8.1 **MOSQUITO COILS (MC)**

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] MOSQUITO COILS**

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

The material, sampled from any part of the consignment in accordance with the procedure described in Note 1 or any other acceptable procedure, shall comply with the specification.

8.1.1 **Description**

The product shall consist of technical …… [ISO common name] complying with the requirements of the WHO specification(s) ......, in the form of ....... (see Section 4.2), together with organic fillers capable of smouldering well, a binder and additives such as synergists, dye and fungicide, formulated in the form of a coil. The coil must burn without producing any flame except at the beginning, and should be readily extinguishable after ignition of the coil.

8.1.2. **Active ingredient**

8.1.2.1 **Identity tests** (Note 2)

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

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

 The ...... [ISO common name] content shall be declared (g/kg) and, when determined on a dry weight basis, 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.

8.1.3 **Relevant impurities**

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

 Maximum: ..….% of the …… [ISO common name] content found under 8.1.2.2.

8.1.3.2 **Water** (CIPAC MT 30.2 or MT 30.6) (Note 4), if required

 Maximum: … g/kg.

8.1.4 **Physical properties**

8.1.4.1 **Average weight of coils** (Note 5)

 The average weight of the coils shall be declared (in g) and when determined on 20 single coils, the average weight shall not differ from that declared by more than ±10%.

8.1.4.2 **Burning time** (Note 6)

 The average burning time determined from five single coils, which must burn continuously in a draught-free atmosphere, shall not be less than that declared.

8.1.4.3 **Strength of coil** (Note 7)

 Every coil of 20 single coils shall be able to withstand a minimum load of 120 g without breaking.

8.1.4.4 **Separation of “twin” coils** (Note 8)

 The mosquito coil, if in “twin” form, shall be properly made so as to facilitate easy separation. When 50 twin coils are separated, not more than 3 coils shall break.

8.1.5 **Storage stability**

8.1.5.1 **Stability at elevated temperature (MT 46.4, in original twin coil packaging)**

 After storage at 54 + 2 0C for 14 days (Note 9), the determined average active ingredient content must not be lower than ......% of the determined average content found before storage (clause 8.1.2.2) (Note 10) and the formulation shall continue to comply with the clauses for:

- by-products of manufacture or storage (8.1.3.1),

- burning time (8.1.4.2),

- strength of coil (8.1.4.3),

- separation of “twin” coils (8.1.4.4).

as required.

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Note 1 Sampling

 *General requirements*

a) Samples shall be stored in such a manner that there is no deterioration of the material.

b) The sampling instrument shall be clean and dry.

c) Samples shall be protected against contamination.

 *Sampling, testing and acceptance*

a) In any consignment, all the master cartons containing containers of the same type shall constitute a lot.

b) Samples shall be drawn from each lot and individually tested to ascertain whether the material complies with the specified requirements.

c) Any sample failing to comply with the specified requirements shall be termed as defective. The acceptance number shall be the maximum number of defective samples permissible for a lot to be accepted.

d) The number of containers to be drawn from the lot and the acceptance number shall be as shown in the following Table.

|  |  |  |
| --- | --- | --- |
| Total number of containers in lot | Number of containers to be tested | Acceptance number |
| 300 or less301 to 12001201 to 20002001 to 70007001 to 1500015001 to 2400024001 to 41000over 41000 | 361321294884126 | 012346913 |

e) Each of the containers to be tested shall be drawn from a different master carton which shall be selected at random. In order to ensure randomness of selection, random number tables shall be used. If such tables are not available, the following procedure may be adopted.

 Starting from any master carton, count the master cartons as 1, 2, 3...... r in a systematic manner. Every rth carton shall be drawn, r being the integral part of N/n, where N is the total number of master cartons in the lot and n the number of master cartons to be selected.

*Preparation of test samples*

a) A sufficient quantity of samples is selected by taking at random a twin-form coil from each individual box of the reduced sample. From the total number of selected coils, sufficient coil samples are reserved for examination for compliance with the requirements of physical characteristics in 8.1.4.1, 8.1.4.2, 8.1.4.3 and 8.1.4.4.

b) The remainder of the coils are ground in a hammer-mill to pass a 1-mm mesh-screen and reserved for testing for compliance with 8.1.2.2, 8.1.3.1 and 8.1.3.2. These groups of samples constitute the test samples. Each set of test samples shall be packed and labelled, taking into account the general requirements of Note 1.

Note 2 Method(s) of analysis must be CIPAC, AOAC or equivalent. Where methods have not yet been published, full details and 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 Normally, the water content should not exceed 120 g/kg. MT 30.2 and MT 30.6 are given as reference methods. However, the applicant should consider the applicability of the method used for the specific formulation characteristics (i.e. using the Dean and Stark method - MT 30.2 - or Karl Fischer method - most recent MT 30.6). The method to be used depends on the % water in the mosquito coil and the working ranges of the methods as well as on the solubility of the mosquito coil in the Karl Fischer reagent or toluene or solvent naphtha (used in Dean and Stark method).

Note 5 Typical average weight per coil is 12 g.

Note 6 A typical burning time should be 7.5 h in order to ensure that the coil burns for a length of time approximately equivalent to the normal duration of sleep. However, in special circumstances to be stated on the label, the burning time may be increased or reduced accordingly.

Note 7 Method for determination of the breaking load/tensile strength of mosquito coil (an alternative, acceptable method may be used).

 *Apparatus*

 Plastic device (Figure 1 below).

 Spring Scale (e.g. Attonic MP-2) with a range 0 to 500 + 5 g, accurately calibrated (Figure 2 below).

 *Sampling*

 Select 20 boxes of mosquito coils randomly, pick one single coil from each box. Discard single coils that are broken or cracked due to careless separation in the selection process. Subject all the 20 single coils of the breaking load test.

 *Procedure*

 A piece of mosquito coil is placed within the plastic device supported by opposite grooves so that on one side the groove only supports 2 cm of the coil from the tip. The coil and plastic device is then placed on the flat platform of the 500 g scale register. The pointed end of the screw is lowered and adjusted to fit into the head/eye of the coil. The screw is then turned gently and gradually in a clockwise direction depressing the mosquito coil downwards until it breaks. The register on the scale is recorded at the breaking point. The minimum specification for the standard coil is 120 g. Repeat the above procedure for the remaining 19 single coils.

Note 8 Method for separation of twin mosquito coils.

 *Procedure*

a) Break the connecting points at the ends of the coils, then hold both heads/eyes of the double coils with thumbs and forefingers.

b) Gently push the heads or eyes in the opposite direction and pull them apart to displace into single coils. Gentle twisting may be done if necessary.

 *Results*

 Satisfactory separation of twin coils is considered achieved if no breakage occurs.

Note 9 Unless other temperatures and/or times are specified. Refer to Section 4.6.2 of this Manual for alternative storage conditions.

Note 10 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 11 A typical unit container contains 5 double coils.

Note 12 Each unit container shall contain at least one mosquito coil stand/holder.

Note 13 The mosquito coil stand/holder must be made of suitable non-flammable materials which can hold the burning coil stably.

**Figure 1. A single mosquito coil supported by plastic device in position.**



**Figure 2 Method for determination of the breaking load/tensile strength of mosquito coil.**

