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►B REGULATION (EC) No 2003/2003 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

of 13 October 2003

relating to fertilisers

(Text with EEA relevance)

(OJ L 304, 21.11.2003, p. 1)

Amended by:

		Official Journal		
		No	page	date
►M1	Council Regulation (EC) No 885/2004 of 26 April 2004	L 168	1	1.5.2004
►M2	Commission Regulation (EC) No 2076/2004 of 3 December 2004	L 359	25	4.12.2004
►M3	Council Regulation (EC) No 1791/2006 of 20 November 2006	L 363	1	20.12.2006
►M4	Commission Regulation (EC) No 162/2007 of 19 February 2007	L 51	7	20.2.2007
►M5	Commission Regulation (EC) No 1107/2008 of 7 November 2008	L 299	13	8.11.2008
►M6	Regulation (EC) No 219/2009 of the European Parliament and of the Council of 11 March 2009	L 87	109	31.3.2009
►M7	Commission Regulation (EC) No 1020/2009 of 28 October 2009	L 282	7	29.10.2009
►M8	Commission Regulation (EU) No 137/2011 of 16 February 2011	L 43	1	17.2.2011
►M9	Commission Regulation (EU) No 223/2012 of 14 March 2012	L 75	12	15.3.2012
►M10	Commission Regulation (EU) No 463/2013 of 17 May 2013	L 134	1	18.5.2013
►M11	Commission Regulation (EU) No 1257/2014 of 24 November 2014	L 337	53	25.11.2014
►M12	Commission Regulation (EU) 2016/1618 of 8 September 2016	L 242	24	9.9.2016
►M13	Commission Regulation (EU) 2019/1102 of 27 June 2019	L 175	25	28.6.2019
►M14	Commission Regulation (EU) 2020/1666 of 10 November 2020	L 377	3	11.11.2020
►M15	Commission Regulation (EU) 2021/862 of 28 May 2021	L 190	74	31.5.2021

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REGULATION (EC) No 2003/2003 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

of 13 October 2003

relating to fertilisers

(Text with EEA relevance)

TITLE I

GENERAL PROVISIONS

CHAPTER I

Scope and definitions

Article 1

Scope

This Regulation shall apply to products which are placed on the market as fertilisers designated ‘EC fertiliser’.

Article 2

Definitions

For the purposes of this Regulation the following definitions shall apply:

(a) ‘Fertiliser’ means material, the main function of which is to provide nutrients for plants.

(b) ‘Primary nutrient’ means the elements nitrogen, phosphorus and potassium only.

(c) ‘Secondary nutrient’ means the elements calcium, magnesium, sodium and sulphur.

(d) ‘Micro-nutrients’ means the elements boron, cobalt, copper, iron, manganese, molybdenum and zinc, essential for plant growth in quantities that are small compared with those of primary and secondary nutrients.

(e) ‘Inorganic fertiliser’ means a fertiliser in which the declared nutrients are in the form of minerals obtained by extraction or by physical and/or chemical industrial processes. Calcium cyanamide, urea and its condensation and association products, and fertilisers containing chelated or complexed micro-nutrients may, by convention, be classed as inorganic fertilisers.

(f) ‘Chelated micro-nutrient’ means a micro-nutrient that is held by one of the organic molecules listed in section E.3.1 of Annex I.

(g) ‘Complexed micro-nutrient’ means a micro-nutrient that is held by one of the molecules listed in section E.3.2 of Annex I.

(h) ‘Type of fertilisers’ means fertilisers with a common type designation as indicated in Annex I.

(i) ‘Straight fertiliser’ means a nitrogenous, phosphatic or potassic fertiliser having a declarable content of only one of the primary nutrients.

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(j) ‘Compound fertiliser’ means a fertiliser having a declarable content of at least two of the primary nutrients and obtained chemically or by blending or by a combination of both.

(k) ‘Complex fertiliser’ means a compound fertiliser, obtained by chemical reaction, by solution, or in its solid state by granulation, having a declarable content of at least two of the primary nutrients. In its solid state each granule contains all the nutrients in their declared composition.

(l) ‘Blended fertiliser’ means a fertiliser obtained by dry mixing of several fertilisers, with no chemical reaction.

(m) ‘Foliar fertiliser’ means a fertiliser suitable for application to and nutrient uptake by the foliage of a crop.

(n) ‘Fluid fertiliser’ means a fertiliser in suspension or solution.

(o) ‘Solution fertiliser’ means a fluid fertiliser that is free of solid particles.

(p) ‘Suspension fertiliser’ means a two-phase fertiliser in which solid particles are maintained in suspension in the liquid phase.

(q) ‘Declaration’ means a statement of the amount of nutrients, including their forms and solubility, guaranteed within specified tolerances.

(r) ‘Declared content’ means the content of an element, or its oxide, which, in accordance with Community legislation, is given on a label of an EC fertiliser or on the relevant accompanying document.

(s) ‘Tolerance’ means the permitted deviation of the measured value of a nutrient content from its declared value.

(t) ‘European Standard’ means CEN (European Committee for Standardisation) standards, which have been officially recognised by the Community and whose reference has been published in the *Official Journal of the European Communities*.

(u) ‘Package’ means a sealable receptacle used to hold, protect, handle, and distribute fertilisers and holding not more than 1 000 kg.

(v) ‘Bulk’ means a fertiliser not packaged as prescribed by this Regulation.

(w) ‘Placing on the market’ means the supply of fertiliser, whether in return for payment or free of charge, or storage for the purpose of supply. Importation of a fertiliser into the customs territory of the European Community shall be deemed to constitute placing on the market.

(x) ‘Manufacturer’ means the natural or legal person responsible for placing a fertiliser on the market; in particular a producer, an importer, a packager working for its own account, or any person changing the characteristics of a fertiliser, shall be deemed to be a manufacturer. However, a distributor who does not change the characteristics of the fertiliser shall not be deemed to be a manufacturer.

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CHAPTER II

Placing on the market

Article 3

EC Fertiliser

A fertiliser belonging to a type of fertilisers listed in Annex I and complying with the conditions laid down in this Regulation, may be designated ‘EC fertiliser’.

The designation ‘EC fertiliser’ shall not be used for a fertiliser which does not comply with this Regulation.

Article 4

Establishment within the Community

The manufacturer shall be established within the Community and shall be responsible for the conformity of the ‘EC fertiliser’ with the provisions of this Regulation.

Article 5

Free circulation

1. Without prejudice to Article 15 and other Community legislation, Member States shall not, on grounds of composition, identification, labelling or packaging, and other provisions contained in this Regulation, prohibit, restrict or hinder the placing on the market of fertilisers marked ‘EC fertiliser’ which comply with the provisions of this Regulation.

2. Fertilisers that are marked ‘EC fertiliser’ in accordance with this Regulation shall circulate freely within the Community.

Article 6

Compulsory statements

1. In order to satisfy the requirements of Article 9, Member States may prescribe that the indication of the nitrogen, phosphorus and potassium contents of fertilisers placed on their market is to be expressed in the following way:

(a) nitrogen solely in the elemental form (N); and either

(b) phosphorus and potassium solely in the elemental form (P, K); or

(c) phosphorus and potassium solely in the oxide form (P_2O_5, K_2O); or

(d) phosphorus and potassium in both elemental and oxide forms simultaneously.

Where the option is chosen to prescribe that the phosphorus and potassium contents be expressed in the form of elements, all references in the Annexes to the oxide form shall be read as being in elemental form and the numerical values shall be converted using the following factors:

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(a) phosphorus (P) = phosphorus pentoxide (P_2O_5) × 0,436;

(b) potassium (K) = potassium oxide (K_2O) × 0,830.

2. Member States may prescribe that the calcium, magnesium, sodium and sulphur contents of secondary nutrient fertilisers and, where the conditions of Article 17 are fulfilled, of primary nutrient fertilisers placed on their markets are to be expressed:

(a) in the oxide form (CaO, MgO, Na_2O, SO_3); or

(b) in the elemental form (Ca, Mg, Na, S); or

(c) in both of these forms.

To convert the calcium oxide, magnesium oxide, sodium oxide and sulphur trioxide contents into calcium, magnesium, sodium and sulphur contents, the following factors shall be used:

(a) calcium (Ca) = calcium oxide (CaO) × 0,715;

(b) magnesium (Mg) = magnesium oxide (MgO) × 0,603;

(c) sodium (Na) = sodium oxide (Na_2O) × 0,742;

(d) sulphur (S) = sulphur trioxide (SO_3) × 0,400.

For the calculated oxide or elemental content, the figure declared shall be rounded to the nearest decimal place.

3. Member States shall not prevent the placing on the market of an ‘EC fertiliser’ labelled in both of the forms mentioned in paragraphs 1 and 2.

4. The content of one or more of the micro-nutrients boron, cobalt, copper, iron, manganese, molybdenum, or zinc in the EC fertilisers belonging to the types of fertilisers listed in sections A, B, C and D of Annex I shall be declared where the following conditions are fulfilled:

(a) the micro-nutrients are added at least in the minimum quantities specified in section E.2.2 and E.2.3 of Annex I;

(b) the EC fertiliser continues to satisfy the requirements of sections A, B, C and D of Annex I.

5. Where the micro-nutrients are the normal ingredients of the raw materials intended to supply primary (N, P, K) and secondary (Ca, Mg, Na, S) nutrients, they may be declared, provided that these micro-nutrients are present at least in the minimum quantities specified in sections E.2.2 and E.2.3 of Annex I.

6. The micro-nutrient content shall be declared in the following manner:

(a) for fertilisers belonging to the types of fertilisers listed in section E.1 of Annex I, in accordance with the requirements set out in column 6 of that section;

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(b) for mixtures of fertilisers referred to in (a) containing at least two different micro-nutrients and meeting the requirements of section E.2.1 of Annex I and for fertilisers belonging to the types of fertilisers listed in sections A, B, C and D of Annex I, by indicating:

(i) the total content, expressed as a percentage of the fertiliser by mass,

(ii) the water-soluble content, expressed as a percentage of the fertiliser by mass, where the soluble content is at least half of the total content.

Where a micro-nutrient is totally water-soluble, only the water-soluble content shall be declared.

Where a micro-nutrient is chemically linked with an organic molecule, the content of the micro-nutrient present in the fertiliser shall be declared immediately following the water-soluble content as a percentage by mass of the product, followed by one of the terms ‘chelated by’, or ‘complexed by’, with the name of the organic molecule as set out in section E.3 of Annex I. The name of the organic molecule may be replaced by its initials.

Article 7

Identification

1. The manufacturer shall provide EC fertilisers with the identification markings listed in Article 9.

2. If the fertilisers are packed, these identification markings shall appear on the packages or labels attached. If the fertilisers are in bulk, these markings shall appear on the accompanying documents.

Article 8

Traceability

Without prejudice to Article 26(3), the manufacturer shall, to ensure traceability of EC fertilisers, maintain records of the origin of the fertilisers. These records shall be available for inspection by Member States for as long as the fertiliser is being supplied to the market, and for a further period of 2 years after the manufacturer stopped supplying it.

Article 9

Markings

1. Without prejudice to other Community rules, the packages, labels and accompanying documents, referred to in Article 7 shall bear the following markings:

(a) Compulsory identification

— The words ‘EC FERTILISER’ in capital letters;

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— Where it exists, the designation of the type of fertiliser as set out in Annex 1;

— For blended fertilisers, the marking ‘blend’ after the designation of the type;

— The additional markings specified in Article 19, 21 or 23;

— Nutrients shall be indicated both in words and by the appropriate chemical symbols, e.g. nitrogen (N), phosphorus (P), phosphorus pentoxide (P_2O_5), potassium (K), potassium oxide (K_2O), calcium (Ca), calcium oxide (CaO), magnesium (Mg), magnesium oxide (MgO), sodium (Na), sodium oxide (Na_2O), sulphur (S), sulphur trioxide (SO_3), boron (B), copper (Cu), cobalt (Co), iron (Fe), manganese (Mn), molybdenum (Mo), zinc (Zn);

— If the fertiliser contains micro-nutrients of which all or part are chemically linked with an organic molecule, the name of the micro-nutrient shall be followed by one of the following qualifiers:

(i) ‘chelated by …’ (name of chelating agent or its abbreviation as set out in section E.3.1 of Annex I);

(ii) ‘complexed by …’ (name of complexing agent as set out in section E.3.2 of Annex I);

— Micro-nutrients contained in the fertiliser, listed in the alphabetical order of their chemical symbols: B, Co, Cu, Fe, Mn, Mo, Zn;

— For products listed in sections E.1 and E.2 of Annex I, the specific directions for use;

— Quantities of fluid fertilisers, expressed by mass. The expression of quantities of fluid fertilisers by volume or in terms of mass versus volume (kilograms per hectolitre or grams per litre) shall be optional;

— Net or gross mass and, optionally, volume for fluid fertilisers. If the gross mass is given, the tare mass must be indicated beside it;

— The name or trade name and the address of the manufacturer.

(b) Optional identification

— As listed in Annex I;

— The directions for the storage and handling, and for fertilisers not listed in Annex I, sections E.1 and E.2, the specific directions for the use of the fertiliser;

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— Indications of the dose rates and conditions of use suitable for the soil and crop conditions under which the fertiliser is used;

— The mark of the manufacturer and the trade description of the product.

The indications referred to in (b) must not conflict with those referred to in (a) and must be clearly separated from them.

2. All the markings referred to in paragraph 1 must be clearly separated from any other information on the packages, labels and accompanying documents.

3. Fluid fertilisers may be placed on the market only if the manufacturer provides suitable additional instructions covering, in particular, storage temperature and prevention of accidents during storage.

4. Detailed rules for the application of this Article shall be adopted under the procedure referred to in Article 32(2).

Article 10

Labelling

1. The labels or markings printed on the package and giving the particulars mentioned under Article 9 must be placed in a conspicuous position. Labels must be attached to the package or to whatever system is used for closing it. If this system consists of a seal, that seal must bear the name or mark of the packager.

2. The markings referred to in paragraph 1 must be and must remain indelible and clearly legible.

3. In the cases of fertilisers in bulk referred to in the second sentence of Article 7(2) a copy of the documents containing the identification markings must accompany the goods and be accessible for inspection purposes.

Article 11

Languages

The label, the markings on the package and the accompanying documents must appear in at least the national language or languages of the Member State in which the EC fertiliser is marketed.

Article 12

Packaging

In the case of packaged EC fertilisers, the package must be closed in such a way or by such a device that, when it is opened, the fastening, fastening seal or the package itself is irreparably damaged. Valve sacks may be used.

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Article 13

Tolerances

1. The nutrient content of EC fertilisers shall comply with the tolerances established in Annex II, which are intended to allow for deviations in manufacture, sampling and analysis.

2. The manufacturer shall not take systematic advantage of the tolerances given in Annex II.

3. No tolerances are allowed in respect of the minimum and maximum contents specified in Annex I.

Article 14

Fertiliser requirements

A type of fertiliser may only be included in Annex I if:

(a) it provides nutrients in an effective manner;

(b) relevant sampling, analysis, and if required, test methods are being provided;

(c) under normal conditions of use it does not adversely affect human, animal, or plant health, or the environment.

Article 15

Safeguard clause

1. Where a Member State has justifiable grounds for believing that a specific EC fertiliser, although satisfying the requirements of this Regulation, constitutes a risk to safety or health of humans, animals or plants or a risk to the environment, it may temporarily prohibit the placing on the market of that fertiliser in its territory or make it subject to special conditions. It shall immediately inform the other Member States and the Commission thereof, giving the reasons for its decision.

2. The Commission shall adopt a decision on the matter within 90 days from the receipt of the information in accordance with the procedure referred to in Article 32(2).

3. The provisions of this Regulation shall not preclude the taking of measures by the Commission or by a Member State which are justified on grounds of public security to prohibit, restrict or hinder the placing on the market of EC fertilisers.

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TITLE II

PROVISIONS FOR SPECIFIC TYPES OF FERTILISERS

CHAPTER I

Inorganic primary nutrient fertilisers

Article 16

Scope

This chapter shall apply to inorganic primary nutrient fertilisers, solid or fluid, straight or compound, including those containing secondary nutrients and/or micro-nutrients, with the minimum nutrient content established in sections A, B, C, E.2.2 or E.2.3 of Annex I.

