6.21 **WATER SOLUBLE POWDERS (****SP)**

Note for preparation of draft specifications. Do not omit clauses or insert additional clauses, nor insert limits that are more lax than those than given in the guidelines, without referring to section 4. From the “Notes” provided at the end of this guideline, incorporate only those which are applicable to the particular specification.

**...... [ISO common name] WATER SOLUBLE POWDER**

[CIPAC number]/SP (month & year of publication)

6.21.1 **Description**

The material shall consist of an homogeneous mixture of technical ...... [ISO common name], complying with the requirements of FAO/WHO specification ..... , in the form of ....... (see Section 4.2), together with any necessary formulants. It shall be in the form of a powder to be applied as a true solution of the active ingredient after solution in water, but which may contain insoluble inert ingredients.

Where the material is packaged in sealed water soluble bags, the description shall be as follows (Note 1):

The material shall consist of a defined quantity of a ...... [ISO common name] water soluble powder complying with the requirements of FAO/WHO specification ...... , in the form of ....... (see Section 4.2), contained in a sealed water soluble bag.

6.21.2 **Active ingredient**

6.21.2.1 **Identity tests** (Note 2)

The active ingredient shall comply with an identity test and, where the identity remains in doubt, shall comply with at least one additional test.

6.21.2.2 **...... [ISO common name] content** (Note 2)

The ...... [ISO common name] content shall be declared (g/kg) and, when determined, the average content measured shall not differ from that declared by more than the appropriate tolerance, given in the table of tolerances, Section 4.3.2.

6.21.3 **Relevant impurities**

6.21.3.1 **By-products of manufacture or storage** (Note 3), if required

Maximum: ......% of the …… [ISO common name] content found under 6.21.2.2.

6.21.3.2 **Water** (MT 30.6) , if required

Maximum: ...... g/kg.

6.21.4 **Physical properties**

6.21.4.1 **Acidity** and/or **alkalinity** (MT 191) or **pH range** (MT 75.3) (Note 4), if required

Maximum acidity: ...... g/kg calculated as H2SO4.

Maximum alkalinity: ...... g/kg calculated as NaOH.

pH range: ...... to ......

6.21.4.2 **Wettability** (MT 53.3)

The formulation shall be completely wetted in ...... min without swirling.

6.21.4.3 **Degree of dissolution and solution stability** (MT 179.1) (Note 5)

Residue of formulation retained on a 75 µm test sieve after dissolution in CIPAC Standard Water D at 25 ± 5 °C (Note 6):

Maximum: ......% after 5 min.

Maximum: ......% after 24 h.

In the case of water soluble bag packaging, the provisions of clause 6.21.6.3 should be applied.

6.21.4.4 **Persistent foam** (MT 47.3) (Note 7)

Maximum: ...... ml after ...... min (Note 8)

In the case of water soluble bag packaging, the provisions of clause 6.21.6.3 should be applied.

6.21.5 **Storage stability**

6.21.5.1 **Stability at elevated temperature** (MT 46.4)

After storage 54 ± 2°C for 14 days (Note 8), the determined average active ingredient content must not be lower than ......% relative to the determined average content found before storage (Note 9) and the formulation shall continue to comply with the clauses for:

- by-products of manufacture or storage (6.21.3.1),

- acidity/alkalinity/pH range (6.21.4.1),

- wettability (6.21.4.2),

- degree of dissolution and solution stability (6.21.4.3),

as required.

In the case of water soluble bag packaging, the package should be enclosed in a watertight sachet, box or any other container at ......°C (Note 10) for ...... days. The determined average active ingredient content must not be lower than ......% relative to the determined average content found before storage, and the formulation shall continue to comply with the clauses for:

- by-products of manufacture or storage (6.21.3.1),

- acidity/alkalinity/pH range (6.21.4.1),

- wettability (6.21.4.2),

- dissolution of the bag (6.21.6.1),

- degree of dissolution and solution stability (6.21.6.2),

- persistent foam (6.21.6.3),

as required. None of the bags tested should show signs of leakage or rupture during normal handling, before and after storage.

6.21.6 **Material packaged in a sealed water soluble bag** (Notes 11, 12 & 13)

6.21.6.1 **Dissolution of the bag** (MT 176)

The dissolution of the bag shall be tested on a sample of the emptied and cleaned bag in CIPAC Standard Water D taken according to the procedure described in Note 12, together with an appropriate proportion of the SP.

