AGP: CP/241
Supercedes
AGP: CP/32
AGP: CP/33

FAO SPECIFICATIONS
FOR PLANT PROTECTION PRODUCTS

PARATHION

0,0-diethyl 0-4-nitrophenyl phosphorothioate

and

PARATHION-METHYL

0,0-dimethyl 0-4-nitrophenyl phosphorothioate

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
Rome, 1989

Group on Pesticide Specifications

FAO Panel of Experts on Pesticide Specifications, Registration Requirements and Application Standards

Technical Secretary: Dr. A.V. Adam
Plant Protection Service
Plant Production and Protection Division

FAO
Via delle Terme di Caracalla
00100 Rome, Italy - Telex: 610181 FAO I

DISCLAIMER [1]

FAO specifications are developed with the basic objective of promoting, as far as practicable, the manufacture, distribution and use of pesticides that meet basic quality requirements.

Compliance with the specifications does not constitute an endorsement or warranty of the fitness of a particular pesticide for a particular purpose, including its suitability for the control of any given pest, or its suitability for use in a particular area. Owing to the complexity of the problems involved, the suitability of pesticides for a particular purpose and the content of the labelling instructions must be decided at the national or provincial level.

Furthermore, pesticides which are manufactured to comply with these specifications are not exempted from any safety regulation or other legal or administrative provision applicable to their manufacture, sale, transportation, storage, handling, preparation and/or use.

FAO disclaims any and all liability for any injury, death, loss, damage or other prejudice of any kind that may arise as a result of, or in connection with, the manufacture, sale, transportation, storage, handling, preparation and/or use of pesticides which are found, or are claimed, to have been manufactured to comply with these specifications.

Additionally, FAO wishes to alert users to the fact that improper storage, handling, preparation and/or use of pesticides can result in either a lowering or complete loss of safety and/or efficacy.

FAO is not responsible, and does not accept any liability, for the testing of pesticides for compliance with the specifications, nor for any methods recommended and/or used for testing compliance. As a result, FAO does not in any way warrant or represent that any pesticide claimed to comply with a FAO specification actually does so.

[1] This disclaimer applies to all specifications published by FAO.

INTRODUCTION TO FAO SPECIFICATIONS
DEVELOPED UNDER THE OLD PROCEDURE

Between 1975 and 2000, FAO published 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. However, all changes and revisions of FAO specifications are now subject to the new procedure described in the *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/ag/agp/agpp/pesticid/)

FAO specifications developed under the old procedure are based on the requirements defined in the Fourth Edition of the *Manual on the development and use of FAO specifications for plant protection products*, Plant Production and Protection Paper No. 128, Rome 1995.

This manual contained 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 (Section 3.1 of the Manual)

   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 (Section 4.2.5 of the Manual)

   - for solids, liquid technical materials, volatile liquids (of maximum boiling point 50°C) and viscous liquids (with minimum kinematic viscosity of 1×10^3 m^2/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 (Section 4.2.7 of the Manual)

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. For examples of such tolerances, see the table in Section 4.2.7 of the Manual.

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 2PQ, England.*

SUBMISSION OF DRAFT SPECIFICATIONS TO FAO

Any organization, commercial firm or interested individual is encouraged to submit relevant specifications, or proposals for revision of existing specifications, for pesticide products for consideration and possible adoption by FAO. Correspondence should be addressed to the Pesticide Management Group, Plant Production and Protection Division, FAO, Viale delle Terme di Caracalla, 00153 Rome, Italy.

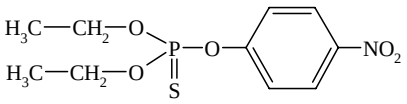
General guidelines on preparing draft specifications are given in the *Manual on the development and use of FAO and WHO Specifications for Plant Protection Products*, FAO Plant Production and Protection Paper No. 173, Rome 2002 (Revised First Edition available only on the FAO home page of the Internet at: http://www.fao.org/ag/agp/agpp/pesticid/).

Specifications which are considered suitable for further processing are assigned priorities and circulated to appropriate organizations and specialists to comment. Comments, together with other relevant information, are then reviewed in detail by the Group on Specifications of the FAO Panel of Experts on Pesticide Specifications, Registration Requirements, Application Standards and Prior Informed Consent. The drafts are converted into FAO Provisional Specifications, or full FAO Specifications.