Article 17

Declaration of secondary nutrients in primary nutrient fertilisers

Calcium, magnesium, sodium and sulphur content may be declared as secondary nutrient content of EC fertilisers belonging to the types of fertiliser listed in sections A, B and C of Annex I, provided that these elements are present in at least the following minimum quantities:

(a) 2 % calcium oxide (CaO), i.e. 1,4 % Ca;

(b) 2 % of magnesium oxide (MgO), i.e. 1,2 % Mg;

(c) 3 % of sodium oxide (Na_2O), i.e. 2,2 % Na;

(d) 5 % of sulphur trioxide (SO_3), i.e. 2 % S.

In such a case, the additional marking specified in Article 19(2)(ii) shall be added to the type designation.

Article 18

Calcium, magnesium, sodium and sulphur

1. The declaration of the magnesium, sodium and sulphur content of the fertilisers listed in sections A, B, and C of Annex I shall be expressed in one of the following ways:

(a) the total content expressed as a percentage of the fertiliser by mass;

(b) the total content and the content soluble in water, expressed as a percentage of the fertiliser by mass where the soluble content is at least a quarter of the total content;

(c) where an element is totally soluble in water, only the content soluble in water shall be declared as a percentage of the mass.

2. Unless otherwise stated in Annex I, a declaration of the calcium content shall only be made if it is soluble in water and shall be expressed as a percentage of the fertiliser by mass.

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Article 19

Identification

1. In addition to the compulsory identification markings referred to in Article 9(1)(a), the markings set out in paragraphs 2, 3, 4, 5 and 6 of this Article shall be stated.

2. The following shall be stated after the type designation of compound fertilisers:

(i) The chemical symbols of the declared secondary nutrients, between brackets and after the symbols of the primary nutrients.

(ii) Numbers indicating the primary nutrient content. The declared secondary nutrient content shall be indicated between brackets after the primary nutrient content.

3. The fertiliser type designation shall only be followed by figures indicating primary and secondary nutrient content.

4. Where micro-nutrients are declared, the words ‘with micro-nutrients’ or the word ‘with’ followed by the name or names and chemical symbols of the micro-nutrients present shall be given.

5. The declared content of primary nutrients and secondary nutrients shall be given as a percentage by mass, as whole numbers or, where necessary, where an appropriate method of analysis exists, to one decimal place.

In fertilisers containing more than one declared nutrient, the order shall be for primary nutrients: N, P_2O_5 and/or P, K_2O and/or K, and for secondary nutrients: CaO and/or Ca, MgO and/or Mg, Na_2O and/or Na, SO_3 and/or S.

The declared content of micro-nutrients shall give the name and symbol of each micro-nutrient, indicating the percentage by mass as specified in sections E.2.2 and E.2.3 of Annex I and according to solubility.

6. The forms and solubility of the nutrients shall also be expressed as a percentage by mass of fertiliser, except where Annex I explicitly provides that this content shall be otherwise expressed.

The number of decimal places shall be one, except for micro-nutrients where it shall be as specified in sections E.2.2 and E.2.3 of Annex I.

CHAPTER II

Inorganic secondary nutrient fertilisers

Article 20

Scope

This chapter shall apply to inorganic secondary nutrient fertilisers, solid or fluid, including those containing micro-nutrients, with the minimum nutrient content established in sections D, E.2.2, and E.2.3 of Annex I.

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Article 21

Identification

1. In addition to the compulsory identification markings referred to in Article 9(1)(a), the markings set out in paragraphs 2, 3, 4 and 5 of this Article shall be stated.

2. Where micro-nutrients are declared, the words ‘with micro-nutrients’ or the word ‘with’, followed by the name or names and chemical symbols of the micro-nutrients present, shall be given.

3. The declared content of secondary nutrients shall be given as a percentage by mass, as whole numbers or, where necessary, where an appropriate method of analysis exists, to one decimal place.

Where more than one secondary nutrient is present, the order shall be:

CaO and/or Ca, MgO and/or Mg, Na_2O and/or Na, SO_3 and/or S.

The declared content of micro-nutrients shall give the name and symbol of each micro-nutrient, indicating the percentage by mass as specified in sections E.2.2 and E.2.3 of Annex I and according to solubility.

4. The forms and solubility of the nutrients shall also be expressed as a percentage by mass of fertiliser, except where Annex I explicitly provides that this content shall be otherwise expressed.

The number of decimal places shall be one, except for micro-nutrients where it shall be as specified in sections E.2.2 and E.2.3 of Annex I.

5. Unless otherwise stated in Annex I, a declaration of the calcium content shall only be made if it is soluble in water and shall be expressed as a percentage of the fertiliser by mass.

CHAPTER III

Inorganic micro-nutrient fertilisers

Article 22

Scope

This chapter shall apply to inorganic micro-nutrient fertilisers, solid or fluid, with the minimum nutrient content established in sections E.1 and E.2.1 of Annex I.

Article 23

Identification

1. In addition to the compulsory identification markings referred to in Article 9(1)(a) the markings set out in paragraphs 2, 3, 4 and 5 of this Article shall be stated.

2. Where the fertiliser contains more than one micro-nutrient, the type designation ‘mixture of micro-nutrients’ followed by the names of the micro-nutrients present and their chemical symbols, shall be given.

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3. For fertilisers containing only one micro-nutrient (section E.1 of Annex I), the declared micro-nutrient content shall be given as a percentage by mass, in whole numbers or, where necessary, to one decimal place.

4. The forms and solubility of micro-nutrients shall be expressed as a percentage by mass of fertiliser, except where Annex I explicitly provides that this content shall be otherwise expressed.

The number of decimal places for micro-nutrients shall be as specified in section E.2.1 of Annex I.

5. Below the compulsory or optional declarations the following shall be entered on the label and accompanying documents with regard to the products appearing in sections E.1 and E.2.1 of Annex I:

'To be used only where there is a recognised need. Do not exceed the appropriate dose rates.'

Article 24

Packaging

EC fertilisers covered by the provisions of this chapter shall be packaged.

CHAPTER IV

Ammonium nitrate fertilisers of high nitrogen content

Article 25

Scope

For the purpose of this chapter, ammonium nitrate fertilisers of high nitrogen content, straight or compound, are ammonium nitrate based products manufactured for use as fertilisers and containing more than 28 % by mass of nitrogen in relation to ammonium nitrate.

This type of fertiliser may contain inorganic or inert substances.

The substances used in the manufacturing of this type of fertiliser must not increase its sensitivity to heat or its tendency to detonate.

Article 26

Safety measures and controls

1. The manufacturer shall ensure that straight ammonium nitrate fertilisers of high nitrogen content comply with the provisions of section 1 of Annex III.

2. The checking, analysis and testing for official controls of straight ammonium nitrate fertilisers of high nitrogen content provided for by this chapter shall be carried out in accordance with the methods described in section 3 of Annex III.

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3. To ensure the traceability of ammonium nitrate EC fertilisers of high nitrogen content placed on the market, the manufacturer shall maintain records of the names and addresses of the sites, and of the operators of the sites, at which the fertiliser and its principal components were produced. These records shall be available for inspection by Member States for as long as the fertiliser is being supplied to the market, and for a further period of 2 years after the manufacturer stopped supplying it.

Article 27

Test of resistance to detonation

Without prejudice to the measures referred to in Article 26, the manufacturer shall ensure that each type of EC high nitrogen content ammonium nitrate fertiliser placed on the market has passed the test of resistance to detonation described in sections 2, 3 (method 1, point 3) and 4 of Annex III of this Regulation. This test shall be carried out by one of the approved laboratories referred to in Article 30(1) or 33(1). Manufacturers shall submit the results of the test to the competent authority of the Member State concerned at least 5 days before placing the fertiliser on the market, or at least 5 days before the arrival of the fertiliser at the borders of the European Community in the case of imports. Thereafter, the manufacturer shall continue to guarantee that all supplies of the fertiliser placed on the market are capable of passing the abovementioned test.

Article 28

Packaging

Ammonium nitrate fertilisers of high nitrogen content shall be made available to the final user only in packaged form.

TITLE III

CONFORMITY ASSESSMENT OF FERTILISERS

Article 29

Control measures

1. Member States may subject fertilisers marked ‘EC fertiliser’ to official control measures for the purpose of verifying that they comply with this Regulation.

Member States may charge fees not exceeding the cost of tests needed for such control measures, but this shall not oblige manufacturers to repeat tests or to pay for repeated tests where the first test was made by a laboratory which fulfilled the conditions of Article 30 and where the test showed compliance of the fertiliser in question.

2. Member States shall ensure that sampling and analysis for official controls of EC fertilisers belonging to types of fertilisers listed in Annex I are carried out in accordance with the methods described in Annex III and IV.

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3. Compliance with this Regulation in respect of conformity to types of fertiliser and compliance with the declared nutrient content and/or the declared content expressed as forms and solubilities of such nutrients may be verified at official inspections only by means of sampling and analysis methods established in accordance with Annex III and IV and taking into account the tolerances specified in Annex II.

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4. The Commission shall adapt and modernise the measuring, sampling and analysis methods and shall, wherever possible, use European Standards. Those measures, designed to amend non-essential elements of this Regulation, shall be adopted in accordance with the regulatory procedure with scrutiny referred to in Article 32(3). The same procedure shall apply to the adoption of implementing rules needed to specify the control measures provided for in this Article and in Articles 8, 26 and 27. Such rules shall in particular address the question of the frequency with which tests need to be repeated, as well as measures that are designed to ensure that the fertiliser put on the market is identical with the fertiliser tested.

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Article 30

Laboratories

1. Member States shall notify to the Commission the list of those approved laboratories on their territories that are competent to provide the necessary services for checking compliance of EC fertilisers with the requirements of this Regulation. Such laboratories must meet the standards mentioned in section B of Annex V. Such notification shall be made by 11 June 2004 and on the occasion of each subsequent modification.

2. The Commission shall publish the list of approved laboratories in the *Official Journal of the European Union*.

3. Where a Member State has justifiable grounds for believing that an approved laboratory does not meet the standards referred to in paragraph 1, it shall raise this matter in the committee referred to in Article 32. If the committee agrees that the laboratory does not meet the standards, the Commission shall remove the name from the list referred to in paragraph 2.

4. The Commission shall adopt a decision on the matter within 90 days from the receipt of the information in accordance with the procedure referred to in Article 32(2).

5. The Commission shall publish the amended list in the *Official Journal of the European Union*.

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TITLE IV

FINAL PROVISIONS

CHAPTER I

Adaptation of the Annexes

Article 31

New EC fertilisers

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1. The Commission shall adapt Annex I to include new types of fertilisers.

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2. A manufacturer or its representative which wishes to propose a new type of fertiliser for inclusion in Annex I and is required to compile a technical file for that purpose shall do so by taking into account the technical documents referred to in section A of Annex V.

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3. The Commission shall adapt the Annexes to take account of technical progress.

4. The measures referred to in paragraphs 1 and 3, designed to amend non-essential elements of this Regulation, shall be adopted in accordance with the regulatory procedure with scrutiny referred to in Article 32(3).

Article 32

Committee procedure

1. The Commission shall be assisted by a Committee.

2. Where reference is made to this paragraph, Articles 5 and 7 of Decision 1999/468/EC shall apply, having regard to the provisions of Article 8 thereof.

The period laid down in Article 5(6) of Decision 1999/468/EC shall be set at three months.

3. Where reference is made to this paragraph, Article 5a(1) to (4) and Article 7 of Decision 1999/468/EC shall apply, having regard to the provisions of Article 8 thereof.

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CHAPTER II

Transitional provisions

Article 33

Competent laboratories

1. Without prejudice to the provisions of Article 30(1), Member States may for a transitional period until 11 December 2007 continue to apply their national provisions for authorising competent laboratories to provide the necessary services for checking compliance of EC fertilisers with the requirements of this Regulation.

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2. Member States shall notify the list of these laboratories to the Commission, giving details of their authorisation scheme. Such notification shall be made by 11 June 2004 and on the occasion of each subsequent modification.

Article 34

Packaging and labelling

Notwithstanding Article 35(1), EC fertiliser markings, packagings, labels and accompanying documents provided for by earlier Directives may continue to be used until 11 June 2005.

CHAPTER III

Final provisions

Article 35

Repealed Directives

1. Directives 76/116/EEC, 77/535/EEC, 80/876/EEC and 87/94/EEC are hereby repealed.

2. References to the Directives repealed shall be construed as references to this Regulation. In particular, derogations from Article 7 of Directive 76/116/EEC that were granted by the Commission under Article 95(6) of the Treaty shall be construed as derogations from Article 5 of the present Regulation and shall continue to produce their effects notwithstanding the entry into force of this Regulation. Pending the adoption of penalties under Article 36, Member States may continue to apply penalties for infringements of national rules implementing the Directives mentioned in paragraph 1.

Article 36

Penalties

The Member States shall lay down the rules on penalties applicable to infringements of the provisions of this Regulation and shall take all measures necessary to ensure that they are implemented. The penalties provided for must be effective, proportionate and dissuasive.

Article 37

National provisions

The Member States shall notify the Commission by 11 June 2005 of any national provisions adopted pursuant to Articles 6(1), 6(2), 29(1) and 36 of this Regulation, and shall notify it without delay of any subsequent amendment affecting them.

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Article 38

Entry into force

This Regulation shall enter into force on the twentieth day after its publication in the *Official Journal of the European Union* with the exception of Articles 8 and 26(3), which shall enter into force 11 June 2005.

This Regulation shall be binding in its entirety and directly applicable in all Member States.

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ANNEX I

LIST OF TYPES OF EC FERTILISERS

A. **Inorganic straight primary nutrient fertilisers**

A.1. *Nitrogenous fertilisers*

No	Type designation	Data on method of production and essential ingredients	Minimum content of nutrients (percentage by weight) Data on the expression of nutrients Other requirements	Other data on the type designation	Nutrient content to be declared Forms and solubilities of the nutrients Other criteria
1	2	3	4	5	6
1(a)	Calcium nitrate (nitrate of lime)	Chemically obtained product containing calcium nitrate as its essential ingredient and possibly ammonium nitrate	15 % N Nitrogen expressed as total nitrogen or as nitric and ammoniacal nitrogen. Maximum content of ammoniacal nitrogen: 1,5 % N		Total nitrogen Additional optional particulars: Nitric nitrogen Ammoniacal nitrogen
1(b)	Calcium magnesium nitrate (nitrate of lime and magnesium)	Chemically obtained product containing calcium nitrate and magnesium nitrate as essential ingredients	13 % N Nitrogen expressed as nitric nitrogen. Minimum content of magnesium in the form of water-soluble salts expressed as magnesium oxide: 5 % MgO		Nitric nitrogen Water-soluble magnesium oxide
1(c)	Magnesium nitrate	Chemically obtained product containing as its essential ingredient hexahydrated magnesium nitrate	10 % N Nitrogen expressed as nitric nitrogen 14 % MgO Magnesium expressed as water-soluble magnesium oxide	When marketed in the form of crystals as note ‘in crystallised form’ may be added	Nitric nitrogen Water-soluble magnesium oxide
2(a)	Sodium nitrate (nitrate of soda)	Chemically obtained product containing sodium nitrate as its essential ingredient	15 % N Nitrogen expressed as nitric nitrogen		Nitric nitrogen
2(b)	Chile nitrate	Product prepared from caliche, containing sodium nitrate as its essential ingredient	15 % N Nitrogen expressed as nitric nitrogen		Nitric nitrogen

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1	2	3	4	5	6
3(a)	Calcium cyanamide	Chemically obtained product containing calcium cyanamide as its essential ingredient, calcium oxide and possibly small quantities of ammonium salts and urea	18 % N Nitrogen expressed as total nitrogen, at least 75 % of the nitrogen declared being bound in the form of cyanamide		Total nitrogen
3(b)	Nitrogenous calcium cyanamide	Chemically obtained product containing calcium cyanamide as its essential ingredient, and calcium oxide and possibly small quantities of ammonium salts and urea, plus added nitrate	18 % N Nitrogen expressed as total nitrogen, at least 75 % of the non-nitric nitrogen declared being bound in the form of cyanamide. Nitric nitrogen content: — minimum: 1 % N — maximum: 3 % N		Total nitrogen Nitric nitrogen
▼M5 4	Sulphate of ammonia	Chemically obtained product containing ammonium sulphate as its essential ingredient, possibly with up to 15 % calcium nitrate (nitrate of lime).	19,7 % N Nitrogen expressed as total nitrogen. Maximum content of nitric nitrogen 2,2 % N if calcium nitrate (nitrate of lime) is added.	When marketed in the form of a combination of ammonium sulphate and calcium nitrate (nitrate of lime), the designation must include ‘with up to 15 % calcium nitrate (nitrate of lime)’.	Ammoniacal nitrogen. Total nitrogen if calcium nitrate (nitrate of lime) is added
▼B 5	Ammonium nitrate or calcium ammonium nitrate	Chemically obtained product containing ammonium nitrate as its essential ingredient, which may contain fillers such as ground limestone, calcium sulphate, ground dolomite, magnesium sulphate, kieserite	20 % N Nitrogen expressed as nitric nitrogen and ammoniacal nitrogen, each of these two forms of nitrogen accounting for about half the nitrogen present. See Annexes III.1 and III.2 of this regulation, if required.	The designation ‘calcium ammonium nitrate’ is exclusively reserved for a fertiliser containing only calcium carbonate (for instance limestone) and/or magnesium carbonate and calcium carbonate (for instance dolomite) in addition to ammonium nitrate. The minimum content of these carbonates must be 20 % and their purity level at least 90 %	Total nitrogen Nitric nitrogen Ammoniacal nitrogen

