



**Food and Agriculture Organization
of the United Nations**

AGP: CP/82

**FAO SPECIFICATIONS
FAO PLANT PROTECTION PRODUCTS**

**METAM-SODIUM
sodium N-methyldithiocarbamate dihydrate**

**FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
Rome, 1979**

DISCLAIMER

FAO specifications are developed with the basic objective of ensuring, as far as possible, that pesticides complying with them are satisfactory for the purpose for which they are intended. However, the Group on Pesticide Specifications of the FAO Panel of Experts on Pesticide Specifications, Registration Requirements, Application Standards and Prior Informed Consent wishes to emphasize that, owing to the complexity of the problems involved, questions such as the suitability of pesticides for the control of a particular pest must be decided at national or provincial level. These specifications should not be assumed to be an endorsement of the use of a particular compound for a given purpose by either the Group of Experts or FAO.

Accordingly, neither the Food and Agriculture Organization of the United Nations (FAO) nor the members of the Group on Pesticide Specifications of the FAO Panel of Experts on Pesticide Specifications, Registration Requirements, Application Standards and Prior Informed Consent warrant that pesticides complying with these specifications are suitable for control of any given pest or for use in any particular area.

Furthermore, the preparation and use of pesticides complying with these specifications are not exempt from any safety regulation or other legal or regulatory provision applicable thereto. Neither FAO nor any member of the FAO Group of Experts shall be liable for any injury, loss, damage or prejudice of any kind that may be suffered as a result of the preparation or use of pesticides complying with these specifications.

Additionally, the Group of Experts wishes to warn users of specifications that improper field mixing and/or application of pesticides can result in either a lowering or complete loss of their efficacy. This holds true even in cases where such pesticides comply with the specifications indicated.

Accordingly, the Group of Experts and/or FAO can accept no responsibility for the consequences of improper field mixing and/or application.

INTRODUCTION

From time to time, FAO publishes booklets of specifications for technical materials and related formulations of plant protection products. Revisions of, and additions to, already published specifications will be issued when necessary, but revisions may be printed in the *FAO Plant Protection Bulletin* during the interval between editions.

The specifications contained herein have been carefully reviewed and agreed by the Group on Pesticide Specifications of the FAO Panel of Experts on Pesticide Specifications, Registration Requirements, Application Standards and Prior Informed Consent after consultations with official government scientists, the pesticides industry through GCPF (Global Crop Protection Federation) and, where appropriate, with individual manufacturers.¹

FAO has published a *Manual on the development and use of FAO and WHO Specifications for Plant Protection Products*, FAO Plant Production and Protection Paper No. 173, Rome 2002 (Revised First Edition available only on the FAO home page of the Internet at: <http://www.fao.org/pest-and-pesticide-management/en/>).

This manual contains detailed definitions and other essential background information on basic procedures and technical principles adopted by the group on Pesticide Specifications of the FAO Panel of Experts on Pesticide Specifications, Registration Requirements, Application Standards and Prior Informed Consent, such as:

1. Categories of Specifications

FAO Tentative Specifications (Code 'S/T', formerly 'TS') are those which have been recommended by FAO as preliminary specifications and which are based on minimum requirements. The methods of analysis cited are normally supplied by the manufacturer or may already have been published or be the subject of collaborative work.

FAO Provisional Specifications [Code 'S/P', formerly ('S')] are those for which more evidence of the necessary parameters is available and where some collaborative study of the methods of analysis has been carried out.

FAO (full) Specifications (Code 'S/F', formerly 'S').

Specifications that have all necessary requirements together with CIPAC (full) methods, or other collaboratively studied (proven) methods.^{2,3}

Wherever possible, standards for apparatus and common names for pesticides are those approved by the International Organization for Standardization (ISO).

2. Expression of active ingredient content

- for solids, liquid technical materials, volatile liquids (of maximum boiling point 50 °C) and viscous liquids (with minimum kinematic viscosity of 1×10^3 m²/s at 20 °C) the FAO Specification shall be based on expression of the content as g/kg;

- for all other liquids the active ingredient content of the product shall be declared in terms of g/kg *or* g/l at 20 °C. If the customer requires both g/kg *and* g/l at 20 °C, then in case of dispute the analytical results shall be calculated as g/kg.

3. Tolerance on content

A declared content of active ingredient must be included in all specifications, and one of the problems immediately arising is the level of tolerance acceptable about the nominal figure. The tolerance is influenced by (a) the reproducibility of the method of analysis, (b) the sampling error and (c) the manufacturing variance.

Allowable variations in analytical results (i.e. tolerances in content of active ingredient) with respect to specific pesticide consignments are intended to cover reasonable variations in the contents of active ingredients.

4. Containers/packaging

FAO guidelines are in preparation.

Containers shall comply with pertinent national and international transport and safety regulations.

Technical materials, dustable powders and granules

Containers shall be suitable, clean, dry and as specified, and shall not adversely affect, or be affected by, the contents, but shall adequately protect them against external conditions.