INFORMATION

COMMON NAME: Parathion (ISO)

EMPIRICAL FORMULA: C10H14NO5PS



RMM: 291.3

CAS REGISTRY NUMBER: 56-38-2

CIPAC CODE NUMBER: 10.b

CHEMICAL NAME:

0,0-diethyl 0-4-nitrophenyl phosphorothioate (IUPAC)
0,0-diethyl 0-(4-nitrophenyl) phosphorothioate (CA)

PARATHION TECHNICAL
FAO Specification 10.b/TC/S (1989)

.1 DESCRIPTION

The material shall consist of parathion together with related manufacturing impurities and shall be a brown liquid with a garlic-like odour free from visible extraneous matter and added modifying agents.

.2 ACTIVE INGREDIENT

.2.1 Identity tests (CIPAC 1B, 10.b/TC/(M.1)/2, p.1875 and -/(M.2)/2, p.1876) (Note 1).

Where the identity of the active ingredient is in doubt, then it shall comply with at least one additional test.

.2.2 Parathion (CIPAC 1B, 10.b/TC/(M.1)/3, p.1875 or -/(M.2)/3, p.1877) (Note 2).

The parathion content shall be declared (not less than 950 g/kg) and, when determined, the content obtained shall not differ from that declared by more than +/- 20 g.

.3 IMPURITIES

.3.1 Water (MT 30.1, CIPAC 1, p.897)

Maximum: 1 g/kg

.4 PHYSICAL PROPERTIES

.4.1 Acidity (31.1.1, CIPAC 1, p.903)

Maximum: 3 g/kg calculated as H2S04

Note 1 Alternatively, the method 10.b/1/M41.3, CIPAC 1, p.555 may be used.

Note 2 Alternatively, the method 10.b/1/M41.2, CIPAC 1, p.551 may be used.

PARATHION DUSTABLE POWDERS
FAO Specification 10.b/DP/S (1989)

.1 DESCRIPTION

The material shall consist of a homogeneous mixture of technical parathion [complying with the requirements of FAO Specification 10.b/TC/s (1989)] together with carriers and any other necessary formulants. It shall be in the form of a fine, free-flowing powder free from visible extraneous matter and hard lumps.

.2 ACTIVE INGREDIENT

.2.1 Identity tests (CIPAC 1, 10.b/2/M41.3, p.557)

Where the identity of the active ingredient is in doubt, then isolated active ingredient shall comply with at least one additional test.

.2.2 Parathion (CIPAC 1, 10.b/2/MV1.2, p.556)

The parathion content shall be declared (g/kg) and, when determined, the content obtained shall not differ from that declared by more than the following amounts:

Declared Content	Permitted Tolerance
up to 25 g/kg	+/- 15% of the declared content
above 25 g/kg	+/- 10% of the declared content

.3 PHYSICAL PROPERTIES

.3.1 Acidity or Alkalinity (MT 31.1.2, CIPAC 1, p.903)

Maximum acidity: 3 g/kg calculated as H_2SO_4
Maximum alkalinity: 2 g/kg calculated as NaOH.

.3.2 Dry sieve test (CIPAC 1, 10.b/2/M/1.5, p.557)

Maximum: 5% retained on a 75 µm test sieve. Not more than (0.005 x X) % of the amount of the sample used for the determination shall be present as parathion in the residue on the sieve, where X is the parathion content (g/kg) found under .2.2 (Note 1).

.3.3 Flowability (MT 44, CIPAC 1A, p.1567)

If required, maximum flow number: 14

In the absence of proven methodology, this clause is for information only.

.4 STORAGE STABILITY

.4.1 Stability at 54 C (MT 46.1.4, CIPAC 1, p.953)

After storage at 54 +/- 2°C for 14 days, the product shall continue to comply with .2.2 (except that the minimum permitted parathion content shall be 90% of that found under .2.2, .3.1 and .3.2.

Note 1 If the product has a found content of 50 g/kg of parathion and 20 g of sample is used in the test, then the amount of parathion in the residue on the sieve should not exceed 0.05 g, i.e.

$$\frac{(0.005 \times 50) \times 20}{100}$$

PARATHION WETTABLE POWDERS
FAO Specification 10.b/WP/S (1989)

.1 DESCRIPTION

The material shall consist of a homogeneous mixture of technical parathion [complying with the requirements of FAO Specification 10.b/TC/S (1989)] together with filler(s) and any other necessary formulants. It shall be in the form of a fine powder free from visible extraneous matter and hard lumps.

.2 ACTIVE INGREDIENT

.2.1 Identity Tests [CIPAC 1, 10.b/3/M/1.4, p.558)

Where the identity of the active ingredient is in doubt, then the isolated active ingredient shall comply with at least one additional test.