▼B

1	2	3	4	5	6
6	Ammonium sulphate-nitrate	Chemically obtained product containing as essential ingredients ammonium nitrate and ammonium sulphate	25 % N Nitrogen expressed as ammoniacal and nitric nitrogen. Minimum nitric nitrogen content: 5 %		Total nitrogen Ammoniacal nitrogen Nitric nitrogen
7	Magnesium sulphonitrate	Chemically obtained product containing ammonium nitrate, ammonium sulphate and magnesium sulphate as essential ingredients	19 % N Nitrogen expressed as ammoniacal and nitric nitrogen. Minimum nitric nitrogen content: 6 % N 5 % MgO Magnesium in the form of water-soluble salts expressed as magnesium oxide		Total nitrogen Ammoniacal nitrogen Nitric nitrogen Water-soluble magnesium oxide
8	Magnesium ammonium nitrate	Chemically obtained product containing ammonium nitrates and magnesium compound salts (dolomite magnesium carbonate and/or magnesium sulphate) as essential ingredients	19 % N Nitrogen expressed as ammoniacal nitrogen and nitric nitrogen. Minimum nitric nitrogen content 6 % N 5 % MgO Magnesium expressed as total magnesium oxide		Total nitrogen Ammoniacal nitrogen Nitric nitrogen Total magnesium oxide and possibly, water-soluble magnesium oxide
9	Urea	Chemically obtained product containing carbonyl diamide (carbamide) as its essential ingredient	44 % N Total ureic nitrogen (including biuret). Maximum biuret content: 1,2 %		Total nitrogen, expressed as ureic nitrogen
10	Crotonylidene diurea	Product obtained by reaction of urea with crotonaldehyde Monomeric compound	28 % N Nitrogen expressed as total nitrogen At least 25 % N from the crotonylidene diurea Maximum ureic nitrogen content: 3 %		Total nitrogen Ureic nitrogen where this is at least 1 % by weight Nitrogen from crotonylidene diurea

▼B

1	2	3	4	5	6
11	Isobutylidene diurea	Product obtained by reaction of urea with isobutyraldehyde Monomeric compound Monomeric compound	28 % N Nitrogen expressed as total nitrogen At least 25 % N from isobutylidene diurea Maximum ureic nitrogen content: 3 %		Total nitrogen Ureic nitrogen where this is at least 1 % by weight Nitrogen from isobutylidene diurea
12	Urea formaldehyde	Product obtained by reaction of urea with formaldehyde and containing as its essential ingredients molecules of urea formaldehyde Polymeric compound	36 % N total nitrogen Nitrogen expressed as total nitrogen At least 3/5 of the declared total nitrogen content must be soluble in hot water At least 31 % N from urea formaldehyde Maximum ureic nitrogen content: 5 %		Total nitrogen Ureic nitrogen where this is at least 1 % by weight Nitrogen from formaldehyde urea that is soluble in cold water Nitrogen from formaldehyde urea that is only soluble in hot water
13	Nitrogenous fertiliser containing crotonylidene diurea	Product obtained chemically containing crotonylidene diurea and a straight nitrogen fertiliser [List A-1, excluding products 3(a), 3(b) and 5]	18 % N expressed as total nitrogen At least 3 % nitrogen in ammoniacal and/or nitric and/or ureic form At least 1/3 of the declared total nitrogen content must be derived from crotonylidene diurea Maximum biuret content: (ureic N + crotonylidene diurea N) × 0,026		Total nitrogen For each form amounting to at least 1 %: — nitric nitrogen — ammoniacal nitrogen — ureic nitrogen Nitrogen from crotonylidene diurea
14	Nitrogenous fertiliser containing isobutylidene diurea	Product obtained chemically containing isobutylidene diurea and a straight nitrogenous fertiliser [List A-1, excluding products 3(a), 3(b) and 5]	18 % N expressed as total nitrogen At least 3 % nitrogen in ammoniacal and/or nitric and/or ureic form A least 1/3 of the declared total nitrogen content must derive from isobutylidene diurea Maximum biuret content: (Ureic N + isobutylidene diurea N) × 0,026		Total nitrogen For each form amounting to at least 1 %: — nitric nitrogen — ammoniacal nitrogen — ureic nitrogen Nitrogen from isobutylidene diurea

▼B

1	2	3	4	5	6
15	Nitrogenous fertiliser containing urea formaldehyde	Product obtained chemically containing urea formaldehyde and a straight nitrogenous fertiliser [List A-1, excluding products 3(a), 3(b) and 5]	18 % N expressed as total nitrogen At least 3 % nitrogen in ammoniacal and/or nitric and/or ureic form At least 1/3 of the declared total nitrogen content must derive from urea formaldehyde The nitrogen from the urea formaldehyde must contain at least 3/5 nitrogen that is soluble in hot water Maximum biuret content: (Ureic N + urea formaldehyde) × 0,026		Total nitrogen For each form amounting to at least 1 %: — nitric nitrogen — ammoniacal nitrogen — ureic nitrogen Nitrogen from urea formaldehyde Nitrogen from urea formaldehyde that is soluble in cold water Nitrogen from urea formaldehyde that is only soluble in hot water

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►M5 16 ◄	Urea-ammonium sulphate	Product obtained chemically from urea and ammonium sulphate	30 % N Nitrogen expressed as ammoniacal and ureic nitrogen Minimum ammoniacal nitrogen content: 4 % Minimum sulphur content expressed as sulphur trioxide: 12 % Maximum biuret content: 0,9 %		Total nitrogen Ammoniacal nitrogen Ureic nitrogen Water-soluble sulphur trioxide

►M5 ——————— ◄

▼B

A.2. *Phosphatic fertilisers*

Where a particle size criterion is prescribed for the basic constituent materials of fertilisers sold in granular form (fertilisers 1, 3, 4, 5, 6 and 7), it will be established by an appropriate analytical method.

No	Type designation	Data on method of production and essential ingredients	Minimum content of nutrients (percentage by weight) Data on the expression of nutrients Other requirements	Other data on the type designation	Nutrient content to be declared Forms and solubilities of the nutrients Other criteria
1	2	3	4	5	6
1	Basic slag: — Thomas phosphates — Thomas slag	Product obtained in iron-smelting by treatment of the phosphorus melts and containing calcium silicophosphates as its essential ingredients	12 % P_2O_5 Phosphorus expressed as phosphorus pentoxide soluble in mineral acids, at least 75 % of the declared content of phosphorus pentoxide being soluble in 2 % citric acid or P_2O_5 Phosphorus expressed as phosphorus pentoxide soluble in 2 % citric acid Particle size: — at least 75 % able to pass through a sieve with a mesh of 0,160 mm — at least 96 % able to pass through a sieve with a mesh of 0,630 mm		Total phosphorus pentoxide (soluble in mineral acids) 75 % of which (to be indicated as % by weight) is soluble in 2 % citric acid (for marketing in France, Italy, Spain, Portugal, Greece ►M1 , Czech Republic, Estonia, Cyprus, Latvia, Lithuania, Hungary, Malta, Poland, Slovenia, Slovakia, ◄ ►M3 Bulgaria and Romania ◄) Total phosphorus pentoxide (soluble in mineral acids) and phosphorus pentoxide soluble in 2 % citric acid (for marketing in the United Kingdom) Phosphorus pentoxide soluble in 2 % citric acid (for marketing in Germany, Belgium, Denmark, Ireland, Luxembourg, the Netherlands and Austria)
2(a)	Single superphosphate	Product obtained by reaction of ground mineral phosphate with sulphuric acid and containing monocalcium phosphate as an essential ingredient as well as calcium sulphate	16 % P_2O_5 Phosphorus expressed as P_2O_5 soluble in neutral ammonium citrate, at least 93 % of the declared content of P_2O_5 being water-soluble Test sample: 1 g		Phosphorus pentoxide soluble in neutral ammonium citrate Water-soluble phosphorus pentoxide
2(b)	Concentrated superphosphate	Product obtained by reaction of ground mineral phosphate with sulphuric acid and phosphoric acid and containing monocalcium phosphate as an essential ingredient as well as calcium sulphate	25 % P_2O_5 Phosphorus expressed as P_2O_5 soluble in neutral ammonium citrate, at least 93 % of the declared content of P_2O_5 being water-soluble Test sample: 1 g		Phosphorus pentoxide soluble in neutral ammonium citrate Water-soluble phosphorus pentoxide

▼B

1	2	3	4	5	6
▼M2 2(c)	Triple superphosphate	Product obtained by reaction of ground mineral phosphate with phosphoric acid and containing monocalcium phosphate as its essential ingredient	38 % P_2O_5 Phosphorus expressed as P_2O_5 soluble in neutral ammonium citrate, at least 85 % of the declared content of P_2O_5 being water-soluble Test sample: 3 g		Phosphorus pentoxide soluble in neutral ammonium citrate Water-soluble phosphorus pentoxide
▼B 3	Partially solubilised rock phosphate	Product obtained by partial solubilisation of ground rock phosphate with sulphuric acid or phosphoric acid and containing as essential ingredients monocalcium phosphate, tricalcium phosphate and calcium sulphate	20 % P_2O_5 Phosphorus expressed as P_2O_5 soluble in mineral acids, at least 40 % of the declared content of P_2O_5 being water-soluble Particle size: — at least 90 % able to pass through a sieve with a mesh of 0,160 mm — at least 98 % able to pass through a sieve with a mesh of 0,630 mm		Total phosphorus pentoxide (soluble in mineral acids) Phosphorus pentoxide soluble in water
▼M7 3(a)	Partially solubilised rock phosphate with magnesium	Product obtained by partial solubilisation of ground rock phosphate with sulphuric acid or phosphoric acid with the addition of magnesium sulphate or magnesium oxide, and containing as essential ingredients monocalcium phosphate, tricalcium phosphate, calcium sulphate and magnesium sulphate	16 % P_2O_5 6 % MgO Phosphorus expressed as P_2O_5 soluble in mineral acids, at least 40 % of the declared content of P_2O_5 being water-soluble Particle size: — at least 90 % able to pass through a sieve with a mesh of 0,160 mm — at least 98 % able to pass through a sieve with a mesh of 0,630 mm		Total phosphorus pentoxide (soluble in mineral acids) Phosphorus pentoxide soluble in water Total magnesium oxide Water-soluble magnesium oxide
▼B 4	Dicalcium phosphate	Product obtained by precipitation of solubilised phosphoric acid from mineral phosphates or bones, and containing dicalcium phosphate dihydrate as its essential ingredient	38 % P_2O_5 Phosphorus expressed as P_2O_5 soluble in alkaline ammonium citrate (Petermann) Particle size: — at least 90 % able to pass through a sieve with a mesh of 0,160 mm — at least 98 % able to pass through a sieve with a mesh of 0,630 mm		Phosphorus pentoxide soluble in alkaline ammonium citrate

▼B

1	2	3	4	5	6
5	Calcined phosphate	Product obtained by heat treatment of ground rock phosphate with alkaline compounds and silicic acid, and containing alkaline calcium phosphate and calcium silicate as essential ingredients	25 % P_2O_5 Phosphorus expressed as P_2O_5 soluble in alkaline ammonium citrate (Petermann) Particle size: — at least 75 % able to pass through a sieve with a mesh of 0,160 mm — at least 96 % able to pass through a sieve with a mesh of 0,630 mm		Phosphorus pentoxide soluble in alkaline ammonium citrate
6	Aluminium-calcium phosphate	Product obtained in amorphous form by heat treatment and grinding, containing aluminium and calcium phosphates as essential ingredients	30 % P_2O_5 Phosphorus expressed as P_2O_5 soluble in mineral acids, at least 75 % of the declared content of P_2O_5 being soluble in alkaline ammonium citrate (Joulie) Particle size: — at least 90 % able to pass through a sieve with a mesh of 0,160 mm — at least 98 % able to pass through a sieve with a mesh of 0,630 mm		Total phosphorus pentoxide (soluble in mineral acids) Phosphorus pentoxide soluble in alkaline ammonium citrate
7	Soft ground rock phosphate	Product obtained by grinding soft mineral phosphates and containing tricalcium phosphate and calcium carbonate as essential ingredients	25 % P_2O_5 Phosphorus expressed as P_2O_5 soluble in mineral acids, at least 55 % of the declared content of P_2O_5 being soluble in 2 % formic acid Particle size: — at least 90 % able to pass through a sieve with a mesh of 0,063 mm — at least 99 % able to pass through a sieve with a mesh of 0,125 mm		Total phosphorus pentoxide (soluble in mineral acids) Phosphorus pentoxide soluble in 2 % formic acid Percentage by weight of material able to pass through a sieve with a mesh of 0,063 mm

▼B

A.3. *Potassic fertilisers*

No	Type designation	Data on method of production and essential ingredients	Minimum content of nutrients (percentage by weight) Data on the expression of nutrients Other requirements	Other data on the type designation	Nutrient content to be declared Forms and solubilities of the nutrients Other criteria
1	2	3	4	5	6
▼M11 1	Crude potassium salt	Product obtained from crude potassium salts	9 % K_2O Potassium expressed as water-soluble K_2O 2 % MgO Magnesium in the form of water-soluble salts, expressed as magnesium oxide	Usual trade names may be added	Water-soluble potassium oxide Water-soluble magnesium oxide Total sodium oxide Chloride content must be declared
▼M10 2	Enriched crude potassium salt	Product obtained from crude potassium salts enriched by blending with potassium chloride	18 % K_2O Potassium expressed as water-soluble K_2O	Usual trade names may be added	Water-soluble potassium oxide Optional mention of the water-soluble magnesium oxide content where higher than 5 % MgO
▼B 3	Muriate of potash	Product obtained from crude potassium salts and containing potassium chloride as its essential ingredient	37 % K_2O Potassium expressed as water-soluble K_2O	Usual trade names may be added	Water-soluble potassium oxide
4	Potassium chloride containing magnesium salts	Product obtained from crude potassium salts with added magnesium salts and containing potassium chloride and magnesium salts as essential ingredients	37 % K_2O Potassium expressed as water-soluble K_2O 5 % MgO Magnesium in the form of water-soluble salts, expressed as magnesium oxide		Water-soluble potassium oxide Water-soluble magnesium oxide

▼B

1	2	3	4	5	6
5	Sulphate of potash	Product obtained chemically from potassium salts and containing potassium sulphate as its essential ingredient	47 % K_2O Potassium expressed as water-soluble K_2O Maximum chloride content: 3 % Cl		Water-soluble potassium oxide Optional mention of the chloride content
6	Sulphate of potash containing magnesium salt	Product obtained chemically from potassium salts, possibly with addition of magnesium salts, and containing potassium sulphate and magnesium sulphate as essential ingredients	22 % K_2O Potassium expressed as water-soluble K_2O 8 % MgO Magnesium in the form of water-soluble salts, expressed as magnesium oxide Maximum chloride content: 3 % Cl	Usual trade names may be added	Water-soluble potassium oxide Water-soluble magnesium oxide Optional mention of the chloride content
7	Kieserite with potassium sulphate	Product obtained from Kieserite with potassium sulphate added	8 % MgO Magnesium expressed as water-soluble MgO 6 % K_2O Potassium expressed as water-soluble K_2O Total MgO + K_2O: 20 % Maximum chloride content: 3 % Cl	Usual trade names may be added	Water-soluble magnesium oxide Water-soluble potassium oxide Optional mention of the chloride content

B. **Inorganic compound primary nutrient fertilisers**

B.1. *NPK fertilisers*

B.1.1.	Type designation:	NPK fertilisers.
	Data on method of production:	Product obtained chemically or by blending, without addition of organic nutrients of animal or vegetable origin.
	Minimum content of nutrients (percentage by weight):	— Total: 20 % (N + P_2O_5 + K_2O); — For each of the nutrients: 3 % N, 5 % P_2O_5, 5 % K_2O.

