SRI LANKA STANDARD 466 : PART 17 : 1983
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SPECIFICATION FOR
PLANT PROTECTION PRODUCTS
PART 17–2, 4-D

BUREAU OF CEYLON STANDARDS

SPECIFICATION FOR PLANT PROTECTION PRODUCTS

PART 17 : 2,4 - D

SLS 466:Part 17:1983

Gr.8

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Sri Lanka Standards are subject to periodical revision in order to accommodate the progress made by industry. Suggestions for improvement will be recorded and brought to the notice of the Committees to which the revisions are entrusted.

This standard does not purport to include all the necessary provisions of a contract.

SRI LANKA STANDARD

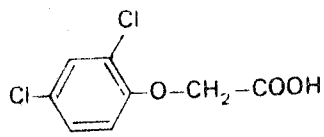
SPECIFICATION FOR PLANT PROTECTION PRODUCTS

PART 17 : 2,4 - D

FOREWORD

This Sri Lanka Standard was authorized for adoption and publication by the Council of the Bureau of Ceylon Standards on 1983-11-29, after the draft, finalized by the Drafting Committee on Pesticides, had been approved by the Agricultural and Food Products Divisional Committee.

2, 4-D is the common name accepted by the International Organization for Standardization (ISO) for 2,4-dichlorophenoxyacetic acid. The structural formula is



$C_8H_6Cl_2O_3$

This specification is based on the FAO specification on 2,4-D.

Methods of analysis and miscellaneous techniques referred to in this part have been developed and adopted by Collaborative International Pesticides Analytical Council Limited (CIPAC) and are found in CIPAC handbook vol. 1 (1970) and vol.1A (1980).

Information on standard waters for laboratory evaluation of pesticidal formulations will be found in *CIPAC Monograph 1, Standard Waters and an FAO Survey of naturally occurring waters (1972)*, W. Heffer and Sons Limited Cambridge, United Kingdom.

Wherever possible, standards for apparatus and common names for pesticides are those approved by the ISO.

All standard values given in this part are in SI units.

This specification is subject to the provisions of the *Control of Pesticides Act No. 33 of 1980* and regulations framed thereunder.

Other essential background information could be obtained from *Manual on the use of FAO Specification for Plant Protection Products.*

1 SCOPE

This part prescribes requirements and methods of sampling and test for 2,4-D technical, 2,4-D sodium salt technical, 2,4-D sodium salt water soluble powders, 2,4-D technical esters, 2,4-D ester emulsifiable concentrates and 2,4-D amine aqueous salt solutions.

2 REFERENCES

SLS 592 Methods for sampling of pesticidal products

SLS ... Code of practice for packaging of pesticides.

SECTION 1 - 2,4-D TECHNICAL

3 DESCRIPTION

This section refers to technical grades of 2,4-D which are white to slightly brown crystalline powders or wet cakes and possess not more than a slight odour.

4 ACTIVE INGREDIENT

4.1 Extractable acids *(CIPAC 1, p.241, Method 1/1/M/1.2)*

4.1.1 *Minimum content*

Minimum : 88.0 per cent.

4.1.2 *Declared content*

The extractable acid content, expressed as 2,4-D, shall be declared and, when determined, the percentage obtained shall not differ from that declared by more than ± 2 percentage units.

4.2 Equivalent mass of extractable acids *(CIPAC 1, p.243, Method 1/1/M/1.3)*

Minimum : 220.

Maximum : 224.

4.3 Melting point of extractable acids *(CIPAC 1, p.244 Method 1/1/M/1.4)*

Minimum : 137 °C.

Maximum : 141 °C.

The melting point shall not be depressed by admixture with an equal quantity of pure 2,4-D.

5 IMPURITIES

5.1 Free phenols *(CIPAC 1, p.244, Method 1/1/M/1.6)*

Maximum : 1 per cent, expressed as 2,4-dichlorophenol (see Note 1), of the acid content declared under 4.1.2 (see Note 2).

5.2 Solubility in triethanolamine *(CIPAC 1, p.245, Method 1/1/M/1.9)*

A triethanolamine solution of the material shall not leave more than 0.1 per cent residue on a 150-µm test sieve, and the sieved solution shall be clear and free from sediment.

5.3 Sulphated ash *(CIPAC 1, p.245, Method 1/1/M/1.8)*

Maximum : 1 per cent of the acid content declared under 4.1.2 (see Note 2).

