water movement in the wet patch on tilting.
f. Record the time taken, in minutes, for the water to soak into the product samples. If more than 7 min elapses and the water has not soaked in, note this and the final time the product was checked.

D6 TEST REPORT

The test report shall contain the following:

a. Sample identification, including sufficient details to show the time period between the manufacture and testing of the product.
b. The time, in minutes, taken for the water to soak into the product. If the water did not soak into the product within 7 min, report this and the time period for which the product was monitored.
c. Reference to this test method, i.e. Appendix D of AS 4454.