▼B

Forms, solubilities and nutrient content to be declared as specified in columns 4, 5 and 6 Particle size			Data for identification of the fertilisers Other requirements		
N	P_2O_5	K_2O	N	P_2O_5	K_2O
1	2	3	4	5	6
(1) Total nitrogen (2) Nitric nitrogen (3) Ammoniacal nitrogen (4) Ureic nitrogen (5) Cyanamide nitrogen	(1) Water-soluble P_2O_5 (2) P_2O_5 soluble in neutral ammonium citrate (3) P_2O_5 soluble in neutral ammonium citrate and in water (4) P_2O_5 soluble in mineral acids only (5) P_2O_5 soluble in alkaline ammonium citrate (Petermann) (6a) P_2O_5 soluble in mineral acids, of which at least 75 % of the declared P_2O_5 content is soluble in 2 % citric acid (6b) P_2O_5 soluble in 2 % citric acid (7) P_2O_5 soluble in mineral acids, of which at least 75 % of the declared P_2O_5 content is soluble in alkaline ammonium citrate (Joulie) (8) P_2O_5 soluble in mineral acids, of which at least 55 % of the declared P_2O_5 content is soluble in 2 % formic acid	Water soluble K_2O	(1) Total nitrogen (2) If any of the forms of nitrogen (2) to (5) amounts to at least 1 % by weight, it must be declared (3) If above 28 %, see Annex III.2	1. An NPK fertiliser free from Thomas slag, calcined phosphate, aluminium-calcium phosphate, partially solubilised rock phosphate and soft ground rock phosphate must be declared in accordance with solubilities (1), (2) or (3): — when the water-soluble P_2O_5 does not amount to 2 %, solubility (2) only shall be declared; — when the water-soluble P_2O_5 is at least 2 %, solubility (3) shall be declared, and the water-soluble P_2O_5 content must be indicated [solubility (1)]. The P_2O_5 content soluble in mineral acids only must not exceed 2 %. For this type 1, the test sample for determining solubilities (2) and (3) shall be 1 g. 2 (a) An NPK fertiliser containing soft ground rock phosphate or partially solubilised rock phosphate must be free from Thomas slag, calcined phosphate and aluminium-calcium phosphate. It shall be declared in accordance with solubilities (1), (3) and (4) This type of fertiliser must contain: — at least 2 % P_2O_5 soluble in mineral acids only [solubility (4)];	(1) Water-soluble potassium oxide (2) The indication 'low in chloride' is linked to a maximum content of 2 % Cl (3) Chloride content may be declared

1	2	3	4	5	6
				— at least 5 % P_2O_5 soluble in water and neutral ammonium citrate [solubility (3)]; — at least 2,5 % water-soluble P_2O_5 [solubility (1)]. This type of fertiliser must be marketed under the designation 'NPK fertiliser containing soft ground rock phosphate' or 'NPK fertiliser containing partially solubilised rock phosphate'. For this type 2(a), the test sample for determining solubility (3) shall be 3 g.	
Particle size of the basic phosphatic ingredients Thomas slag: at least 75 % able to pass through a sieve with a mesh of 0,160 mm Aluminium-calcium phosphate: at least 90 % able to pass through a sieve with a mesh of 0,160 mm Calcined phosphate: at least 75 % able to pass through a sieve with a mesh of 0,160 mm Soft ground rock phosphate: at least 90 % able to pass through a sieve with a mesh of 0,063 mm Partially solubilised rock phosphate: at least 90 % able to pass through a sieve with a mesh of 0,160 mm				2 (b) An NPK fertiliser containing aluminium-calcium phosphate must be free from Thomas slag, calcined phosphate, soft ground rock phosphate and partially solubilised rock phosphate. It shall be declared in accordance with solubilities (1) and (7), the latter applying after deduction of the solubility in water. This type of fertiliser must contain: — at least 2 % of water-soluble P_2O_5 [solubility (1)]; — at least 5 % of P_2O_5 according to solubility (7). This type of fertiliser must be marketed under the designation 'NPK fertiliser containing aluminium-calcium phosphate'. 3. In the case of NPK fertilisers containing only one of the following types of phosphatic fertiliser: Thomas slag, calcined phosphate, aluminium-calcium phosphate, soft ground rock phosphate, the type designation must be followed by an indication of the phosphate ingredient.	

1	2	3	4	5	6
				The declaration of the solubility of the P_2O_5 must be given in accordance with the following solubilities: — for fertilisers based on Thomas slag: solubility (6a) (France, Italy, Spain, Portugal, Greece ►**M1** , Czech Republic, Estonia, Cyprus, Latvia, Lithuania, Hungary, Malta, Poland, Slovenia, Slovakia, ◄ ►**M3** Bulgaria, Romania ◄), (6b) (Germany, Belgium, Denmark, Ireland, Luxembourg, Netherlands, United Kingdom and Austria); — for fertilisers based on calcined phosphate: solubility (5); — for fertilisers based on aluminium-calcium phosphate: solubility (7); — for fertilisers based on soft ground rock phosphate: solubility (8).	

B.1. *NPK fertilisers (continued)*

B.1.2.	Type designation:	NPK fertiliser containing crotonylidene diurea or isobutylidene diurea or urea formaldehyde (as appropriate).
	Data on method of production:	Product obtained chemically without addition of organic nutrients of animal or vegetable origin and containing crotonylidene diurea or isobutylidene diurea or urea formaldehyde.
	Minimum content of nutrients (percentage by weight):	— Total: 20 % ($N + P_2O_5 + K_2O$); — For each of the nutrients: — 5 % N. At least ¼ of the declared content of total nitrogen must derive from nitrogen form (5) or (6) or (7). At least 3/5 of the declared nitrogen content (7) must be soluble in hot water, — 5 % P_2O_5, — 5 % K_2O.

▼B

Forms, solubilities and nutrient content to be declared as specified in columns 4, 5 and 6 Particle size			Data for identification of the fertilisers Other requirements		
N	P_2O_5	K_2O	N	P_2O_5	K_2O
1	2	3	4	5	6
(1) Total nitrogen (2) Nitric nitrogen (3) Ammoniacal nitrogen (4) Ureic nitrogen (5) Nitrogen from crotonylidene diurea (6) Nitrogen from isobutylidene diurea (7) Nitrogen from urea formaldehyde (8) Nitrogen from urea formaldehyde that is only soluble in hot water (9) Nitrogen from urea formaldehyde that is soluble in cold water	(1) Water-soluble P_2O_5 (2) P_2O_5 soluble in neutral ammonium citrate (3) P_2O_5 soluble in neutral ammonium citrate and in water	Water-soluble K_2O	(1) Total nitrogen (2) If any of the forms of nitrogen (2) to (4) amounts to at least 1 % by weight, it must be declared (3) One of the forms of nitrogen (5) to (7) (as appropriate). Nitrogen form (7) must be declared in the form of nitrogen (8) and (9)	An NPK fertiliser free from Thomas slag, calcined phosphate, aluminium-calcium phosphate, partially solubilised rock phosphate and rock phosphate must be declared in accordance with solubilities (1), (2) or (3): — when the water-soluble P_2O_5 does not amount to 2 %, solubility (2) only shall be declared, — when the water-soluble P_2O_5 is at least 2 %, solubility (3) shall be declared, and the water-soluble P_2O_5 content must be indicated [solubility (1)]. The P_2O_5 content soluble in mineral acids only must not exceed 2 %. The test sample for determining solubilities (2) and (3) shall be 1 g.	(1) Water-soluble potassium oxide (2) The indication ‘low in chloride’ is linked to a maximum content of 2 % Cl (3) Chloride content may be declared

B.2. *NP fertilisers*

B.2.1.	Type designation:	NP fertilisers.
	Data on method of production:	Product obtained chemically or by blending without addition of organic nutrients of animal or vegetable origin.
	Minimum content of nutrients (percentage by weight):	— Total: 18 % (N + P_2O_5); — For each of the nutrients: 3 % N, 5 % P_2O_5.

▼B

Forms, solubilities and nutrient content to be declared as specified in columns 4, 5 and 6 Particle size			Data for identification of the fertilisers Other requirements		
N	P_2O_5	K_2O	N	P_2O_5	K_2O
1	2	3	4	5	6
(1) Total nitrogen (2) Nitric nitrogen (3) Ammoniacal nitrogen (4) Ureic nitrogen (5) Cyanamide nitrogen	(1) Water-soluble P_2O_5 (2) P_2O_5 soluble in neutral ammonium citrate (3) P_2O_5 soluble in neutral ammonium citrate and in water (4) P_2O_5 soluble in mineral acids only (5) P_2O_5 soluble in alkaline ammonium citrate (Petermann) (6a) P_2O_5 soluble in mineral acids, of which at least 75 % of the declared P_2O_5 content is soluble in 2 % citric acid (6b) P_2O_5 soluble in 2 % citric acid (7) P_2O_5 soluble in mineral acids of which at least 75 % of the declared P_2O_5 content is soluble in alkaline ammonium citrate (Joulie) (8) P_2O_5 soluble in mineral acids of which at least 55 % of the declared P_2O_5 content is soluble in 2 % formic acid		(1) Total nitrogen (2) If any of the forms of nitrogen (2) to (5) amounts to at least 1 % by weight, it must be declared	1. An NP fertiliser free from Thomas slag, calcined phosphate, aluminium-calcium phosphate, partially solubilised rock phosphate and soft ground rock phosphate must be declared in accordance with solubilities (1), (2) or (3): — when the water-soluble P_2O_5 does not amount to 2 %, solubility (2) only shall be declared; — when the water-soluble P_2O_5 is at least 2 %, solubility (3) shall be declared, and the water-soluble P_2O_5 content must be indicated [solubility (1)]. The P_2O_5 content soluble in mineral acids only must not exceed 2 %. For this type 1, the test sample for determining solubilities (2) and (3) shall be 1 g. 2 (a) A NP fertiliser containing soft ground rock phosphate or partially solubilised rock phosphate must be free from Thomas slag, calcined phosphate and aluminium-calcium phosphate. It shall be declared in accordance with solubilities (1), (3) and (4). This type of fertiliser must contain: — at least 2 % P_2O_5 soluble in mineral acids only [solubility (4)];	

1	2	3	4	5	6
				— at least 5 % P_2O_5 soluble in water and neutral ammonium citrate [solubility (3]; — at least 2,5 % water soluble P_2O_5 [solubility (1)]. This type of fertiliser must be marketed under the designation 'NP fertiliser containing soft ground rock phosphate' or 'NP fertiliser containing partially solubilised rock phosphate'. For this type 2(a), the test sample for determining solubility (3) shall be 3 g.	
Particle size of the basic phosphatic ingredients: Thomas slag — at least 75 % able to pass through a sieve with a mesh of 0,160 mm Aluminium-calcium phosphate — at least 90 % able to pass through a sieve with a mesh of 0,160 mm Calcined phosphate — at least 75 % able to pass through a sieve with a mesh of 0,160 mm Soft ground rock phosphate — at least 90 % able to pass through a sieve with a mesh of 0,063 mm Partially solubilised rock phosphate — at least 90 % able to pass through a sieve with a mesh of 0,160 mm				2 (b) A NP fertiliser containing aluminium-calcium phosphate, must be free from Thomas slag, calcined phosphate, soft ground rock phosphate and partially solubilised rock phosphate. It shall be declared in accordance with solubilities (1) and (7), the latter applying after deduction of the solubility in water. This type of fertiliser must contain: — at least 2 % water-soluble P_2O_5 [solubility (1)]; — at least 5 % P_2O_5 according to solubility (7). This type of fertiliser must be marketed under the designation 'NP fertiliser containing aluminium-calcium phosphate'. 3. In the case of NP fertilisers containing only one of the following types of phosphatic fertiliser: Thomas slag, calcined phosphate, aluminium-calcium phosphate, soft ground rock phosphate, the type designation must be followed by an indication of the phosphate ingredient.	

1	2	3	4	5	6
				The declaration of the solubility of the P_2O_5 must be given in accordance with the following solubilities: — for fertilisers based on Thomas slag: solubility (6a) (France, Italy, Spain, Portugal, Greece ►**M1** , Czech Republic, Estonia, Cyprus, Latvia, Lithuania, Hungary, Malta, Poland, Slovenia, Slovakia, ◄ ►**M3** Bulgaria, Romania ◄), (6b) (Germany, Belgium, Denmark, Ireland, Luxembourg, Netherlands, United Kingdom and Austria); — for fertilisers based on calcined phosphate: solubility (5); — for fertilisers based on aluminium-calcium phosphate: solubility (7); — for fertilisers based on soft ground rock phosphate: solubility (8).	

B.2. *NP fertilisers (cont'd)*

B.2.2.	Type designation:	NP fertiliser containing crotonylidene diurea or isobutylidene diurea or urea formaldehyde (as appropriate)
	Data on method of production:	Product obtained chemically without addition of organic nutrients of animal or vegetable origin and containing crotonylidene diurea or isobutylidene diurea or urea formaldehyde
	Minimum content of nutrients (percentage by weight):	— Total: 18 % ($N + P_2O_5$); — For each of the nutrients: — 5 % N. At least ¼ of the declared content of total nitrogen must derive from nitrogen form (5) or (6) or (7). At least 3/5 of the declared nitrogen content (7) must be soluble in hot water, — 5 % P_2O_5.

▼B

Forms, solubilities and nutrient content to be declared as specified in columns 4, 5 and 6 Particle size			Data for identification of the fertilisers Other requirements		
N	P_2O_5	K_2O	N	P_2O_5	K_2O
1	2	3	4	5	6
(1) Total nitrogen (2) Nitric nitrogen (3) Ammoniacal nitrogen (4) Ureic nitrogen (5) Nitrogen from crotonylidene diurea (6) Nitrogen from isobutylidene diurea (7) Nitrogen from urea formaldehyde (8) Nitrogen from urea formaldehyde that is only soluble in hot water (9) Nitrogen from urea formaldehyde that is soluble in cold water	(1) Water-soluble P_2O_5 (2) P_2O_5 soluble in neutral ammonium citrate (3) P_2O_5 soluble in neutral ammonium citrate and in water		(1) Total nitrogen (2) If any of the forms of nitrogen (2) to (4) amounts to at least 1 % by weight, it must be declared (3) One of the forms of nitrogen (5) to (7) (as appropriate). Nitrogen form (7) must be declared in the form of nitrogen (8) and (9)	An NP fertiliser free of Thomas slag, calcined phosphate, aluminium-calcium phosphate, partially solubilised rock phosphate and rock phosphate must be declared in accordance with solubilities (1), (2) or (3): — when the water-soluble P_2O_5 does not amount to 2 %, solubility (2) only shall be declared; — when the water-soluble P_2O_5 is at least 2 %, solubility (3) shall be declared, and the water-soluble P_2O_5 content must be indicated [solubility (1)]. The P_2O_5 content soluble in mineral acids only must not exceed 2 %. The test sample for determining solubilities (2) and (3) shall be 1 g.	

B.3. *NK fertilisers*

B.3.1.	Type designation:	NK fertilisers.
	Data on method of production:	Product obtained chemically or by blending, without addition of organic nutrients of animal or vegetable origin.
	Minimum content of nutrients (percentage by weight):	— Total: 18 % (N + K_2O); — For each of the nutrients: 3 % N, 5 % K_2O.

▼B

Forms, solubilities and nutrient content to be declared as specified in columns 4, 5 and 6 Particle size			Data for identification of the fertilisers Other requirements		
N	P_2O_5	K_2O	N	P_2O_5	K_2O
1	2	3	4	5	6
(1) Total nitrogen (2) Nitric nitrogen (3) Ammoniacal nitrogen (4) Ureic nitrogen (5) Cyanamide nitrogen		Water-soluble K_2O	(1) Total nitrogen (2) If any of the forms of nitrogen (2) to (5) amounts to at least 1 % by weight, it must be declared		(1) Water-soluble potassium oxide (2) The indication 'low in chloride' is linked to a maximum content of 2 % Cl (3) Chloride content may be declared

B.3. *NK fertilisers (cont'd)*

	Type designation:	NK fertiliser containing crotonylidene diurea or isobutylidene diurea or urea formaldehyde (as appropriate).
	Data on method of production:	Product obtained chemically without addition of organic nutrients of animal or vegetable origin and containing crotonylidene diurea or isobutylidene diurea or urea formaldehyde.
B.3.2.	Minimum content of nutrients (percentage by weight):	— Total: 18 % (N + K_2O); — For each of the nutrients: — 5 % N At least ¼ of the declared content of total nitrogen must derive from nitrogen form (5) or (6) or (7). At least 3/5 of the declared nitrogen content (7) must be soluble in hot water, — 5 % K_2O.