5.4 Water *(CIPAC 1, p.244, Method 1/1/M/1.7)*

The water content shall be declared and, when determined shall be not more than 12 per cent.

6 PACKAGING

The containers shall comply with the requirements stipulated in SLS....

7 MARKING

The marking on the containers shall be in accordance with the *Control of Pesticides Act. No. 33 of 1980* and regulations framed thereunder.

SECTION 2 - 2,4-D SODIUM SALT TECHNICAL

8 DESCRIPTION

This section refers to technical grades of 2,4-D sodium salt monohydrate, which are white to pale brown, crystalline powders or wet cakes and possess not more than slight odour.

9 ACTIVE INGREDIENT

9.1 Extractable acids *(CIPAC 1, p.245, Method 1.1 Na/1/M/1.2)*

9.1.1 *Minimum content*

Minimum : 55.0 per cent.

9.1.2 *Declared content*

The extractable acid content, expressed as 2,4-D shall be declared and when determined, the percentage obtained shall not differ from that declared by more than ± 2 percentage units.

9.2 Equivalent mass of extractable acids *(CIPAC 1, p.247, Method 1.1 Na/1/M/1.3).*

Minimum : 220

Maximum : 224

9.3 Melting point of extractable acids *(CIPAC 1, p.248, Method 1.1 Na/1/M/1.4)*

Minimum : 137 °C

Maximum : 141 °C.

The melting point shall not be depressed by admixture with an equal quantity of pure 2,4-D.

10 IMPURITIES

10.1 Free phenols *(CIPAC 1, p.248, Method 1.1 Na/1/M/1.5)*

Maximum : 1 per cent expressed as 2,4-dichlorophenol (see Note 1), of the acid content declared under **9.1.2** (see Note 3).

10.2 Water *(CIPAC 1, p.249, Method 1.1 Na/1/M/1.6)*

The water content shall be declared (see Note 4) and, when determined shall be not more than 25 per cent.

10.3 Material insoluble in water *(CIPAC 1, p.249, Method 1.1 Na/1/M/1.7)*

A solution of the product shall pass completely through a 250-µm test sieve; not more than 0.1 per cent shall retain on a 150-µm test sieve; and the sieved solution shall be clear or opalescent and free from sediment.

11 PHYSICAL PROPERTIES

11.1 Rate of solution *(CIPAC 1, p.249, Method 1.1 Na/1/M/1.8)*

All the product, other than the insoluble material found under **10.3** shall dissolve in 5 minutes in distilled water, and the solution, after standing for 18 hours, shall not have more than a trace of additional sediment.

12 PACKAGING

The containers shall comply with the requirements stipulated in SLS ....

13 MARKING

The marking on the containers shall be in accordance with the *Control of Pesticides Act No. 33 of 1980* and regulations framed thereunder.

SECTION 3 - 2,4-D SODIUM SALT WATER SOLUBLE POWDERS

14 DESCRIPTION

This section refers to solid products containing technical 2,4-D sodium salt as the only active ingredient, together with any necessary formulants for use in sprays.

It shall be formulated from 2,4-D sodium salt complying with the specification for *2,4-D Sodium Salt Technical* (see section 2).

15 ACTIVE INGREDIENT

15.1 Extractable acids *(CIPAC 1, p.245, Method 1.1 Na/1/M/1.2)*

The extractable acid content, expressed as 2,4-D, shall be declared and when determined, the results obtained shall be within ± 3 per cent of the declared content.

15.2 Equivalent mass of extractable acids *(CIPAC 1, p.247, Method 1.1 Na/1/M/1.3)*

Minimum : 220

Maximum : 224.

15.3 Melting point of extractable acids *(CIPAC 1, p.248, Method 1.1 Na/1/M/1.4)*

Minimum : 137 °C

Maximum : 141 °C

The melting point shall not be depressed by admixture with an equal quantity of pure 2,4-D.

16 IMPURITIES

16.1 Free phenols *(CIPAC 1, p.258, Method 1.1 Na/1/M/1.5)*

Maximum : 1 per cent expressed as 2,4-dichlorophenol (see Note 1), of the acid content declared under 15.1 (see Note 5).