.2.2 Parathion (CIPAC 1, 10.b/3/M/1.2, p.558)

The parathion content shall be declared (q/kg) and, when determined, the content obtained shall not differ from that declared by more than the following amounts:

Declared Content	Permitted Tolerance
up to 100 g/kg	+/- 10% of the declared content
100 to 250 g/kg	+/- 6% of the declared content
250 to 400 g/kg	+/- 5% of the declared content
above 400 g/kg	+/- 20 g.

.3 PHYSICAL PROPERTIES

.3.1 Acidity or alkalinity (MT 31.1.2, CIPAC 1, p.903)
Maximum acidity: 5 g/kg calculated as H_2SO_4
Maximum alkalinity: 2 g/kg calculated as NaOH

.3.2 Wet Sieve Test (MT 59.3. CIPAC 1, p.981)
Maximum: 2% retained on a 75 µm test sieve

.3.3 Suspensibility (CIPAC 1, 10.b/3/M/1.6, p.559) (Notes 1 and 2)

A minimum of 60% of the parathion content found under .2.2 shall be in suspension after 30 minutes in CIPAC Standard Water C. (Notes 1 and 2).

Alternatively, if the buyer requires other CIPAC Standard Waters to be used, then this shall be specified when ordering.

.3.4 Persistent foam (MT 47, CIPAC 1, p.954) (Note 3)
Maximum: 25 ml after 1 minute.

.3.5 Wetting of the product (MT 53.3.1, CIPAC 1, p.967)

The product shall be completely wetted in 1 minute without swirling.

.4 STORAGE STABILITY

.4.1 Stability at 54 C (MT 46.1.1, CIPAC 1, p.951)

After storage at 54 +/- 2°C for 14 days, the product shall continue to comply with .2.2, .3.1, .3.2 and .3.5.

Note 1 The product should be tested at the highest and lowest rates of use recommended by the supplier, provided this does not exceed the conditions given in the method MT 15.1, CIPAC 1, p.861.

Note 2 This test will normally only be carried out after the heat stability test .4.1.

Note 3 The amount of sample to be used in the test should be specified.

PARATHION SOLUTIONS
Specification 10.b/OL/S (1989)

.1 DESCRIPTION

The material shall consist of a solution of technical parathion [complying with the requirements of FAO Specification 10.b/TC/S (1989)] together with any necessary formulants. It shall be free from visible suspended matter and sediment.

.2 ACTIVE INGREDIENT

.2.1 Identity tests (CIPAC 1, 10.b/4/M/1.4, p.562)

Where the identity of the active ingredient is in doubt, then the isolated active ingredient shall comply with at least one additional test.

.2.2 Parathion (CIPAC 1, 10.b/4/M/1.3, p.561)

The parathion content shall be declared (g/kg or g/l at 20°C, Note 1) and when determined, the content obtained shall not differ from that declared by more than the following amounts:

Declared content	Permitted tolerance
up to 200 g/kg or g/l	+/- 10% of the declared content
above 200 g/kg or g/l	+ /-20 g

.3 IMPURITIES

.3.1 Water (MT 30.1, CIPAC 1, p.897 or 30.2, p.899)

Maximum: 2 g/kg

.4 PHYSICAL PROPERTIES

.4.1 Acidity or Alkalinity (MT 31.1.3, CIPAC 1, p.904 or MT 31.2.3, p 905) (Note 2)

Maximum acidity: 3 g/kg calculated as H_2SO_4
Maximum alkalinity: 0.5 g/kg calculated as NaOH.

.4.2 Flash point (MT 12, CIPAC 1, p.846]

If required, the flash point of the product shall not be lower than the minimum declared flash point. A closed cup method shall be used and the method stated (Note 3).

.4.3 Miscibility with hydrocarbon oil (MT 23, CIPAC 1, p.891)

If required, the product shall be miscible with the appropriate hydrocarbon oil (Note 4).

5. STORAGE STABILITY

.5.1 Stability at 0 C (MT 39.1, CIPAC 1, p.930)

After storage at 0 +/- 1°C for 7 days, the volume of solid and/or liquid which separates shall be not more than 0.3 ml.

Note 1 If the buyer requires both g/kg and g/l at 20°C, then in case of dispute, the analytical result shall be calculated as g/kg.

Note 2 These methods have not been tested on this type of formulation but may be used as a starting point for further development.

Note 3 Attention is drawn to the appropriate national and international regulations on handling and transport of flammable materials.

Note 4 The concentration should not be higher than the highest concentration recommended in the instructions for use.

PARATHION EMULSIFIABLE CONCENTRATES
FAO Specification 10.b/EC/S (1989)

.1 DESCRIPTION

The material shall consist of technical parathion [complying with the requirements of FAO Specification 10.b/TC/S (1989)] dissolved in suitable solvents with any other necessary formulants. It shall be in the form of a stable liquid, free from visible suspended matter and sediment.