▼B

Forms, solubilities and nutrient content to be declared as specified in columns 4, 5 and 6 Particle size			Data for identification of the fertilisers Other requirements		
N	P_2O_5	K_2O	N	P_2O_5	K_2O
1	2	3	4	5	6
(1) Total nitrogen (2) Nitric nitrogen (3) Ammoniacal nitrogen (4) Ureic nitrogen (5) Nitrogen from crotonylidene diurea (6) Nitrogen from isobutylidene diurea (7) Nitrogen from urea formaldehyde (8) Nitrogen from urea formaldehyde that is only soluble in hot water (9) Nitrogen from urea formaldehyde that is soluble in cold water		Water-soluble K_2O	(1) Total nitrogen (2) If any of the forms of nitrogen (2) to (4) amounts to at least 1 % by weight, it must be declared (3) One of the forms of nitrogen (5) to (7) (as appropriate). Nitrogen form (7) must be declared in the form of nitrogen (8) and (9)		(1) Water-soluble potassium oxide (2) The indication 'low in chloride' is linked to a maximum content of 2 % Cl (3) Chloride content may be declared

B.4. *PK fertilisers*

Type designation:	PK fertilisers.
Data on method of production:	Product obtained chemically or by blending, without addition of organic nutrients of animal or vegetable origin.
Minimum content of nutrients (percentage by weight):	— Total: 18 % (P_2O_5 + K_2O); — For each of the nutrients: 5 % P_2O_5, 5 % K_2O.

▼B

Forms, solubilities and nutrient content to be declared as specified in columns 4, 5 and 6 Particle size			Data for identification of the fertilisers Other requirements		
N	P_2O_5	K_2O	N	P_2O_5	K_2O
1	2	3	4	5	6
	(1) Water-soluble P_2O_5 (2) P_2O_5 soluble in neutral ammonium citrate (3) P_2O_5 soluble in neutral ammonium citrate and in water (4) P_2O_5 soluble in mineral acids only (5) P_2O_5 soluble in alkaline ammonium citrate (Petermann) (6a) P_2O_5 soluble in mineral acids, of which at least 75 % of the declared P_2O_5 content is soluble in 2 % citric acid (6b) P_2O_5 soluble in 2 % citric acid (7) P_2O_5 soluble in mineral acids of which at least 75 % of the declared P_2O_5 content is soluble in alkaline ammonium citrate (Joulie) (8) P_2O_5 soluble in mineral acids, of which at least 55 % of the declared P_2O_5 content is soluble in 2 % formic acid	Water soluble K_2O		1. A PK fertiliser free from Thomas slag, calcined phosphate, aluminium-calcium phosphate, partially solubilised rock phosphate and soft ground rock phosphate must be declared in accordance with solubilities (1), (2) or (3): — when the water-soluble P_2O_5 does not amount to 2 % solubility (2) only shall be declared; — when the water-soluble P_2O_5 is at least 2 % solubility (3) shall be declared and the water-soluble P_2O_5 content must be indicated [solubility (1)]. The P_2O_5 content soluble in mineral acids only must not exceed 2 %. For this type 1, the test sample for determining solubilities (2) and (3) shall be 1 g. 2 (a) A PK fertiliser containing soft ground rock phosphate or partially solubilised rock phosphate must be free from Thomas slag, calcined phosphate and aluminium-calcium phosphate. It shall be declared in accordance with solubilities (1), (3) and (4) This type of fertiliser must contain: — at least 2 % P_2O_5 soluble in mineral acids only [solubility (4)];	(1) Water-soluble potassium oxide (2) The indication ‘low in chloride’ is linked to a maximum content of 2 % Cl (3) Chloride content may be declared

1	2	3	4	5	6
				— at least 5 % P_2O_5 soluble in water and neutral ammonium citrate [solubility (3)]; — at least 2,5 % water-soluble P_2O_5 [solubility (1)]. This type of fertiliser must be marketed under the designation 'PK fertiliser containing soft ground rock phosphate' or 'PK fertiliser containing partially solubilised rock phosphate'. For this type 2(a), the test sample for determining solubility (3) shall be 3 g	
Particle size of the basic phosphatic ingredients: Thomas slag — at least 75 % able to pass through a sieve with a mesh of 0,160 mm Aluminium-calcium phosphate — at least 90 % able to pass through a sieve with a mesh of 0,160 mm Calcined phosphate — at least 75 % able to pass through a sieve with a mesh of 0,160 mm Soft ground rock phosphate — at least 90 % able to pass through a sieve with a mesh of 0,063 mm Partially solubilised rock phosphate — at least 90 % able to pass through a sieve with a mesh of 0,160 mm				2 (b) A PK fertiliser containing aluminium-calcium phosphate must be free from Thomas slag, calcined phosphate and partially solubilised rock phosphate. It shall be declared in accordance with solubilities (1) and (7), the latter applying after deduction of the solubility in water. This type of fertiliser must contain: — at least 2 % water-soluble P_2O_5 [solubility (1)]; — at least 5 % P_2O_5 according to solubility (7). This type of fertiliser must be marketed under the designation 'PK fertiliser containing aluminium-calcium phosphate'.	
				3. In the case of PK fertilisers containing only one of the following types of phosphatic fertiliser: Thomas slag, calcined phosphate, aluminium-calcium phosphate, soft ground rock phosphate, the type designation must be followed by an indication of the phosphate ingredient.	

1	2	3	4	5	6
				The declaration of the solubility of the P_2O_5 must be given in accordance with the following solubilities: — for fertilisers based on Thomas slag: solubility (6a) (France, Italy, Spain, Portugal, Greece ►**M1** , Czech Republic, Estonia, Cyprus, Latvia, Lithuania, Hungary, Malta, Poland, Slovenia, Slovakia, ◄ ►**M3** Bulgaria, Romania ◄), (6b) (Germany, Belgium, Denmark, Ireland, Luxembourg, Netherlands, United Kingdom and Austria) — for fertilisers based on calcined phosphate: solubility (5); — for fertilisers based on aluminium-calcium phosphate: solubility (7); — for fertilisers based on soft ground rock phosphate: solubility (8).	

C. **Inorganic fluid fertilisers**

C.1. *Straight fluid fertilisers*

No	Type designation	Data on method of production and essential ingredients	Minimum content of nutrients (percentage by weight) Data on the expression of nutrients Other requirements	Other data or type designation	Nutrient content to be declared Forms and solubilities of the nutrients Other criteria
1	2	3	4	5	6
1	Nitrogen fertiliser solution	Product obtained chemically and by dissolution in water, in a form stable at atmospheric pressure, without addition of organic nutrients of animal or vegetable origin	15 % N Nitrogen expressed as total nitrogen or, if there is only one form, nitric nitrogen or ammoniacal nitrogen or ureic nitrogen Maximum biuret content: ureic N × 0,026		Total nitrogen and, for any form that amounts to not less than 1 %, nitric nitrogen, ammoniacal nitrogen and/or ureic nitrogen If the biuret content is less than 0,2 %, the words ‘low in biuret’ may be added

▼B

1	2	3	4	5	6
2	Urea Ammonium nitrate fertiliser solution	Product obtained chemically and by dissolution in water, containing ammonium nitrate and urea	26 % N Nitrogen expressed as total nitrogen, where the ureic nitrogen accounts for about half of the nitrogen present Maximum biuret content: 0,5 %		Total nitrogen Nitric nitrogen, ammoniacal nitrogen and ureic nitrogen If the biuret content is less than 0,2 %, the words 'low in biuret' may be added
3	Calcium nitrate solution	Product obtained by dissolving calcium nitrate in water	8 % N Nitrogen expressed as nitrogen in nitric form with a maximum 1 % nitrogen as ammonia Calcium expressed as water soluble CaO	The type designation may be followed, as appropriate, by one of the following indications: — for foliar application; — for making nutrient solutions; — for ferti-irrigation.	Total nitrogen Water soluble calcium oxide for the uses stipulated in column 5 Optionally: — nitrogen in nitric form; — nitrogen as ammonia.
4	Magnesium nitrate solution	Product obtained chemically and by dissolving magnesium nitrate in water	6 % N Nitrogen expressed as nitric nitrogen 9 % MgO Magnesium expressed as water-soluble magnesium oxide Minimum pH: 4		Nitric nitrogen Water-soluble magnesium oxide
5	Calcium nitrate suspension	Product obtained by suspension of calcium nitrate in water	8 % N Nitrogen expressed as total nitrogen or nitric and ammoniacal nitrogen maximum content of ammoniacal nitrogen: 1,0 % 14 % CaO Calcium expressed as water soluble CaO	The type designation may be followed by one of the following indications: — for foliar application; — for making nutrient solutions and suspensions; — for fertigation.	Total nitrogen Nitric nitrogen Water soluble calcium oxide for the uses stipulated in column 5

▼B

1	2	3	4	5	6
6	Nitrogen fertiliser solution with urea formaldehyde	Product obtained chemically or by dissolution in water of urea formaldehyde and a nitrogenous fertiliser from list A-1 in this regulation, excluding products 3(a), 3(b), and 5	18 % N expressed as total nitrogen At least one third of the declared total nitrogen content must derive from urea formaldehyde Maximum biuret content: (ureic N + urea formaldehyde N) × 0,026		Total nitrogen For each form amounting to at least 1 %: — Nitric nitrogen; — Ammoniacal nitrogen; — Ureic nitrogen. Nitrogen from urea formaldehyde
7	Nitrogen fertiliser suspension with urea formaldehyde	Product obtained chemically or by suspension in water of urea formaldehyde and a nitrogenous fertiliser from list A-1 in this regulation, excluding products 3(a), 3(b), and 5	18 % N expressed as total nitrogen At least one third of the declared total nitrogen content must derive from urea formaldehyde of which at least three fifths has to be soluble in hot water Maximum biuret content: (ureic N + urea formaldehyde N) × 0,026		Total nitrogen For each form amounting to at least 1 % — Nitric nitrogen; — Ammoniacal nitrogen; — Ureic nitrogen. Nitrogen from urea formaldehyde Nitrogen from urea formaldehyde that is soluble in cold water Nitrogen from urea formaldehyde that is only soluble in hot water
▼M15 8	Potassium formate water solution	Product obtained by reacting potassium hydroxide, formaldehyde, butyraldehyde, and formic acid followed by separation and evaporation	50 % potassium formate 28 % K_2O Potassium expressed as water soluble K_2O 27 % formate		Water soluble potassium oxide

▼B

C.2. *Compound fluid fertilisers*

C.2.1.	Type designation:	NPK-fertiliser solution.
	Data on method of production:	Product obtained chemically and by dissolution in water, in a form stable at atmospheric pressure, without addition of organic nutrients of animal or vegetable origin.
	Minimum content of nutrients (percentage by weight) and other requirements:	— Total: 15 %, (N + P_2O_5 + K_2O); — For each of the nutrients: 2 % N, 3 % P_2O_5, 3 % K_2O; — Maximum biuret content: ureic N × 0,026.

▼B

Forms, solubilities and nutrient content to be declared as specified in columns 4, 5 and 6 Particle size			Data for identification of the fertilisers Other requirements		
N	P_2O_5	K_2O	N	P_2O_5	K_2O
1	2	3	4	5	6
(1) Total nitrogen (2) Nitric nitrogen (3) Ammoniacal nitrogen (4) Ureic nitrogen	Water-soluble P_2O_5	Water-soluble K_2O	(1) Total nitrogen (2) If any of the forms of nitrogen (2) to (4) amounts to not less than 1 % by weight, it must be declared (3) If the biuret content is less than 0,2 %, the words 'low in biuret' may be added	Water-soluble P_2O_5	(1) Water-soluble potassium oxide (2) The words 'low in chloride' may be used only where the Cl content does not exceed 2 % (3) The chloride content may be declared

C.2. *Compound fluid fertilisers (cont'd)*

▼M11

C.2.2	Type designation:	NPK-fertiliser solution containing urea formaldehyde
	Data on method of production:	Product obtained chemically and by dissolution in water, in a form stable at atmospheric pressure, without addition of organic nutrients of animal or vegetable origin and containing urea formaldehyde
	Minimum content of nutrients (percentage by weight) and other requirements:	— Total 15 % (N + P_2O_5 + K_2O) — For each of the nutrients: — 5 % N, at least 25 % of the declared content of total nitrogen must derive from nitrogen form (5) — 3 % P_2O_5 — 3 % K_2O Maximum biuret content: (ureic N + urea formaldehyde N) × 0,026

▼M11

Forms, solubilities and nutrient content to be declared as specified in columns 4, 5 and 6 — Particle size			Data for identification of the fertilisers — Other requirements		
N	P_2O_5	K_2O	N	P_2O_5	K_2O
1	2	3	4	5	6
(1) Total nitrogen (2) Nitric nitrogen (3) Ammoniacal nitrogen (4) Ureic nitrogen (5) Nitrogen from urea formaldehyde	Water-soluble P_2O_5	Water-soluble K_2O	(1) Total nitrogen (2) If any of the forms of nitrogen (2), (3) and (4) amounts to not less than 1 % by weight, it must be declared (3) Nitrogen from urea formaldehyde (4) If the biuret content is less than 0,2 %, the words 'low in biuret' may be added	Water-soluble P_2O_5	(1) Water-soluble potassium oxide (2) The words 'low in chloride' may be used only where the Cl content does not exceed 2 % (3) The chloride content may be declared

C.2.3	Type designation:	NPK-fertiliser suspension
	Data on method of production:	Product in liquid form, in which the nutrients are derived from substances both in suspension in the water and in solution without addition of organic nutrients of animal or vegetable origin
	Minimum content of nutrients (percentage by weight) and other requirements:	— Total: 20 %, ($N + P_2O_5 + K_2O$) — For each of the nutrients: 3 % N, 4 % P_2O_5, 4 % K_2O — Maximum biuret content: ureic N × 0,026

▼M11

Forms, solubilities and nutrient content to be declared as specified in columns 4, 5 and 6 — Particle size			Data for identification of the fertilisers — Other requirements		
N	P_2O_5	K_2O	N	P_2O_5	K_2O
1	2	3	4	5	6
(1) Total nitrogen (2) Nitric nitrogen (3) Ammoniacal nitrogen (4) Ureic nitrogen	(1) Water-soluble P_2O_5 (2) P_2O_5 soluble in neutral ammonium citrate (3) P_2O_5 soluble in neutral ammonium citrate and water	Water-soluble K_2O	(1) Total nitrogen (2) If any of the forms of nitrogen (2), (3) and (4) amounts to not less than 1 % by weight, it must be declared (3) If the biuret content is less than 0,2 %, the words 'low in biuret' may be added	The fertilisers must not contain Thomas slag, aluminium calcium phosphate, calcined phosphates, partially solubilised phosphates or rock phosphates (1) If the water-soluble P_2O_5 is less than 2 %, only solubility 2 shall be declared (2) If the water-soluble P_2O_5 is at least 2 %, solubility 3 and the water-soluble P_2O_5 content shall be declared	(1) Water-soluble potassium oxide (2) The words 'low in chloride' may be used only where the Cl content does not exceed 2 % (3) The chloride content may be declared

C.2.4	Type designation:	NPK-fertiliser suspension containing urea formaldehyde
	Data on method of production:	Product in liquid form, in which the nutrients are derived from substances both in solution and in suspension in water, without addition of organic nutrients of animal or vegetable origin and containing urea formaldehyde
	Minimum content of nutrients (percentage by weight) and other requirements:	— Total 20 % (N + P_2O_5 + K_2O) — For each of the nutrients: — 5 % N, at least 25 % of the declared content of total nitrogen must derive from nitrogen form (5) At least 3/5 of the declared nitrogen content (5) must be soluble in hot water — 4 % P_2O_5 — 4 % K_2O Maximum biuret content: (ureic N + urea formaldehyde N) × 0,026