Wettable powders

The product shall be packed in suitable, clean, dry containers as specified in the order. The container shall provide all necessary protection against compaction, atmospheric moisture, loss by vaporization and/or contamination to ensure that the product suffers no deterioration under normal transit and storage conditions.

The product shall be protected by an adequate moisture barrier. This may be a suitable bag of polyethylene or alternative means of giving equal or better protection.

Solutions and emulsifiable concentrates

Containers shall be lined, where necessary, with a suitable material, or the interior surfaces shall be treated to prevent corrosion and/or deterioration of the contents.

Additional information should be given in all specifications where particular pesticides present problems in packaging.

5. Biological information

Phytotoxicity

No test can be specified to cover the possible phytotoxicity of a formulation to all crops. When a crop is not mentioned in the instructions for use, purchasers should check with the supplier that the material is suitable, always provided that such a use is not restricted or legally forbidden.

Wetting of crops

The dilute spray should satisfactorily wet the leaves of the specified crops when used in accordance with the instructions. Test method MT 53.2, CIPAC F, p.162, may be useful.

¹ *Should national pesticide specifications developed from these approved FAO specifications deviate from them, the National Authority responsible for making such changes is requested to inform the FAO Plant Protection Service of the nature of, and the reasons for, the modifications.*

² *Methods of analysis and miscellaneous techniques referred to in these specifications have been developed and adopted by CIPAC (Collaborative International Pesticides Analytical Council Ltd.). See CIPAC Handbooks 1 (1970), 1A (1980), 1B (1983), 1C (1985), D (1988), E (1993), F (1995), G (1995), CIPAC Proceedings 1980 and 1981, obtainable from Black Bear Press Limited, King's Hedges Road, Cambridge CB4 2PQ, England. The page numbers of specific methods are given in parentheses in the specifications. Copies of methods not yet published can be obtained from the FAO Plant Protection Service.*

³ *Information on standard waters for laboratory evaluation of pesticidal formulations will be found in CIPAC Monograph 1, Standard Waters and an FAO Survey on Naturally Occurring Waters (1972), Black Bear Press Limited, King's Hedges Road, Cambridge CB4, England.*

METAM-SODIUM AQUEOUS SOLUTIONS

FAO Specification Code 20.1Na/13/S/15

.1 DESCRIPTION

The product shall consist of a homogenous aqueous solution containing metam-sodium as the active ingredient; colouring matter can be included. It shall be reasonable free from suspended matter and sediment. Free carbon disulphide shall be absent (Notes 1 and 5).

.2 ACTIVE INGREDIENT

.2.1 *Identity tests*

Where the identity of the material is in doubt, it shall comply with any two of the following tests:

.2.1.1 *Dithiocarbamate* (CIPAC 1B; 20.1Na/13/M/1.4.1)

On the addition of sulphuric acid the material shall yield a white precipitate which breaks down to carbon disulphide.

.2.1.2 *Primary amine* (-/M/1.4.3)

The material shall give a white precipitate with mercuric chloride.

.2.1.3 *Oxidation product* (-/M/1.4.3)

The melting point of the oxidation product shall be between 93 and 96°C.

.2.1.4 *TLC of the copper salt* (-/M/1.4.4)

The copper salt produced from the product when subjected to TLC shall remain on the base line.

.2.2 *Metam-sodium* (CIPAC 1; 20.1Na/13/M/1.3)

The metam-sodium content shall be declared (g/1 at 20°C or % w/w; Note 2). When the combined carbon disulphide is determined and expressed as metam-sodium (Note 3) the content obtained shall not differ from that declared by more than $\pm 5\%$ of the declared content.

.3 IMPURITIES

.3.1 *Insoluble material* (-/M/3.5)

Maximum: 0.2% retained on a 125 μm test sieve.

.4 PHYSICAL PROPERTIES

.4.1 *Flash Point* (-/M/1.6)

Minimum 66°C (Abel Method; Note 4)

.4.2 Stability on dilution (-/M/1.7)

After dilution with CIPAC Standard Water C the resulting solution shall continue to comply with .3.1.

.5 STORAGE STABILITY

.5.1 Stability at 30°C (-/M/1.8)

After storage at 30°C ± 2°C for 14 days the product shall continue to comply with .2.2, .3.1, .4.1 and .4.2 (Note 5).

.6 CONTAINERS

Containers shall be lined with a suitable material, or the interior surfaces treated to prevent corrosion and/or deterioration of the contents, which should not be allowed to come into contact with any untreated metal surface.

Plastic containers are acceptable.

They shall comply with pertinent national and international transport and safety regulations.

NOTES

Note 1: Under certain conditions free carbon disulphide may separate out and sink to the bottom of the container. This will be highly flammable and toxic and this presents a handling hazard.

Samples must include material from the bottom of the container.

Note 2: If the customer requires both g/l at 20°C and % w/w then in case of dispute the analytical results shall be calculated as % w/w.

Note 3: 1.00% carbon disulphide = 1.70 metam-sodium.

Note 4: This clause is included to reject products which evolve free carbon disulphide too readily.

Note 5: The container labels should include a warning that the product should be stored in a cool place, i.e. below 25°C.