.2 ACTIVE INGREDIENT

.2.1 Identity tests (CIPAC 1B, 10.b/EC/(M.1)/2, P. 1878 and -/(M.2)/2, P. 1878) (Note 1)

Where the identity of the active ingredient is in doubt, then the isolated active ingredient shall comply with at least one additional test.

.2.2 Parathion (CIPAC 1B, 10.b/EC/(M.1)/3, p.1878 o -/(M.2)/3, P. 1878 (Note 2)

The parathion content shall be declared (g/kg or g/1 at 20°C, (Note 3) and when determined, the content obtained shall not differ from that declared by more than the following amounts:

Declared content	Permitted tolerance
up to 500 g/kg or g/l	+/- 5% of the declared content
above 500 g/kg or g/l	+/- 25 g.

.3 IMPURITIES

.3.1 Water (MT 30.1, CIPAC 1, p.897 or MT 30.2, p.899)

Maximum: 2 g/kg

.4 PHYSICAL PROPERTIES

.4.1 Acidity or Alkalinity (MT 31.1.3, CIPAC 1, p.904 or 31.2.3, p.905)

Maximum acidity: 3 g/kg calculated as H_2SO_4
Maximum alkalinity: 1 g/kg calculated as NaOH

.4.2 Emulsion stability and re-emulsification (MT 36.1.1, CIPAC 1, p. 910)

After the heat stability test (.5.2) the product, when diluted at 30°C, (Note 4) with CIPAC Standard Waters A and C, shall comply with the following:

Time after dilution	Limits of stability
0 h	Initial emulsification complete
0.5 h	'Cream', maximum: 2 ml
2.0 h	'Cream', maximum: 4 ml ‘Free oil', nil
24 h (Note 5)	Re-emulsification complete
24.5 h (Note 5)	‘Cream', max: 4 ml ‘Free oil’, max: 0.5 ml

In special cases, a test using CIPAC Standard Waters A and C before the heat stability test may be necessary.

Alternatively, if the buyer requires other CIPAC Standard waters to be used, then this shall be specified when ordering.

.4.3 Flash point (MT 12, CIPAC 1, p.846)

If required, the flash point of the product shall not be lower than the minimum declared flash point. A closed cup method shall be used and the method stated (Note 6).

.5 STORAGE STABILITY

.5.1 Stability at O C (MT 39.1, CIPAC 1, p.930)

After storage at 0 +/- 1°C for 7 days, the volume of solid and/or liquid which separates shall not be more than 0.3 ml.

.5.2 Stability at 54 C (MT 46.1.3, CIPAC 1, p.952)

After storage at 54 +/- 2 C for 14 days, the product shall continue to comply with 2.2 and 4.1

Note 1 Alternatively, the method 10.b/5/M/l.4, CIPAC l, p.565 may be used.

Note 2 Alternatively, the method 10.b/5/M/1.3, CIPAC 1, p.563 may be used.

Note 3 If the buyer requires both g/kg and g/l at 20°C, then in case of dispute, the analytical result shall be calculated as g/kg.

Note 4 Unless another temperature is specified.

Note 5 These tests need only be carried out in case of doubt as to the emulsion stability result of the 2 hour test.

Note 6 Attention is drawn to the appropriate national international regulations on handling and transport flammable materials.

INFORMATION

COMMON NAME:	Parathion-methyl (ISO)
EMPIRICAL FORMULA:	C8H10NO5PS
RMM:	263.2
CAS REGISTRY NUMBER:	298-00-0
CIPAC CODE NUMBER:	10.a

CHEMICAL NAME:

0,0-dimethyl 0-4-nitrophenyl phosphorothioate (IUPAC)
0,0-dimethyl 0-(4-nitrophenyl) phosphorothioate (CA)

PARATHION-METHYL TECHNICAL
FAO Specification 10.a/TC/S (1989)

.1 DESCRIPTION

The material shall consist of parathion-methyl together with related manufacturing impurities and shall be a liquid or solid free from visible extraneous matter and added modifying agents.

.2 ACTIVE INGREDIENT

.2.1 Identity tests (CIPAC 1B, 10.a/TC/(M.1)/2, p.1879 -/(M.2)/2, p.1881) (Note 1).

Where the identity of the active ingredient is in doubt, then it shall comply with at least one additional test.

.2.2 Parathion-methyl (CIPAC 1B, 10.a/TC/(M.l)/3, p.1879 or -/(X.2)/3, p. 1881) (Note 2).