▼M11

Forms, solubilities and nutrient content to be declared as specified in columns 4, 5 and 6 — Particle size			Data for identification of the fertilisers — Other requirements		
N	P_2O_5	K_2O	N	P_2O_5	K_2O
1	2	3	4	5	6
(1) Total nitrogen (2) Nitric nitrogen (3) Ammoniacal nitrogen (4) Ureic nitrogen (5) Nitrogen from urea formaldehyde	(1) Water-soluble P_2O_5 (2) P_2O_5 soluble in neutral ammonium citrate (3) P_2O_5 soluble in neutral ammonium citrate and in water	Water-soluble K_2O	(1) Total nitrogen (2) If any of the forms of nitrogen (2), (3) and (4) amounts to not less than 1 % by weight, it must be declared (3) Nitrogen from urea formaldehyde (4) If the biuret content is less than 0,2 %, the words 'low in biuret' may be added	The fertilisers must not contain Thomas slag, aluminium calcium phosphate, calcined phosphates, partially solubilised phosphates or rock phosphates (1) If the water-soluble P_2O_5 is less than 2 %, only solubility (2) shall be declared (2) If the water-soluble P_2O_5 is at least 2 %, solubility (3) and the water-soluble P_2O_5 content shall be declared	(1) Water-soluble potassium oxide (2) The words 'low in chloride' may be used only where the Cl content does not exceed 2 % (3) The chloride content may be declared

C.2.5	Type designation:	NP-fertiliser solution
	Data on method of production:	Product obtained chemically and by dissolution in water, in a form stable at atmospheric pressure, without addition of organic nutrients of animal or vegetable origin
	Minimum content of nutrients (percentage by weight) and other requirements:	— Total: 18 %, (N + P_2O_5) — For each of the nutrients: 3 % N, 5 % P_2O_5 — Maximum biuret content: ureic N × 0,026

▼M11

Forms, solubilities and nutrient content to be declared as specified in columns 4, 5 and 6 — Particle size			Data for identification of the fertilisers — Other requirements		
N	P_2O_5	K_2O	N	P_2O_5	K_2O
1	2	3	4	5	6
(1) Total nitrogen (2) Nitric nitrogen (3) Ammoniacal nitrogen (4) Ureic nitrogen	Water-soluble P_2O_5		(1) Total nitrogen (2) If any of the forms of nitrogen (2), (3) and (4) amounts to not less than 1 % by weight, it must be declared (3) If the biuret content is less than 0,2 %, the words 'low in biuret' may be added	Water-soluble P_2O_5	

C.2.6	Type designation:	NP-fertiliser solution containing urea formaldehyde
	Data on method of production:	Product obtained chemically and by dissolution in water, in a form stable at atmospheric pressure, without addition of organic nutrients of animal or vegetable origin and containing urea formaldehyde
	Minimum content of nutrients (percentage by weight) and other requirements:	— Total 18 % (N +P_2O_5) — For each of the nutrients: — 5 % N, at least 25 % of the declared content of total nitrogen must derive from nitrogen form (5) — 5 % P_2O_5 Maximum biuret content: (ureic N + urea formaldehyde N) × 0,026

▼M11

Forms, solubilities and nutrient content to be declared as specified in columns 4, 5 and 6 — Particle size			Data for identification of the fertilisers — Other requirements		
N	P_2O_5	K_2O	N	P_2O_5	K_2O
1	2	3	4	5	6
(1) Total nitrogen (2) Nitric nitrogen (3) Ammoniacal nitrogen (4) Ureic nitrogen (5) Nitrogen from urea formaldehyde	Water-soluble P_2O_5		(1) Total nitrogen (2) If any of the forms of nitrogen (2), (3) and (4) amounts to not less than 1 % by weight, it must be declared (3) Nitrogen from urea formaldehyde (4) If the biuret content is less than 0,2 %, the words 'low in biuret' may be added	Water-soluble P_2O_5	

C.2.7	Type designation:	NP-fertiliser suspension
	Data on method of production:	Product in liquid form, in which the nutrients are derived from substances both in solution and in suspension in the water, without addition of organic nutrients of animal or vegetable origin
	Minimum content of nutrients (percentage by weight) and other requirements:	— Total: 18 %, (N + P_2O_5) — For each of the nutrients: 3 % N, 5 % P_2O_5 — Maximum biuret content: ureic N × 0,026

▼M11

Forms, solubilities and nutrient content to be declared as specified in columns 4, 5 and 6 — Particle size			Data for identification of the fertilisers. Other requirements		
N	P_2O_5	K_2O	N	P_2O_5	K_2O
1	2	3	4	5	6
(1) Total nitrogen (2) Nitric nitrogen (3) Ammoniacal nitrogen (4) Ureic nitrogen	(1) Water-soluble P_2O_5 (2) P_2O_5 soluble in neutral ammonium citrate (3) P_2O_5 soluble in neutral ammonium citrate and water		(1) Total nitrogen (2) If any of the forms of nitrogen (2), (3) and (4) amounts to not less than 1 % by weight, it must be declared (3) If the biuret content is less than 0,2 %, the words 'low in biuret' may be added	The fertilisers may not contain Thomas slag, aluminium calcium phosphate, calcined phosphates, partially solubilised phosphate or rock phosphates (1) If the water-soluble P_2O_5 is less than 2 % only solubility 2 shall be declared (2) If the water-soluble P_2O_5 is at least 2 %, solubility 3 will be declared and the water-soluble P_2O_5 content must be stated	

C.2.8	Type designation:	NP-fertiliser suspension containing urea formaldehyde
	Data on method of production:	Product in liquid form, in which the nutrients are derived from substances both in solution and in suspension in water, without addition of organic nutrients of animal or vegetable origin and containing urea formaldehyde
	Minimum content of nutrients (percentage by weight) and other requirements:	— Total 18 % (N + P_2O_5) — For each of the nutrients: — 5 % N, at least 25 % of the declared content of total nitrogen must derive from nitrogen form (5) At least 3/5 of the declared nitrogen content (5) must be soluble in hot water — 5 % P_2O_5 Maximum biuret content: (ureic N + urea formaldehyde N) × 0,026

▼M11

Forms, solubilities and nutrient content to be declared as specified in columns 4, 5 and 6 — Particle size			Data for identification of the fertilisers — Other requirements		
N	P_2O_5	K_2O	N	P_2O_5	K_2O
1	2	3	4	5	6
(1) Total nitrogen (2) Nitric nitrogen (3) Ammoniacal nitrogen (4) Ureic nitrogen (5) Nitrogen from urea formaldehyde	(1) Water-soluble P_2O_5 (2) P_2O_5 soluble in neutral ammonium citrate (3) P_2O_5 soluble in neutral ammonium citrate and in water		(1) Total nitrogen (2) If any of the forms of nitrogen (2), (3) (4) amounts to not less than 1 % by weight, it must be declared (3) Nitrogen from urea formaldehyde (4) If the biuret content is less than 0,2 %, the words 'low in biuret' may be added	The fertilisers must not contain Thomas slag, aluminium calcium phosphate, calcined phosphates, partially solubilised phosphates or rock phosphates (1) If the water-soluble P_2O_5 is less than 2 %, only solubility (2) shall be declared (2) If the water-soluble P_2O_5 is at least 2 %, solubility (3) and the water-soluble P_2O_5 content shall be declared	

C.2.9	Type designation:	NK-fertiliser solution
	Data on method of production:	Product obtained chemically and by dissolution in water, in a form stable at atmospheric pressure, without addition of organic nutrients of animal or vegetable origin
	Minimum content of nutrients (percentage by weight) and other requirements:	— Total: 15 % (N + K_2O) — For each of the nutrients: 3 % N, 5 % K_2O — Maximum biuret content: ureic N × 0,026

▼M11

Forms, solubilities and nutrient content to be declared as specified in columns 4, 5 and 6 — Particle size			Data for identification of the fertilisers — Other requirements		
N	P_2O_5	K_2O	N	P_2O_5	K_2O
1	2	3	4	5	6
(1) Total nitrogen (2) Nitric nitrogen (3) Ammoniacal nitrogen (4) Ureic nitrogen		Water-soluble K_2O	(1) Total nitrogen (2) If any of the forms of nitrogen (2), (3) and (4) amounts to not less than 1 % by weight, it must be declared (3) If the biuret content is less than 0,2 %, the words 'low in biuret' may be added		(1) Water-soluble potassium oxide (2) The words 'low in chloride' may be used only where the Cl content does not exceed 2 % (3) The chloride content may be declared

C.2.10	Type designation:	NK-fertiliser solution containing urea formaldehyde
	Data on method of production:	Product obtained chemically and by dissolution in water, in a form stable at atmospheric pressure, without addition of organic nutrients of animal or vegetable origin and containing urea formaldehyde
	Minimum content of nutrients (percentage by weight) and other requirements:	— Total 15 % (N + K_2O) — For each of the nutrients: — 5 % N, at least 25 % of the declared content of total nitrogen must derive from nitrogen form (5) — 5 % K_2O Maximum biuret content: (ureic N + urea formaldehyde N) × 0,026

▼M11

Forms, solubilities and nutrient content to be declared as specified in columns 4, 5 and 6 — Particle size			Data for identification of the fertilisers — Other requirements		
N	P_2O_5	K_2O	N	P_2O_5	K_2O
1	2	3	4	5	6
(1) Total nitrogen (2) Nitric nitrogen (3) Ammoniacal nitrogen (4) Ureic nitrogen (5) Nitrogen from urea formaldehyde		Water-soluble K_2O	(1) Total nitrogen (2) If any of the forms of nitrogen (2), (3) and (4) amounts to not less than 1 % by weight, it must be declared (3) Nitrogen from urea formaldehyde (4) If the biuret content is less than 0,2 %, the words 'low in biuret' may be added		(1) Water-soluble potassium oxide (2) The words 'low in chloride' may be used only where the Cl content does not exceed 2 % (3) The chloride content may be declared

C.2.11	Type designation:	NK-fertiliser suspension
	Data on method of production:	Product in liquid form, in which the nutrients are derived from substances both in solution and in suspension in the water, without addition of organic nutrients of animal or vegetable origin
	Minimum content of nutrients (percentage by weight) and other requirements:	— Total: 18 % (N + K_2O) — For each of the nutrients: 3 % N, 5 % K_2O — Maximum biuret content: ureic N × 0,026

▼M11

Forms, solubilities and nutrient content to be declared as specified in columns 4, 5 and 6 — Particle size			Data for identification of the fertilisers — Other requirements		
N	P_2O_5	K_2O	N	P_2O_5	K_2O
1	2	3	4	5	6
(1) Total nitrogen (2) Nitric nitrogen (3) Ammoniacal nitrogen (4) Ureic nitrogen		Water-soluble K_2O	(1) Total nitrogen (2) If any of the forms of nitrogen (2), (3) and (4) amounts to not less than 1 % by weight, it must be declared (3) If the biuret content is less than 0,2 %, the words 'low in biuret' may be added		(1) Water-soluble potassium oxide (2) The words 'low in chloride' may be used only where the Cl content does not exceed 2 % (3) The chloride content may be declared

C.2.12	Type designation:	NK-fertiliser suspension containing urea formaldehyde
	Data on method of production:	Product in liquid form, in which the nutrients are derived from substances both in solution and in suspension in water, without addition of organic nutrients of animal or vegetable origin and containing urea formaldehyde
	Minimum content of nutrients (percentage by weight) and other requirements:	— Total 18 %(N +K_2O) — For each of the nutrients: — 5 % N, at least 25 % of the declared content of total nitrogen must derive from nitrogen form (5) At least 3/5 of the declared nitrogen content (5) must be soluble in hot water — 5 % K_2O Maximum biuret content: (ureic N + urea formaldehyde N) × 0,026

▼M11

Forms, solubilities and nutrient content to be declared as specified in columns 4, 5 and 6 — Particle size			Data for identification of the fertilisers — Other requirements		
N	P_2O_5	K_2O	N	P_2O_5	K_2O
1	2	3	4	5	6
(1) Total nitrogen (2) Nitric nitrogen (3) Ammoniacal nitrogen (4) Ureic nitrogen (5) Nitrogen from urea formaldehyde		Water-soluble K_2O	(1) Total nitrogen (2) If any of the forms of nitrogen (2), (3) and (4) amounts to not less than 1 % by weight, it must be declared (3) Nitrogen from urea formaldehyde (4) If the biuret content is less than 0,2 %, the words 'low in biuret' may be added		(1) Water-soluble potassium oxide (2) The words 'low in chloride' may be used only where the Cl content does not exceed 2 % (3) The chloride content may be declared

C.2.13	Type designation:	PK-fertiliser solution
	Data on method of production:	Product obtained chemically and by dissolution in water, without addition of organic nutrients of animal or vegetable origin
	Minimum content of nutrients (percentage by weight) and other requirements:	— Total: 18 % (P_2O_5 + K_2O) — For each of the nutrients: 5 % P_2O_5, 5 % K_2O

Forms, solubilities and nutrient content to be declared as specified in columns 4, 5 and 6 — Particle size			Data for identification of the fertilisers — Other requirements		
N	P_2O_5	K_2O	N	P_2O_5	K_2O
1	2	3	4	5	6
	Water-soluble P_2O_5	Water-soluble K_2O		Water-soluble P_2O_5	(1) Water-soluble potassium oxide (2) The words 'low in chloride' may be used only where the Cl content does not exceed 2 % (3) The chloride content may be declared

▼M11

C.2.14	Type designation:	PK-fertiliser suspension
	Data on method of production:	Product in liquid form, in which the nutrients are derived from substances both in solution and in suspension in water, without addition of organic nutrients of animal or vegetable origin
	Minimum content of nutrients (percentage by weight) and other requirements:	— Total: 18 % (P_2O_5 + K_2O) — For each of the nutrients: 5 % P_2O_5, 5 % K_2O

Forms, solubilities and nutrient content to be declared as specified in columns 4, 5 and 6 — Particle size			Data for identification of the fertilisers — Other requirements		
N	P_2O_5	K_2O	N	P_2O_5	K_2O
1	2	3	4	5	6
	(1) Water-soluble P_2O_5 (2) P_2O_5 soluble in neutral ammonium citrate (3) P_2O_5 soluble in neutral ammonium citrate and water	Water-soluble K_2O		The fertilisers must not contain Thomas slag, aluminium calcium phosphate, calcined phosphates, partially solubilised phosphates or rock phosphates (1) If the water-soluble P_2O_5 is less than 2 % only solubility 2 will be declared (2) If the water-soluble P_2O_5 is at least 2 % solubility 3 and the water-soluble P_2O_5 content shall be declared	(1) Water-soluble potassium oxide (2) The words ‘low in chloride’ may be used only where the Cl content does not exceed 2 % (3) The chloride content may be declared

▼B

D. **Inorganic secondary nutrient fertilisers**

No	Type designation	Data on method of production and essential ingredients	Minimum content of nutrients (percentage by weight) Data on the expression of nutrients Other requirements	Other data or type designation	Nutrient content to be declared Forms and solubilities of the nutrients Other criteria
1	2	3	4	5	6
1	Calcium sulphate	Product of natural or industrial origin containing calcium sulphate at various degrees of hydration	25 % CaO 35 % SO_3 Calcium and sulphur expressed as total CaO + SO_3 Fineness of grind: — at least 80 % to pass through a sieve with a 2 mm mesh width, — at least 99 % to pass through a sieve with a 10 mm mesh width	Usual trade names may be added	Total sulphur trioxide Optional: total CaO
2	Calcium chloride solution	Calcium chloride solution of industrial origin	12 % CaO Calcium expressed as water-soluble CaO		Calcium oxide Optional: for plant spraying
▼M8 2.1	Calcium formate	Chemically obtained product containing calcium formate as essential ingredient	33,6 % CaO Calcium expressed as water-soluble CaO 56 % formate		Calcium oxide Formate
2.2	Calcium formate fluid	Product obtained by dissolution in water of calcium formate	21 % CaO Calcium expressed as water-soluble CaO 35 % formate		Calcium oxide Formate
▼M14 2.3	Calcium chelate of iminodisuccinic acid	Chemically obtained product containing calcium chelate of iminodisuccinic acid as essential ingredient, without addition of organic nutrients of animal or vegetable origin	9 % CaO Calcium expressed as CaO, chelated by iminodisuccinic acid (IDHA) water-soluble.		Calcium expressed as CaO, chelated by iminodisuccinic acid (IDHA) water-soluble

▼B

1	2	3	4	5	6
3	Elemental sulphur	Comparatively refined natural or industrial product	98 % S (245 %: SO_3) Sulphur expressed as total SO_3		Total sulphur trioxide
4	Kieserite	Product of mineral origin containing monohydrated magnesium sulphate as main component	24 % MgO 45 % SO_3 Magnesium and sulphur expressed as water-soluble magnesium oxide and sulphur trioxide	Usual trade names may be added	Water-soluble magnesium oxide Optional: water-soluble sulphur trioxide
▼M7 5	Magnesium sulphate	Product containing heptahydrated magnesium sulphate as main ingredient	15 % MgO 28 % SO_3 Where micro-nutrients are added, and declared in accordance with Article 6(4) and 6(6): 10 % MgO 17 % SO_3 Magnesium and sulphur expressed as water-soluble magnesium oxide and sulphur trioxide	The usual trade names may be added	Water-soluble magnesium oxide Water-soluble sulphur trioxide
▼B 5.1	Magnesium sulphate solution	Product obtained by dissolution in water of magnesium sulphate of industrial origin	5 % MgO 10 % SO_3 Magnesium and sulphur expressed as water-soluble magnesium oxide and water-soluble sulphuric anhydride	Usual trade names may be added	Water-soluble magnesium oxide Optional: water-soluble sulphuric anhydride
5.2	Magnesium hydroxide	Product obtained chemically and having as its essential ingredient magnesium hydroxide	60 % MgO Particle size: at least 99 % able to pass through a sieve with a mesh of 0,063 mm		Total magnesium oxide
5.3	Suspension of magnesium hydroxide	Product obtained by suspension of type 5.2	24 % MgO		Total magnesium oxide
6	Magnesium chloride solution	Product obtained by dissolving magnesium chloride of industrial origin	13 % MgO Magnesium expressed as magnesium oxide Maximum calcium content: 3 % CaO		Magnesium oxide

▼B

E. **Inorganic micro-nutrient fertilisers**

Explanatory note: The following notes are applicable to the whole of Part E.