16.2 Material insoluble in water *(CIPAC 1, p.249, Method 1.1 Na/1/M/1.7)*

When the product is dissolved in water, any insoluble material shall pass completely through a 250-µm test sieve, not more than 0.1 per cent shall remain on a 150-µm test sieve, and the sieved solution shall be clear or opalescent and free from sediment.

17 PHYSICAL PROPERTIES

17.1 Rate of solution *(CIPAC 1, p.249, Method 1.1 Na/1/M/1.8)*

All the product, other than the insoluble matter found under **16.2**, shall dissolve in 5 minutes, in CIPAC Standard water D at 20 ± 1 °C and the resulting solution after standing for 18 hours shall contain not more than a trace of additional sediment.

18 PACKAGING

The containers shall comply with the requirements stipulated in SLS ....

19 MARKING

The marking on the containers shall be in accordance with the *Control of Pesticides Act No. 33 of 1980* and regulations framed thereunder.

SECTION 4 - 2,4-D TECHNICAL ESTERS

20 DESCRIPTION

This section refers to grades of 2,4-D esters which shall be free from visible water and suspended matter.

21 ACTIVE INGREDIENTS

21.1 Esters

The 2,4-D ester(s) present shall be named, that is :*R* shall be identified.

21.2 Extractable acids *(CIPAC 1, p.249, Method 1.3/1/M/1.2)*

The extractable acid content (per cent m/m) shall be declared and, when determined, the result obtained shall not differ from that declared by more than ± 4 per cent (see Note 6).

21.3 Equivalent mass of extractable acids *(CIPAC 1, p.254, Method 1.3/1/M/1.3)*.

Minimum : 219

Maximum : 225.

21.4 Melting point of extractable acids *(CIPAC 1, p.255, Method 1.3/1/M/1.4)*

Minimum : 135 °C

Maximum : 141 °C.

The melting point shall not be depressed by admixture with an equal quantity of pure 2,4-D.

22 IMPURITIES

22.1 Free acidity *(CIPAC 1, p.255, Method 1.3/1/M/1.5)*.

Maximum : 3 per cent expressed as 2,4-D of the acid content declared under 21.2.

22.2 Suspended solids *(CIPAC 1, p.255, Method 1.3/1/M/1.7)*

Maximum : 0.1 per cent m/m.

22.3 Water *(CIPAC 1, p.255, Method 1.3/1/M/1.6)*

No visible water shall be present.

23 PACKAGING

The containers shall comply with the requirements stipulated in SLS...

24 MARKING

The marking on the containers shall be in accordance with the *Control of Pesticides Act No. 33 of 1980* and regulation framed thereunder.

SECTION 5 - 2,4-D ESTER EMULSIFIABLE CONCENTRATES

25 DESCRIPTION

The product shall consist of an emulsifiable concentrate based on technical 2,4-D ester(s) as the only active ingredient(s), together with suitable solvents and any necessary formulants. It shall be free from visible suspended matter and sediment.

It shall be formulated from 2,4-D esters complying with the specification for *2,4-D Technical Esters* (section 4).

26 ACTIVE INGREDIENT

26.1 Esters

The name(s) of the 2,4-D ester(s) shall be declared (see Note 7).

26.2 Extractable acids *(CIPAC 1, p.249, Method 1.3/5/M/1.2 or CIPAC 1A, p.1194, Method 1.3/5/M/1.3;* see Note 8).

The extractable acid content (per cent m/m **and/or** g/l at 20 °C), expressed as 2,4-D, shall be declared and, when determined (see Note 9) the content obtained shall not differ from that declared by more than the following amounts;

Declared content	Permitted tolerance
Up to 60 per cent m/m	± 6 per cent of the declared content
Above 60 per cent m/m	± 3.6 percentage units.

26.3 Equivalent mass of extracted acids *(CIPAC 1, p.259, Method 1.3/5/M/1.4)*

Minimum : 219

Maximum : 225

26.4 Melting point of extracted acids *(CIPAC 1, p.260, Method 1.3/5/M/1.4)*

Minimum : 135 °C

Maximum : 141 °C.

The melting point shall not be depressed by admixture with an equal quantity of pure 2,4-D.

27 IMPURITIES

27.1 Free acidity (see Note 10).

Maximum : 3 per cent, expressed as 2,4-D of the acid content found under **26.2.**

27.2. Material insoluble in oil *(CIPAC 1, p.260, Method 1.3/5/M/1.7)*

The product shall give a clear, or opalescent, homogeneous solution, which shall pass completely through a 150-µm test sieve.