The parathion-methyl content shall be declared (not less than 900 g/kg) and, when determined, the content obtained shall not differ from that declared by more than +/- 20 g.

.3 IMPURITIES

.3.1 S-methyl parathion (CIPAC 1, p.550, CIPAC 1A, p 1318)

Maximum: 1.3% of the parathion-methyl content found under .2.2

.3.2 Parathion (CIPAC 1, p.550, CIPAC 1A, p 1318)

Maximum: 2.5 g/kg

.3.3 Water (MT 30.1, CIPAC 1, p.897)

Maximum: 3 g/kg

.3.4 Acetone insolubles (MT 27, CIPAC 1, p.894) Maximum: 5 g/kg

.4 PHYSICAL PROPERTIES

.4.1 Acidity (MT 31.1.1, CIPAC 1, p.903 or 31.2.1, p.905)

Maximum acidity: 3 g/kg calculated as H_2SO_4

.5 EXPLOSION HAZARDS

The technical material tends to set to a solid of melting point about 29°C. It must be heated to melting point before formulating. A suitable temperature is 55 C maintained e.g. on a water bath. The material may explode if heated above 100 C. Accordingly, local overheating must be avoided.

Note 1 Alternatively, the method 10.a/1/M/1.3, CIPAC 1, p.570 may be used.

Note 2 Alternatively, the method 10.a/1/M/1.2, CIPAC 1, p.569 may be used.

Note 3 No quantitative standardized method, but a characterization method by TLC (10.a/1/M41.3, CIPAC 1, p.570) may be used.

PARATHION-METHYL TECHNICAL CONCENTRATE SOLUTIONS
FAO Specification 10.a/TK/S (1989)

.1 DESCRIPTION

The material shall consist of parathion-methyl together with related manufacturing impurities. It shall be a light to dark tan-coloured liquid at temperatures above 18°C, free from visible extraneous matter and added modifying agents, except for the solvent (Note 1).

.2 ACTIVE INGREDIENT

.2.1 Identity Tests (CIPAC 1B, 10.a/TC/(M.1)/2, p.1879 and -/(M.2)/2, p.l881) (Note 2)

Where the identity of the active ingredient is in doubt, then the isolated active ingredient shall comply with at least one additional test.

.2.2 Parathion-methyl (CIPAC 1B, 10.a/TC/(M.1)/3, p.l879 or -/(M.2)/3, p.l881) (Note 3)

The parathion-methyl content shall be declared (not less than 800 g/kg) and when determined, the content obtained shall not differ from that declared by more than +/- 20 g.

.3 IMPURITIES

.3.1 S-methyl parathion (CIPAC 1, p.550, CIPAC 1A, p 1318)

Maximum: 1.3% of the parathion-methyl content found under .2.2.

.3.2 Parathion (CIPAC 1, p.550, CIPAC 1A, p 1318)

Maximum: 2.5 g/kg

.3.3 Water (MT 30.1, CIPAC 1, p.897)

Maximum: 3 g/kg

.3.4 Acetone insolubles (MT 27, CIPAC 1, p.894)

Maximum: 5 g/kg

.4 PHYSICAL PROPERTIES

.4.1 Acidity (MT 31.1.1, CIPAC 1, p.903 or 31.2.1, p.905)

Maximum: 3 g/kg calculated as H_2SO_4

.5 EXPLOSION HAZARDS

Parathion-methyl may explode violently if heated above 100°C. stored under cold conditions, however, parathion-methyl will crystallize out, from the concentrate, in the form of a hard cake. In order to reconstitute it, the product must be heated above the crystallization temperature and stirred to achieve a uniform material. A suitable temperature for this purpose is 55 C maintained e.g., on water bath. It should be noted that it is not sufficient merely to liquify the material. Furthermore, local overheating must be avoided.

Note 1 Parathion-methyl technical is usually supplied in the form of a concentrate containing up to 200 g/kg of an organic solvent which is added for the purpose of maintaining the fluidity of the product.

Note 2 Alternatively, the method 10.a/1/M41.3, CIPAC 1, p.570 may used.

Note 3 Alternatively, the method 10.a/1/M41.2, CIPAC 1, p.569 may used.

Note 4 No quantitative standardized method, but a characterization method by TLC (10.a/l/M4l.3, CIPAC 1, p.570) may be used.

PARATHION-METHYL DUSTABLE POWDERS
FAO Specification 10.a(DP/S (1989)

.1 DESCRIPTION

The material shall consist of a homogeneous mixture of technical parathion-methyl [complying with the requirements of FAO Specifications 10.a/TC/S or 10.a/TX/S (1989)] together with carriers and any necessary formulants. It shall be in the form of a fine, free-flowing powder free from visible extraneous matter and hard lumps.