Flow time of the suspension: maximum ...... sec.

6.21.6.2 **Degree of dissolution and solution stability** (MT 179.1) (Note 5)

The degree of dissolution and solution stability shall be tested on a solution containing the SP and the bag material in the actual ratio of application, prepared according to the procedure described in Note 13.

Residue of formulation retained on a 75 µm test sieve after dissolution in CIPAC Standard Water D at 25 ± 5 °C (Note 6).

Maximum: ......% after 5 min.

Maximum: ......% after 24 h.

6.21.6.3 **Persistent foam** (MT 47.3) (Note 7)

The persistent foam shall be tested on a solution containing the SP and the bag in the actual ratio of application, prepared according to the procedure described in Note 13.

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Note 1 For record keeping purposes, the suffix “SB” should be added to the formulation code (SP-SB).

Note 2 Method(s) of analysis must be CIPAC, AOAC or equivalent. If the methods have not yet been published then full details, with appropriate method validation data, must be submitted to FAO/WHO by the proposer.

Note 3 This clause should include only relevant impurities and the title should be changed to reflect the name of the relevant impurity. Method(s) of analysis must be peer validated.

Note 4 The method to be used shall be stated. If several methods are available, a referee method shall be selected.

Note 5 This test will detect coarse particles which arise from impurities in the technical material and/or are present as inert ingredients, which could cause blockage of nozzles or filters in the application equipment.

Note 6 Unless another temperature and/or water is specified.

Note 7 The mass of sample to be used in the test should be specified at the highest rate recommended by the supplier. The test is to be conducted in CIPAC standard water D.

Note 8 Unless other temperatures and/or times are specified. Refer to Section 4.6.2 of this Manual for alternative storage conditions.

Note 9 Samples of the formulation taken before and after the storage stability test may be analyzed concurrently after the test in order to reduce the analytical error.

Note 10 If, due to irreversible changes in the characteristics of the bag material when stored above 50 °C, the test temperature should not exceed 45 °C; refer to Section 4.6.2 of this Manual for alternative storage conditions.

Note 11 Sub-sampling

Lay the bag on a bench and carefully open one side of the bag with a cutter, taking care not to damage the seals.

Transfer the contents of the bag into a suitable flask. This material shall be used to carry out the tests for:

- active ingredient identity (6.21.2.1),

- active ingredient content (6.21.2.2),

- by-products of manufacture or storage (6.21.3.1),

- water content (6.21.3.2),

- acidity/alkalinity/pH range (6.21.4.1),

- wettability (6.21.4.2),

- dissolution of the bag (6.21.6.1),

- degree of dissolution and solution stability (6.21.6.2),

- persistent foam (6.21.6.3),

as required.

The bag is then opened on three sides, completely cleaned from adhering powder by brushing or suction and weighed to the nearest centigram. It shall be used to carry out the dissolution test (6.21.6.1). Aliquots of an aqueous solution of the bag material shall be used in the in the degree of dissolution and solution stability (6.21.6.2) and persistent foam (6.21.6.3) tests.

In the case of delay of the above tests, the bag shall be stored in a watertight container (glass bottle or equivalent) to avoid any change in its properties.

Note 12 The sampling of the bag for the dissolution test should be as follows:

“Lay the empty cleaned bag in its original configuration (double layer). Delineate and then cut up a test sample including part of the upper seal (5 cm) and symmetrically including the vertical seal (10 cm).”

If the size of the bag is less than this dimension, use the whole bag.

Carry out the dissolution test immediately to avoid any modification of the sample.

Note 13 The procedure for adding the bag material to the solution for the degree of dissolution and solution stability and the persistent foam tests should be as follows:

"Prepare a stock solution of the bag material (1 mg/ml) by weighing approximately a 100 mg sample (n mg) of the bag (excluding sealed parts) to the nearest mg. Dissolve this sample by stirring in the standard water used for the tests to give a final volume of n ml. Store the stock solution in a stoppered bottle before use.

Calculate the volume (V ml) of the stock solution of the bag to be added to the test suspension of the water soluble powder according to the following equation:

**V(ml) = X *x* 1000B**

**W**

where: B (g) = weight of the emptied and cleaned bag

W (g) = nominal weight of the SP contained in the bag

X (g) = weight of the SP sample used in the test.