27.3 Water *(CIPAC 1, p.260, Method 1.3/5/M/1.6)*

Maximum : 0.5 per cent.

28. PHYSICAL PROPERTIES

28.1 Emulsion stability *(CIPAC 1, p.260, Method 1.3/5/M/1.11)*

After the heat stability test (29.2), the product, when diluted at 30 °C (see Note 11) with the specified CIPAC Standard Waters, shall comply with the following :

Time after dilution (h)	Limits of stability
0	Initial emulsifiability : complete
0.5	Cream : maximum 2 ml
2.0	Cream : maximum 4 ml Free oil : nil
24.0	Re-emulsification : complete
24.5	Cream : maximum 4 ml Free oil : maximum 0.5 ml

The product shall be tested in Standard Water A and in Standard Water D (see Note 12) after the heat stability test.

***28.2 Flash point** *(CIPAC 1, p.260, Method 1.3/5/M/1.9)*

The flash point of the product shall be not lower than the minimum declared flash point. The method used for the determination of flash point shall be stated. (e.g. Abel method) (see Note 13).

28.3 Volatility *(CIPAC 1, p.260, Method 1.3/5/M/1.8)*

It shall be stated whether the *volatility* of the product is high or low.

**For information.*

29 STORAGE STABILITY

29.1 Low temperature stability *(CIPAC 1, p.260, Method 1.3/5/M/1.10)*

After storage at 0 °C (see Note 14) for 7 days, the volume of solid and/or liquid which separates shall be not more than 0.3 per cent.

29.2 Heat stability *(CIPAC 1, p.260, Method 1.3/5/M/1.11)*

After storage at 54 ± 2 °C for 14 days, the concentrate shall continue to comply with **26.2**, **27.1**, **27.2**, **28.1**, **28.3** and **29.1**.

30 PACKAGING

The containers shall comply with the requirements stipulated in SLS...

31 MARKING

The marking on the containers shall be in accordance with the *Control of Pesticides Act No. 33 of 1980* and regulations framed thereunder.

SECTION 6 - 2,4-D AMINE AQUEOUS SALT SOLUTIONS

32 DESCRIPTION

The product shall consist of an aqueous solution based on 2,4-D amine(s) as the only active ingredient(s), together with any necessary formulants. It shall be free from visible suspended matter and sediment.

It shall be formulated with amine made from 2,4-D and complying with the specification for *2,4-D Technical* (section 1).

33 ACTIVE INGREDIENT

33.1 Amine salts

The 2,4-D amines present shall be named.

33.2 Extractable acids *(CIPAC 1, p.261, Method 1.4/13/M/1.3)*

The extractable acid content (per cent m/m and/or g/l at 20 °C), expressed as 2,4-D, shall be declared and when determined, the content obtained shall not differ from that declared by more than the following amounts:

Declared content	Permitted tolerance
Up to 50 per cent m/m or 500 g/l	± 5 per cent of the declared content
Above 50 per cent m/m or 500 g/l	± 2.5 percentage units or ± 25 g/l

33.3 Equivalent mass of extractable acids *(CIPAC 1, p.264, Method 1.4/13/M/1.4)*

Minimum : 220

Maximum : 224.

33.4 Melting point of extractable acids *(CIPAC 1, p.265, Method 1.4/13/M/1.5)*

Minimum : 137 °C

Maximum : 141 °C.

The melting point shall not be depressed by admixture with an equal quantity of pure 2,4-D.

34 IMPURITIES

34.1 Free phenols *(CIPAC 1, p.266, Method 1.4/13/M/1.7)*

Maximum : 1 per cent expressed as 2,4-dichlorophenol (see Note 1), of the acid content declared under 33.2 (see Note 15).

34.2 Material insoluble in water *(CIPAC 1, p.266, Method 1.4/13/M/1.8)*

All the insoluble material shall pass through a 250-µm test sieve and not more than 0.1 per cent shall remain on a 150-µm test sieve.

35 PHYSICAL PROPERTIES

Stability on dilution *(CIPAC 1, p.266, Method 1.4/13/M/1.10)*

The product shall give a clear or opalescent solution, i.e. free from sediment and/or visible solid particles.