.2 ACTIVE INGREDIENT

.2.1 Identity tests (CIPAC 1, 10.a/2/M41.3, p.573)

Where the identity of the active ingredient is in doubt, then the isolated active ingredient shall comply with at least one additional test.

.2.2 Parathion-methyl (CIPAC 1, 10.a/2/M41.2, p.571)

The parathion-methyl content shall be declared (g/kg) and, when determined, the content obtained shall not differ from that declared by more than the following amounts:

Declared Content	Permitted Tolerance
up to 25 g/kg	+/- 15 % of the declared content
above 25 g/kg	+/- 10% of the declared content

.3 IMPURITIES

.3.1 S-methyl parathion (CIPAC 1, p.550, CIPAC 1A, p 1318

Maximum: 2% of the parathion-methyl content found under .2.2

.3.2 Parathion (CIPAC 1, p.550, CIPAC 1A, p 1318

Maximum: 0.25% of the parathion-methyl content found under .2.2

.4 PHYSICAL PROPERTIES

.4.1 Acidity or Alkalinity (MT 31.1.2, CIPAC 1, p.903)

Maximum acidity: 1 g/kg calculated as H_2SO_4
Maximum alkalinity: 2 g/kg calculated as NaOH.

.4.2 Dry sieve test (CIPAC 1, 10.a/2/M41.5, p.573)

Maximum: 5% retained on a 75µm test sieve. Not more than (0.005 x X) % of the amount of the sample used for the determination shall be present as parathion-methyl in the residue on the sieve, where X is the parathion-methyl content (g/kg) found under .2.2 (Note 2).

.4.3 Flowability (MT 44, CIPAC 1A, p.1567)

If required, maximum flow number: 14

In the absence of proven methodology, this clause is for information only.

.5 STORAGE STABILITY

.5.1 Stability at 54 C (MT 46.1.4, CIPAC 1, p.953)

After storage at 54 +/- 2°C for 14 days, the product shall continue to comply with .2.2 (except that the minimum permitted parathion-methyl content shall be 90% of that found under .2.2, .3.1 (except that the maximum permitted S-methyl parathion content shall be 4% of the parathion-methyl content found under .2.2, .4.1 and .4.2 (Note 3).

Note 1 No quantitative standardized method, but a characterization method by TLC (10.a/2/M/1.3, CIPAC 1, p. 573) may be used.

Note 2 If the product has a found content of 50 g/kg of parathion-methyl and 20 g of sample is used in the test, then the amount of parathion-methyl in the residue on the sieve should not exceed 0.05 g, i.e.

$$\frac{(0.005 \times 50) \times 20}{100}$$

Note 3 It should be clearly stated on the label that storage under hot conditions should be avoided in order to prevent decomposition of the product.

PARATHION-METHYL WETTABLE POWDERS
FAO Specification 10.a/WP/S (1989)

.1 DESCRIPTION

The material shall consist of a homogeneous mixture of technical parathion-methyl [complying with the requirements of FAO Specifications 10.a/TC/S or 10.a/IK/S (1989)] together with filler(s) and any other necessary formulants. It shall be in the form of a fine powder free from visible extraneous matter and hard lumps.

.2 ACTIVE INGREDIENT

.2.1 Identity Tests (CIPAC 1, 10.a/3/M/1.3, p.574)

Where the identity of the active ingredient is in doubt, then the isolated active ingredient shall comply with at least one additional test.

.2.2 Parathion-methyl (CIPAC 1, 10. a/3/M/1.2, p.574)

The parathion-methyl content shall be declared (g/kg) and, when determined, the content obtained shall not differ from that declares by more than the following amounts:

Declared Content	Permitted Tolerance
up to 400 g/kg	+/- 5% of the declared content
above 400 g/kg	+/- 20 g

.3 IMPURITIES

.3.1 S-methyl parathion (CIPAC 1, p.550, CIPAC 1A, p 1318

Maximum: 1.5% of the parathion-methyl content found under .2.2

.3.2 Parathion (CIPAC 1, p.550, CIPAC 1A, p 1318
Maximum: 0.25% of the parathion-methyl content found under .2.2

.4 PHYSICAL PROPERTIES

.4.1 Acidity or alkalinity (MT 31.1.2, CIPAC 1, p.903)

Maximum acidity: 5 g/kg calculated as H_2SO_4
Maximum alkalinity: 2 g/kg calculated as NaOH

.4.2 Wet Sieve Test (MT 59.3. CIPAC 1, p.981)

Maximum: 2% retained on a 75 µm test sieve

.4.3 Suspensibility (CIPAC 1, 10.a/3/M41.6, p.574) (Notes 2 and 3).