Note 1: A chelating agent may be designated by means of its initials as set out in E.3.

Note 2: If the product leaves no solid residue after being dissolved in water it may be described as 'for dissolution'.

Note 3: Where a micro-nutrient is present in a chelated form, the pH range guaranteeing acceptable stability of the chelated fraction shall be stated.

E.1. *Fertilisers containing only one micro-nutrient*

E.1.1. *Boron*

No	Type designation	Data on method of production and essential ingredients	Minimum content of nutrients (percentage by weight) Data on the expression of nutrients Other requirements	Other data on the type of designation	Nutrient content to be declared Forms and solubilities of the nutrients Other criteria
1	2	3	4	5	6
1a	Boric acid	Product obtained by the action of an acid on a borate	14 % water-soluble B	The usual trade names may be added	Water-soluble boron (B)
1b	Sodium borate	Chemically obtained product containing as its essential component a sodium borate	10 % water-soluble B	The usual trade names may be added	Water-soluble boron (B)
1c	Calcium borate	Product obtained from colemanite or pandermite containing as its essential ingredient calcium borates	7 % total B Particle size: at least 98 % passing through a 0,063 mm sieve	The usual trade names may be added	Total boron (B)
1d	Boron ethanol amine	Product obtained by reacting a boric acid with an ethanol amine	8 % water-soluble B		Water-soluble boron (B)
1e	Borated fertiliser in solution	Product obtained by dissolving types 1a and/or 1b and/or 1d	2 % water-soluble B	The designation must include the names of the constituents present	Water-soluble boron (B)
▼M9 1f	Borated fertiliser in suspension	Product obtained by suspending types 1a and/or 1b and/or 1c and/or 1d in water	2 % total B	The designation must include the names of the constituents present	Total boron (B) Water-soluble boron (B) if present

▼B

E.1.2. *Cobalt*

No	Type designation	Data on method of production and essential ingredients	Minimum content of nutrients (percentage by weight) Data on the expression of nutrients Other requirements	Other data on the type of designation	Nutrient content to be declared Forms and solubilities of the nutrients Other criteria
1	2	3	4	5	6
2a	Cobalt salt	Chemically obtained product containing a mineral salt of cobalt as its essential ingredient	19 % water-soluble Co	The designation must include the name of the mineral anion	Water-soluble cobalt (Co)
▼M8 2b	Cobalt chelate	Water-soluble product containing cobalt chemically combined with authorised chelating agent(s)	5 % of water-soluble cobalt and at least 80 % of the water-soluble cobalt is chelated by authorised chelating agent(s)	Name of each authorised chelating agent that chelates at least 1 % water-soluble cobalt and that can be identified and quantified by a European standard	Water-soluble cobalt (Co) Optional: Total cobalt (Co) chelated by authorised chelating agents Cobalt (Co) chelated by each authorised chelating agent that chelates at least 1 % water-soluble cobalt and that can be identified and quantified by a European standard
▼M9 2c	Cobalt fertiliser solution	Aqueous solution of types 2a and/or 2b or 2d	2 % water-soluble Co When types 2a and 2d are mixed, the complexed fraction must be at least 40 % of the water-soluble Co	The designation must include: (1) the name(s) of the mineral anion(s), if present (2) the name of any authorised chelating agent that chelates at least 1 % water-soluble cobalt if present and that can be identified and quantified by a European standard or the name of the authorised complexing agent that can be identified by a European standard, if present	Water-soluble cobalt (Co) Cobalt (Co) chelated by each authorised chelating agent that chelates at least 1 % water-soluble cobalt and that can be identified and quantified by a European standard Cobalt (Co) complexed by the authorised complexing agent that can be identified by a European Standard Optional: total cobalt (Co) chelated by authorised chelating agent(s)

▼M9

1	2	3	4	5	6
2d	Cobalt complex	Water-soluble product containing cobalt chemically combined with one authorised complexing agent	5 % of water-soluble Co and the complexed fraction must be at least 80 % of the water-soluble cobalt	The designation must include the name of the authorised complexing agent that can be identified by a European Standard	Water-soluble cobalt (Co) Total cobalt (Co) complexed

▼B

E.1.3. *Copper*

No	Type designation	Data on method of production and essential ingredients	Minimum content of nutrients (percentage by weight) Data on the expression of nutrients Other requirements	Other data on the type of designation	Nutrient content to be declared Forms and solubilities of the nutrients Other criteria
1	2	3	4	5	6
3a	Copper salt	Chemically obtained product containing a mineral salt of copper as its essential ingredient	20 % water-soluble Cu	The designation must include the name of the mineral anion	Water-soluble copper (Cu)
3b	Copper oxide	Chemically obtained product containing copper oxide as its essential ingredient	70 % total Cu Particle size: at least 98 % passing through a 0,063 mm sieve		Total copper (Cu)
3c	Copper hydroxide	Chemically obtained product containing copper hydroxide as its essential ingredient	45 % total Cu Particle size: at least 98 % passing through a 0,063 mm sieve		Total copper (Cu)
3d	Copper chelate	Water-soluble product containing copper chemically combined with authorised chelating agent(s)	5 % of water-soluble copper and at least 80 % of the water-soluble copper is chelated by authorised chelating agent(s)	Name of each authorised chelating agent that chelates at least 1 % water-soluble copper and that can be identified and quantified by a European standard	Water-soluble copper (Cu) Optional: Total copper (Cu) chelated by authorised chelating agents Copper (Cu) chelated by each authorised chelating agent that chelates at least 1 % water-soluble copper and that can be identified and quantified by a European standard

▼M8

▼B

1	2	3	4	5	6
3e	Copper-based fertiliser	Product obtained by mixing types 3a and/or 3b and/or 3c and/or a single one of type 3d and, if required, filler that is neither nutrient nor toxic	5 % total Cu	The designation must include: (1) the name(s) of the copper components; (2) the name of any chelating agent if present	Total copper (Cu) Water-soluble copper (Cu) if this accounts for at least 1/4 of the total copper Chelated copper (Cu) if present
▼M9 3f	Copper fertiliser solution	Aqueous solution of types 3a and/or 3d or 3i	2 % water-soluble Cu When types 3a and 3i are mixed, the complexed fraction must be at least 40 % of the water-soluble Cu	The designation must include: (1) the name(s) of the mineral anion(s), if present (2) the name of any authorised chelating agent that chelates at least 1 % water-soluble copper if present and that can be identified and quantified by a European standard or the name of the authorised complexing agent that can be identified by a European standard	Water-soluble copper (Cu) Copper (Cu) chelated by each authorised chelating agent that chelates at least 1 % water-soluble copper and that can be identified and quantified by a European standard Copper (Cu) complexed by the authorised complexing agent that can be identified by a European Standard Optional: Total copper (Cu) chelated by authorised chelating agent(s)
▼B 3g	Copper oxychloride	Chemically obtained product containing copper oxychloride [$Cu_2Cl(OH)_3$] as an essential ingredient	50 % total Cu Particle size: at least 98 % passing through a 0,063 mm sieve		Total copper (Cu)
▼M9 3h	Copper fertiliser in suspension	Product obtained by suspending types 3a and/or 3b and/or 3c and/or 3d and/or 3g in water	17 % total Cu	The designation must include: (1) the name(s) of the anions, if present	Total copper (Cu) Water-soluble copper (Cu) if present

▼M9

1	2	3	4	5	6
				(2) the name of any authorised chelating agent that chelates at least 1 % water-soluble copper if present and that can be identified and quantified by a European standard	Copper (Cu) chelated by each authorised chelating agent that chelates at least 1 % water-soluble copper and that can be identified and quantified by a European standard
3i	Copper complex	Water-soluble product containing copper chemically combined with one authorised complexing agent	5 % of water-soluble Cu and the complexed fraction must be at least 80 % of the water-soluble copper	The designation must include the name of the authorised complexing agent that can be identified by a European Standard	Water-soluble copper (Cu) Total copper (Cu) complexed

▼M4

E.1.4. *Iron*

No	Type designation	Data on method of production and essential ingredients	Minimum content of nutrients (percentage by weight) Data on the expression of nutrients Other requirements	Other data on the type of designation	Nutrient content to be declared Forms and solubilities of the nutrients Other criteria
1	2	3	4	5	6
4a	Iron salt	Chemically obtained product containing a mineral iron salt as its essential ingredient	12 % water-soluble Fe	The designation must include the name of the mineral anion	Water-soluble iron (Fe)
▼M8 4b	Iron chelate	Water-soluble product containing iron chemically combined with authorised chelating agent(s)	5 % of water-soluble iron, of which the chelated fraction is at least 80 % and at least 50 % of the water-soluble iron is chelated by authorised chelating agent(s)	Name of each authorised chelating agent that chelates at least 1 % water-soluble iron and that can be identified and quantified by a European standard	Water-soluble iron (Fe) Optional: Total iron (Fe) chelated by authorised chelating agents Iron (Fe) chelated by each authorised chelating agent that chelates at least 1 % water-soluble iron and that can be identified and quantified by a European standard

▼M4

1	2	3	4	5	6
▼M9 4c	Iron fertiliser solution	Aqueous solution of types 4a and/or 4b or 4d	2 % water-soluble Fe When types 4a and 4d are mixed, the complexed fraction must be at least 40 % of the water-soluble Fe	The designation must include: (1) the name(s) of the mineral anion(s), if present (2) the name of any authorised chelating agent that chelates at least 1 % water-soluble iron if present and that can be identified and quantified by a European standard or the name of the authorised complexing agent that can be identified by a European standard	Water-soluble iron (Fe) Iron (Fe) chelated by each authorised chelating agent that chelates at least 1 % water-soluble iron and that can be identified and quantified by a European standard Iron (Fe) complexed by the authorised complexing agent that can be identified by a European Standard Optional: total iron (Fe) chelated by authorised chelating agent(s)
4d	Iron complex	Water-soluble product containing iron chemically combined with one authorised complexing agent	5 % of water-soluble Fe and the complexed fraction must be at least 80 % of the water-soluble iron	The designation must include the name of the authorised complexing agent that can be identified by a European Standard	Water-soluble iron (Fe) Total iron (Fe) complexed

▼B

E.1.5. *Manganese*

No	Type designation	Data on method of production and essential ingredients	Minimum content of nutrients (percentage by weight) Data on the expression of nutrients Other requirements	Other data on the type of designation	Nutrient content to be declared Forms and solubilities of the nutrients Other criteria
1	2	3	4	5	6
5a	Manganese salt	Chemically obtained product containing a mineral manganese salt (Mn II) as its essential ingredient	17 % water-soluble Mn	The designation must include the name of the combined anion	Water-soluble manganese (Mn)

▼B

1	2	3	4	5	6
▼M8 5b	Manganese chelate	Water-soluble product containing manganese chemically combined with authorised chelating agent(s)	5 % of water-soluble manganese and at least 80 % of the water-soluble manganese is chelated by authorised chelating agent(s)	Name of each authorised chelating agent that chelates at least 1 % water-soluble manganese and that can be identified and quantified by a European standard	Water-soluble manganese (Mn) Optional: Total manganese (Mn) chelated by authorised chelating agents Manganese (Mn) chelated by each authorised chelating agent that chelates at least 1 % water-soluble manganese and that can be identified and quantified by a European standard
▼B 5c	Manganese oxide	Chemically obtained product containing manganese oxides as essential ingredients	40 % total Mn Particle size: at least 80 % passing through a 0,063 mm sieve		Total manganese (Mn)
5d	Manganese-based fertiliser	Product obtained by mixing types 5a and 5c	17 % total Mn	The designation must include the name of the manganese components	Total manganese (Mn) Water-soluble manganese (Mn) if this accounts for at least 1/4 of the total manganese
▼M9 5e	Manganese fertiliser solution	Aqueous solution of types 5a and/or 5b or 5g	2 % water-soluble Mn When types 5a and 5g are mixed, the complexed fraction must be at least 40 % of the water-soluble Mn	The designation must include: (1) the name(s) of the mineral anion(s), if present (2) the name of any authorised chelating agent that chelates at least 1 % water-soluble manganese if present and that can be identified and quantified by a European standard	Water-soluble manganese (Mn) Manganese (Mn) chelated by each authorised chelating agent that chelates at least 1 % water-soluble manganese and that can be identified and quantified by a European standard Manganese (Mn) complexed by the authorised complexing agent that can be identified by a European Standard

▼M9

1	2	3	4	5	6
				or the name of the authorised complexing agent that can be identified by a European standard	Optional: total manganese (Mn) chelated by authorised chelating agent(s)
5f	Manganese fertiliser in suspension	Product obtained by suspending types 5a and/or 5b and/or 5c in water	17 % total Mn	The designation must include: (1) the name(s) of the anions, if present (2) the name of any authorised chelating agent that chelates at least 1 % water-soluble manganese if present and that can be identified and quantified by a European standard	Total manganese (Mn) Water-soluble manganese (Mn) if present Manganese (Mn) chelated by each authorised chelating agent that chelates at least 1 % water-soluble manganese and that can be identified and quantified by a European standard
5g	Manganese complex	Water-soluble product containing manganese chemically combined with one authorised complexing agent	5 % of water-soluble Mn and the complexed fraction must be at least at least 80 % of the water-soluble manganese	The designation must include the name of the authorised complexing agent that can be identified by a European Standard	Water-soluble manganese (Mn) Total manganese (Mn) complexed

▼B

E.1.6. *Molybdenum*

No	Type designation	Data on method of production and essential ingredients	Minimum content of nutrients (percentage by weight) Data on the expression of nutrients Other requirements	Other data on the type of designation	Nutrient content to be declared Forms and solubilities of the nutrients Other criteria
1	2	3	4	5	6
6a	Sodium molybdate	Chemically obtained product containing sodium molybdate as its essential ingredient	35 % water-soluble Mo		Water-soluble molybdenum (Mo)

▼B

1	2	3	4	5	6
6b	Ammonium molybdate	Chemically obtained product containing ammonium molybdate as its essential ingredient	50 % water-soluble Mo		Water-soluble molybdenum (Mo)
6c	Molybdenum-based fertiliser	Product obtained by mixing types 6a and 6b	35 % water-soluble Mo	The designation must include the names of the molybdenum components	Water-soluble molybdenum (Mo)
6d	Molybdenum-based fertiliser solution	Product obtained by dissolving types 6a and/or one of the type 6b in water	3 % water-soluble Mo	The designation must include the name(s) of the molybdenum component(s)	Water-soluble molybdenum (Mo)

E.1.7. *Zinc*

No	Type designation	Data on method of production and essential ingredients	Minimum content of nutrients (percentage by weight) Data on the expression of nutrients Other requirements	Other data on the type of designation	Nutrient content to be declared Forms and solubilities of the nutrients Other criteria
1	2	3	4	5	6
7a	Zinc salt	Chemically obtained product and having as its essential ingredient a mineral salt of zinc	15 % water-soluble Zn	The designation must include the name of the mineral anion	Water-soluble zinc (Zn)
▼M8 7b	Zinc chelate	Water-soluble product containing zinc chemically combined with authorised chelating agent(s)	5 % of water-soluble zinc and at least 80 % of the water-soluble zinc is chelated by authorised chelating agent(s)	Name of each authorised chelating agent that chelates at least 1 % water-soluble zinc and that can be identified and quantified by a European standard	Water-soluble zinc (Zn) Optional: Total zinc (Zn) chelated by authorised chelating agents Zinc (Zn) chelated by each authorised chelating agent that chelates at least 1 % water-soluble zinc and that can be identified and quantified by a European standard