36 STORAGE STABILITY

Low temperature stability *(CIPAC 1, p.266, Method 1.4/13/M/1.9)*

After storage at 0 °C (see Note 14) for 7 days, there shall be no separation of material.

37 PACKAGING

The containers shall comply with the requirements stipulated in SLS .... .

38 MARKING

The marking on the containers shall be in accordance with the *Control of Pesticides Act No. 33 of 1980* and regulations framed thereunder.

SECTION 7 - SAMPLING AND CONFORMITY TO STANDARD

39 SAMPLING

39.1 Representative samples of the material for ascertaining conformity to the requirements of this specification shall be drawn as prescribed in SLS 592.

39.2 Minimum sizes of composite samples to be drawn shall be as follows:

a) 2,4-D technical - at least 600 g;

b) 2,4-D sodium salt technical - containing 450 g of 2,4-D;

c) 2,4-D sodium salt water soluble powders - containing at least 450 g of 2,4-D;

d) 2,4-D technical esters - at least 600 g;

e) 2,4-D ester emulsifiable concentrates - containing at least 1 500 g of 2,4-D ester(s); and

f) 2,4-D amine aqueous salt solutions - containing at least 600 g of amine salts.

40 CONFORMITY TO STANDARD

A lot shall be declared as conforming to the requirements of this specification, if the following conditions are satisfied:

40.1 All containers selected as in **39.1** conform to the packaging and marking requirements.

40.2 The composite sample drawn as in **39.2** when tested, satisfies the requirements given in the relevant section.

NOTES

1 The chlorophenol content is limited to avoid possible taint of neighbouring crops and foodstuffs.

2 On a declared content of 90 per cent, the maximum permitted free phenol content would be 0.9 per cent of the product.

3 On a declared content of 65 per cent, the maximum permitted phenol content would be 0.65 per cent of the product.

4 This shall also include water of hydration.

5 On a declared content of 60 per cent, the maximum permitted free phenol content would be 0.6 per cent of the product.

6 The method of analysis is suitable for the majority of 2,4-D technical esters. However, the butoxyethanol ester has been known to give erratic results, in which case the purchaser and supplier should verify that the method is suitable.

7 For products based on mixed esters, the approximate percentage of each ester shall be declared.

8 In case of dispute, method 1.3/5/M/1.3 on CIPAC 1A, page 1194 shall be the Referee Method.

9 The methods of analysis are suitable for the majority of 2,4-D ester emulsifiable concentrates. However, the butoxyethanol ester has been known to give erratic results, in which case the purchaser and supplier should verify that the method is suitable.

10 Method of analysis not included in CIPAC 1, or 1A, but will appear in subsequent volumes of CIPAC handbook, pending such publications, a copy of the method may be obtained on request from the FAO Secretariat.

11 Unless another temperature is specified.

12 Unless other CIPAC Standard Waters are specified.

13 Attention is drawn to the appropriate national and international regulations concerning handling and transport of flammable materials.

14 A test temperature of 0 ^{o}C may not be suitable for products intended for use in cold countries and, in such cases, an alternative test temperature may be specified.

15 On a declared content of 40 per cent, the maximum permitted free phenol content would be 0.4 per cent of the product.

SLS CERTIFICATION MARK

The Sri Lanka Standards Institution is the owner of the registered certification mark shown below. Beneath the mark, the number of the Sri Lanka Standard relevant to the product is indicated. This mark may be used only by those who have obtained permits under the SLS certification marks scheme. The presence of this mark on or in relation to a product conveys the assurance that they have been produced to comply with the requirements of the relevant Sri Lanka Standard under a well designed system of quality control inspection and testing operated by the manufacturer and supervised by the SLSI *which includes surveillance inspection of the factory, testing of both factory and market samples.*

Further particulars of the terms and conditions of the permit may be obtained from the Sri *Lanka Standards Institution, 17, Victoria Place, Elvitigala Mawatha, Colombo 08.*

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SRI LANKA STANDARDS INSTITUTION

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The principal objects of the Institution as set out in the Act are to prepare standards and promote their adoption, to provide facilities for examination and testing of products, to operate a Certification Marks Scheme, to certify the quality of products meant for local consumption or exports and to promote standardization and quality control by educational, consultancy and research activity.

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In the International field the Institution represents Sri Lanka in the International Organization for Standardization (ISO), and participates in such fields of standardization as are of special interest to Sri Lanka.

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