A minimum of 60% of the parathion-methyl content found under .2.2 shall be in suspension after 30 minutes in CIPAC Standard Water C. (Notes 2 and 3).

Alternatively, if the buyer requires other CIPAC Standard Waters to be used, then this shall be specified when ordering.

.4.4 Persistent foam (MT 47, CIPAC 1, p.954) (Note 4)

Maximum: 25 ml after 1 minute.

.4.5 Wetting of the product (MT 53.3.1, CIPAC 1, p.967)

The product shall be completely wetted in 1 minute without swirling.

.5 STORAGE STABILITY

.5.1 Stability at 54°C (MT 46.1.1, CIPAC 1, p.951)

After storage at 54 +/- 2°C for 14 days, the product shall continue to comply with .2.2 (except that the minimum permitted parathion-methyl content shall be 95% of that found under .2.2, .3.1 (except that the maximum permitted S-methyl parathion content shall be 3% of the parathion-methyl content found under .2.2, .4.1, .4.2 and .4.5 (Note 5).

Note 1 No quantitative standardized method, but a characterization method by TLC (10.a/3/M41.3, CIPAC 1, p.574) may be used.

Note 2 The product should be tested at the highest and lowest rates of use recommended by the supplier, provided this does not exceed the conditions given in the method MT 15.1, CIPAC 1, p 861.

Note 3 This test will normally only be carried out after the heat stability test .5.1.

Note 4 The amount of sample to be used in the test should be specified.

Note 5 It should be prominently stated on the label that storage under hot conditions should be avoided in order to prevent decomposition of the product.

PARATHION-METHYL SOLUTIONS
Specification 10.a/OL/S (1989)

.1 DESCRIPTION

The material shall consist of a solution of technical parathion-methyl[complying with the requirements of FAO Specifications 10.a/TC/S or 10.a/TX/S (1989)] together with any necessary formulants. It shall be free from visible suspended matter and sediment.

.2 ACTIVE INGREDIENT

.2.1 Identity tests (CIPAC 1, 10. a/4/M/1.4, p.578)

Where the identity of the active ingredient is in doubt, then the isolated active ingredient shall comply with at least one additional test.

.2.2 Parathion-methyl (CIPAC 1, 10.a/4/M/1.3, p.576)

The parathion-methyl content shall be declared (g/kg or g/l at 20 C, Note 1) and when determined, the content obtained shall not differ from that declared by more than the following amounts:

Declared content	Permitted tolerance
up to 200 g/kg or g/l	+ 10% of the declared content
above 200 g/kg or g/l	+ 20 g.

.3 IMPURITIES

.3.1 S-methyl parathion (CIPAC 1, p.550, CIPAC 1A, p 1318)

Maximum: 1.3% of the parathion-methyl content found under .2.2

.3.2 Parathion (CIPAC 1, p.550, CIPAC 1A, p 1318)

Maximum: 0.25% of the parathion-methyl content found under .2.2

.3.3 Water (MT 30.1, CIPAC 1, p.897 or 30.2, p.899)

Maximum: 3 g/kg

.4 PHYSICAL PROPERTIES

.4.1 Acidity or Alkalinity (MT 31.1.3, CIPAC 1, P. 904 or MT 31.2.3, p. 905) (Note 3)

Maximum acidity: 3 g/kg calculated as H_2SO_4
Maximum alkalinity: 0.5 g/kg calculated as NaOH.

.4.2 Flash point (MT 12, CIPAC 1, p.846)

If required, the flash point of the product shall not be lower than the minimum declared flash point. A closed cup method shall be used and the method stated (Note 4).

.4.3 Miscibility with hydrocarbon oil (MT 23, CIPAC 1, p.891)

If required. the product shall be miscible with the appropriate hydrocarbon oil (Note 5).

.5 STORAGE STABILITY

.5.1 Stability at 0°C (MT 39.1, CIPAC 1, p.930)

After storage at 0 +/- 1°C for 7 days, the volume of solid and/or liquid which separates shall be not more than 0.3 ml.

Note 1 If the buyer requires both g/kg and g/l at 20°C, then in case of dispute, the analytical result shall be calculated as g/kg.

Note 2 No quantitative standardized method, but a characterization method by TLC (10.a/4/M/1.3, CIPAC 1, p.578) may be used.

Note 3 These methods have not been tested on this type of formulation but may be used as a starting point for further development.

Note 4 Attention is drawn to the appropriate national and international regulations on handling and transport of flammable materials.

Note 5 The concentration should not be higher than the highest concentration recommended in the instructions for use.

PARATHION-METHYL EMULSIFIABLE CONCENTRATES
FAO Specification 10.a/EC/S (1989)

.1 DESCRIPTION

The material shall consist of technical parathion-methyl [complying with the requirements of FAO Specifications 10.a/TC/S or 10.a/TK/S (1989)] dissolved in suitable solvents with any other necessary formulants. It shall be in the form of a stable liquid free from visible suspended matter and sediment.

.2 ACTIVE INGREDIENT

.2.1 Identity tests (CIPAC 1B, 10.a/EC/(M.1)/2, p.1885 an -/(M.2)/2, p.1885) (Note 1)

Where the identity of the active ingredient is in doubt, then the isolated active ingredient shall comply with at least one additional test.

.2.2 Parathion-methyl (CIPAC 1B, 10.a/EC/(M.1)/3, p.1885 or -/(M.2)/3, p.1885) (Note 2)

The parathion-methyl content shall be declared (g/kg or g/l at 20°C, Note 3) and when determined, the content obtained shall not differ from that declared by more than the following amounts

Declared content	Permitted tolerance
up to 500 g/kg or g/l	+/- 5% of the declared content
above 500 g/kg or g/l	+/- 25 g.

.3 IMPURITIES

.3.1 S-methyl parathion*

Maximum: 1.3% of the parathion-methyl content found under .2.2

.3.2 Parathion* (Note 4)

Maximum: 0.25% of the parathion-methyl content found under .2.2

.3.3 Water (MT 30.1, CIPAC 1, p.897)

Maximum: 3 g/kg

.4 PHYSICAL PROPERTIES

.4.1 Acidity or Alkalinity (MT 31.1.3, CIPAC 1, p.904 or MT 31.2.3, p.905)

Maximum acidity: 4 g/kg calculated as H_2SO_4,
Maximum alkalinity: 1 g/kg calculated as NaOH.

.4.2 Emulsion stability and re-emulsification (MT 36.1.1, CIPAC 1, p.910)

After the heat stability test (.5.2) the product, when diluted at 30°C (Note 5) with CIPAC Standard Waters A and C, shall comply with the following:

Time after dilution	Limits of stability
0 h	Initial emulsification complete
0.5 h	'Cream', maximum: 2 ml
2.0 h	'Cream', maximum: 4 ml 'Free oil', nil
24 h (Note 6)	Re-emulsification complete
24.5 h (Note 6)	'Cream', maximum: 4 ml 'Free oil', maximum: 0.5 ml

In special cases, a test using CIPAC Standard Waters A and before the heat stability test may be necessary.

Alternatively if the buyer requires other CIPAC Standard Water to be used, then this shall be specified when ordering.

.4.3 Flash point (MT 12, CIPAC 1, p.846)

If required, the flash point of the product shall not be low than the minimum declared flash point. A closed cup method shall used and the method stated (Note 7).

.5 STORAGE STABILITY

.5.1 Stability at 0°C (MT 39.1, CIPAC 1, p.930) (Note 8)

After storage at 0 +/- 1°C for 7 days, the volume of solid and liquid which separates shall not be more than 0.3 ml.

.5.2 Stability at 54 C (MT 46.1.3, CIPAC 1, p.952)

After storage at 54 +/- 2°C for 14 days, the product shall continue to comply with .2.2 (except that the minimum permitted parathion methyl content shall be 97.5% of that found under .2.2, .3.1 (except that the maximum permitted S-methyl parathion content shall be 3% the parathion-methyl content found under .2.2 and .4.1.

Note 1 Alternatively, the method 10.a/5/M/1.4, CIPAC 1, p.580 may be used.

Note 2 Alternatively, the method 10.a/5/M/1.3, CIPAC 1, p.579 may be used.

Note 3 If the buyer requires both g/kg and g/l at 20°C, then in case of dispute, the analytical results shall be calculated as g/kg.

Note 4 No quantitative standardized method, but a characterization method by TLC (10.a/5/M41.4, CIPAC 1, p.580) may be used.

Note 5 Unless another temperature is specified.

Note 6 These tests need only be carried out in case of doubt as to the emulsion stability result of the 2 hour test.

Note 7 Attention is drawn to the appropriate national and international regulations on handling and transport of flammable materials.

Note 8 In cold climates it may be necessary to specify a lower temperature.

Products containing more than 400 g/kg should be tested at + 5 C. If such products have been stored below this temperature, they will need to be homogenized by stirring before use.