▼B

1	2	3	4	5	6
7c	Zinc oxide	Chemically obtained product and having as its essential ingredient zinc oxide	70 % total Zn Particle size: at least 80 % passing through a 0,063 mm sieve		Total zinc (Zn)
7d	Zinc-based fertiliser	Product obtained by mixing types 7a and 7c	30 % total Zn	The designation must include the name of the zinc components present	Total zinc (Zn) Water-soluble zinc (Zn) if this accounts for at least 1/4 of the total zinc (Zn)
▼M9 7e	Zinc fertiliser solution	Aqueous solution of types 7a and/or 7b or 7g	2 % water-soluble Zn When types 7a and 7g are mixed, the complexed fraction must be at least 40 % of the water-soluble Zn	The designation must include: (1) the name(s) of the mineral anion(s), if present (2) the name of any authorised chelating agent that chelates at least 1 % water-soluble zinc if present and that can be identified and quantified by a European standard or the name of the authorised complexing agent that can be identified by a European standard	Water-soluble zinc (Zn) Zinc (Zn) chelated by each authorised chelating agent that chelates at least 1 % water-soluble zinc and that can be identified and quantified by a European standard Zinc (Zn) complexed by the authorised complexing agent that can be identified by a European Standard Optional: total zinc (Zn) chelated by authorised chelating agent(s)

▼B

1	2	3	4	5	6
▼M8					
7f	Zinc fertiliser suspension	Product obtained by suspending type 7(a) and/or 7(c) and/or types 7(b) in water	20 % total zinc	The designation must include: (1) the name(s) of the anions (2) the name of any authorised chelating agent that chelates at least 1 % water-soluble zinc if present and that can be identified and quantified by a European standard	Total zinc (Zn) Water-soluble zinc (Zn) if present Zinc (Zn) chelated by each authorised chelating agent that chelates at least 1 % water-soluble zinc and that can be identified and quantified by a European standard
▼M9					
7g	Zinc complex	Water-soluble product containing zinc chemically combined with one authorised complexing agent	5 % of water-soluble zinc and the complexed fraction must be at least 80 % of the water-soluble zinc	The designation must include the name of the authorised complexing agent that can be identified by a European Standard	Water-soluble zinc (Zn) Total zinc (Zn) complexed

▼M8

E.2. *Minimum micro-nutrient content, percentage weight of fertiliser; mixed micro-nutrient fertiliser types*

E.2.1. *Minimum micro-nutrient content in solid or fluid mixtures of micro-nutrient fertilisers, percentage weight of fertiliser*

▼B

	Where the micro-nutrient is present in a form that is	
	exclusively mineral	chelated or complexed
For a micro-nutrient:		
Boron (B)	0,2	0,2
Cobalt (Co)	0,02	0,02
Copper (Cu)	0,5	0,1
Iron (Fe)	2,0	0,3
Manganese (Mn)	0,5	0,1
Molybdenum (Mo)	0,02	—
Zinc (Zn)	0,5	0,1

▼M8

_____

E.2.2. *Minimum micro-nutrient content in EC fertilisers containing primary and/or secondary nutrient(s) with micro-nutrient(s) applied to the soil, percentage weight of fertiliser*

▼B

	For crops or grassland	For horticultural use
Boron (B)	0,01	0,01
Cobalt (Co)	0,002	—
Copper (Cu)	0,01	0,002
Iron (Fe)	0,5	0,02
Manganese (Mn)	0,1	0,01
Molybdenum (Mo)	0,001	0,001
Zinc (Zn)	0,01	0,002

▼M8

E.2.3. *Minimum micro-nutrient content in EC fertilisers containing primary and/or secondary nutrient(s) with micro-nutrient(s) for leaf sprays, percentage weight of fertiliser*

▼B

Boron (B)	0,010
Cobalt (Co)	0,002
Copper (Cu)	0,002
Iron (Fe)	0,020
Manganese (Mn)	0,010
Molybdenum (Mo)	0,001
Zinc (Zn)	0,002

▼M8

E.2.4. *Solid or fluid mixtures of micro-nutrient fertilisers*

▼M9

No	Type designation	Data on method of production and essential requirements	Minimum content of nutrients (percentage by weight) Data on expression of nutrients Other requirements	Other data on the type designation	Nutrient content to be declared Forms and solubilities of the micro-nutrients Other criteria
1	2	3	4	5	6
1	Mixture of micro-nutrients	Product obtained by mixing two or more E.1 types of fertiliser or obtained by dissolving and/or suspending two or more E.1 types of fertiliser in water	(1) 5 % total content for a solid mixture or (2) 2 % total content for a fluid mixture Individual micro-nutrients according to Section E.2.1	Name of each micronutrient and its chemical symbol present listed in alphabetical order of their chemical symbols followed by the name(s) of its counter-ion(s) immediately after the type designation.	Total content of each micro-nutrient expressed as percentage of the fertiliser by mass, except where a micro-nutrient is totally water-soluble. Water-soluble content of each micro-nutrient expressed as percentage of the fertiliser by mass where the soluble content is at least half of the total content. Where a micro-nutrient is totally water-soluble, only the water-soluble content shall be declared. Where a micro-nutrient is chemically linked with an organic molecule, the micro-nutrient shall be declared immediately following the water-soluble content as a percentage of the fertiliser by mass, followed by one of the terms ‘chelated by’ or ‘complexed by’ with the name of each authorised chelating or complexing agent(s) as set out in Section E.3. The name of the organic molecule may be replaced by its initials. The following statement below the compulsory and optional declarations: ‘To be used only where there is a recognised need. Do not exceed the appropriate dose rate’.

▼M4

E.3. *List of authorised organic chelating and complexing agents for micronutrients*

The following substances are authorised provided that their corresponding nutrient chelate has complied with the requirements of Council Directive 67/548/EEC ([1]).

▼M9

E.3.1. *Chelating agents* ([2])

Acids, or sodium, potassium or ammonium salts of:

No	Designation	Alternative designation	Chemical formula	CAS number of the acid ([1])
1	Ethylenediaminetetraacetic acid	EDTA	$C_{10}H_{16}O_8N_2$	60-00-4
2	2-hydroxyethylethylenediaminetriacetic acid	HEEDTA	$C_{10}H_{18}O_7N_2$	150-39-0
3	diethylenetriaminepentaacetic acid	DTPA	$C_{14}H_{23}O_{10}N_3$	67-43-6
4	ethylenediamine- N,N'-di[(ortho-hydroxyphenyl)acetic acid]	[o,o] EDDHA	$C_{18}H_{20}O_6N_2$	1170-02-1
5	ethylenediamine- N-[(ortho-hydroxyphenyl)acetic acid]- N'-[(para-hydroxyphenyl)acetic acid]	[o,p] EDDHA	$C_{18}H_{20}O_6N_2$	475475-49-1
6	ethylenediamine- N,N'-di[(ortho-hydroxy-methylphenyl)acetic acid]	[o,o] EDDHMA	$C_{20}H_{24}O_6N_2$	641632-90-8
7	ethylenediamine- N-[(ortho-hydroxy-methylphenyl)acetic acid]- N'-[(para-hydroxy-methylphenyl)acetic acid]	[o,p] EDDHMA	$C_{20}H_{24}O_6N_2$	641633-41-2
8	ethylenediamine- N,N'-di[(5-carboxy-2-hydroxyphenyl)acetic acid]	EDDCHA	$C_{20}H_{20}O_{10}N_2$	85120-53-2
9	ethylenediamine- N,N'-di[(2-hydroxy-5-sulfophenyl)acetic acid] and its condensation products	EDDHSA	$C_{18}H_{20}O_{12}N_2S_2$ + n*($C_{12}H_{14}O_8N_2S$)	57368-07-7 and 642045-40-7
10	Iminodisuccinic acid	IDHA	$C_8H_{11}O_8N$	131669-35-7
11	N,N'-di(2-hydroxybenzyl)ethylenediamine-N,N'-diacetic acid	HBED	$C_{20}H_{24}N_2O_6$	35998-29-9

▼M12

12	[S,S]-Ethylenediaminedisuccinic acid	[S,S]-EDDS	$C_{10}H_{16}O_8N_2$	20846-91-7

▼M9

([1]) For information only.

([1]) OJ 196, 16.8.1967, p. 1.

([2]) The chelating agents are to be identified and quantified by the European Standards that cover the mentioned chelating agents.

▼M9

E.3.2. *Complexing agents* (1)

The following complexing agents are only permitted in products for fertigation and/or foliar application, except for Zn lignosulfonate, Fe lignosulfonate, Cu lignosulfonate and Mn lignosulfonate that can be applied directly to the soil.

Acids, or sodium, potassium or ammonium salts of:

▼M10

No	Designation	Alternative designation	Chemical formula	CAS number of the acid (1)
1	Lignosulfonic acid	LS	No chemical formula available	8062-15-5 (2)
▼M12				
2	Heptagluconic acid	HGA	$C_7H_{14}O_8$	23351-51-1

▼M10

(1) For information only.
(2) For quality reasons, the relative phenolic hydroxyl content and the relative organic sulphur content as measured by EN 16109 must exceed 1,5 % and 4,5 % respectively.

▼M5

F. **Nitrification and urease inhibitors**

The urease and nitrification inhibitors listed in the Tables F.1. and F.2. below may be added to the nitrogenous fertilisers types listed in Sections A.1., B.1., B.2., B.3., C.1. and C.2. of Annex I subject to the following provisions:

(1) at least 50 % of the total nitrogen content of the fertiliser consists of the nitrogen forms specified in column 3;

(2) they do not belong to the fertiliser types mentioned in column 4.

Fertilisers to which a nitrification inhibitor listed in Table F.1. has been added shall have the words ‘with nitrification inhibitor ([type designation of nitrification inhibitor])’ added to their type designation.

Fertilisers to which a urease inhibitor listed in Table F.2. has been added shall have the words ‘with urease inhibitor ([type designation of urease inhibitor])’ added to their type designation.

Technical information, as complete as possible, must be provided with each package or bulk consignment by the person responsible for marketing. This information must enable the user in particular to determine the rates and timing of application in relation to the crop being grown.

New nitrification inhibitors or urease inhibitors may be included in the Tables F1 or F2 respectively after evaluation of the technical files submitted in accordance with guidelines to be elaborated for these compounds.

(1) The complexing agents are to be identified by the European Standards that cover the mentioned complexing agents.

▼M5

F.1. *Nitrification inhibitors*

No	Type designation and composition of the nitrification inhibitor	Minimum and maximum inhibitor content as a percentage by mass of the total nitrogen present as ammonium nitrogen and urea nitrogen.	EC fertiliser types for which the inhibitor may not be used	Description of nitrification inhibitors with which mixtures are allowed Data on permitted ratio
1	2	3	4	5
1	Dicyandiamide ELINCS No 207-312-8	Minimum 2,25 Maximum 4,5		
▼M9 2	Product containing dicyandiamide (DCD) and 1,2,4-triazole (TZ) EC# EINECS No 207-312-8 EC# EINECS No 206-022-9	Minimum 2,0 Maximum 4,0		Mixture ratio 10:1 (DCD:TZ)
3	Product containing 1,2,4-triazole (TZ) and 3-methylpyrazole (MP) EC# EINECS No 206-022-9 EC# EINECS No 215-925-7	Minimum 0,2 Maximum 1,0		Mixture ratio 2:1 (TZ:MP)
▼M11 4	3,4-dimethyl-1H-pyrazole phosphate (DMPP) EC No 424-640-9	Minimum: 0,8 Maximum: 1,6		
▼M13 5	Isomeric mixture of 2-(3,4-dimethylpyrazole-1-yl)-succinic acid and 2-(4,5-dimethylpyrazole-1-yl)-succinic acid (DMPSA) EC No 940-877-5	Minimum: 0,8 Maximum: 1,6		

▼M5

F.2. *Urease inhibitors*

No	Type designation and composition of the urease inhibitor	Minimum and maximum inhibitor content as a percentage by mass of the total nitrogen present as urea nitrogen	EC fertiliser types for which the inhibitor may not be used	Description of urease inhibitors with which mixtures are allowed Data on permitted ratio
1	2	3	4	5
1	N-(n-butyl) thiophosphoric triamide (NBPT) ELINCS No 435-740-7	Minimum 0,09 Maximum 0,20		
▼M9 2	N-(2-nitrophenyl)phosphoric triamide (2-NPT) EC# EINECS No 477-690-9	Minimum 0,04 Maximum 0,15		

▼M5

No	Type designation and composition of the urease inhibitor	Minimum and maximum inhibitor content as a percentage by mass of the total nitrogen present as urea nitrogen	EC fertiliser types for which the inhibitor may not be used	Description of urease inhibitors with which mixtures are allowed Data on permitted ratio
1	2	3	4	5
▼M12 3	Mixture of N-butylphosphorothioic triamide (NBPT) and N-propylphosphorothioic triamide (NPPT) (ratio 3:1 ([1])) Reaction mixture: EC No 700-457-2 Mixture of NBPT/NPPT: NBPT: ELINCS No 435-740-7 NPPT: CAS No 916809-14-8	Minimum: 0,02 Maximum: 0,3		

([1]) Tolerance on the portion of NPPT: 20 %.

▼M10

G. **Liming materials**

The words ‘LIMING MATERIAL’ shall be added after the term ‘EC FERTILISER’.

All the properties mentioned in the tables of Sections G.1 to G.5 refer to the product as supplied unless otherwise specified.

Granulated liming materials which are produced by aggregating smaller primary particles must break down when stirred in water into particles with fineness distributions as specified in the type descriptions, and as measured using Method 14.9 ‘Determination of the breakdown of granules’.

G.1. *Natural Limes*

No	Type designation	Data on method of production and essential ingredients	Minimum content of nutrients (percentage by weight) Data on the expression of nutrients Other requirements	Other data on the type designation	Nutrient content to be declared Forms and solubilities of the nutrients Other criteria to be declared
1	2	3	4	5	6
1(a)	Limestone — standard quality	Product containing as its essential ingredient calcium carbonate, obtained by grinding of natural deposits of limestone.	Minimum neutralising value: 42 Fineness determined by wet sieving: — at least 97 % to pass through a 3,15 mm sieve; — at least 80 % to pass through a 1 mm sieve; and — at least 50 % to pass through a 0,5 mm sieve.	Usual trade names or alternative names may be added.	Neutralising value Total calcium Total magnesium (optional) Reactivity and method of determination (optional) Moisture (optional) Fineness determined by wet sieving (optional) Soil incubation results (optional)
1(b)	Limestone — fine quality		Minimum neutralising value: 50 Fineness determined by wet sieving: — at least 97 % to pass through a 2 mm sieve; — at least 80 % to pass through a 1 mm sieve; — at least 50 % to pass through a 0,315 mm sieve; and — at least 30 % to pass through a 0,1 mm sieve.	Usual trade names or alternative names may be added.	

▼M10

1	2	3	4	5	6
2(a)	Magnesian limestone — standard quality	Product containing as its essential ingredients calcium carbonate and magnesium carbonate, obtained by grinding of natural deposits of magnesian limestone.	Minimum neutralising value: 45 Total magnesium: 3 % MgO Fineness determined by wet sieving: — at least 97 % to pass through a 3,15 mm sieve; — at least 80 % to pass through a 1 mm sieve; and — at least 50 % to pass through a 0,5 mm sieve.	Usual trade names or alternative names may be added.	Neutralising value Total calcium Total magnesium Reactivity and method of determination (optional) Moisture (optional) Fineness determined by wet sieving (optional) Soil incubation results (optional)
2(b)	Magnesian limestone — fine quality		Minimum neutralising value: 52 Total magnesium: 3 % MgO Fineness determined by wet sieving: — at least 97 % to pass through a 2 mm sieve; — at least 80 % to pass through a 1 mm sieve; — at least 50 % to pass through a 0,315 mm sieve; and — at least 30 % to pass through a 0,1 mm sieve.	Usual trade names or alternative names may be added.	

▼M10

1	2	3	4	5	6
3(a)	Dolomitic limestone — standard quality	Product containing as its essential ingredients calcium carbonate and magnesium carbonate, obtained by grinding of natural deposits of dolomite.	Minimum neutralising value: 48 Total magnesium: 12 % MgO Fineness determined by wet sieving: — at least 97 % to pass through a 3,15 mm sieve; — at least 80 % to pass through a 1 mm sieve; and — at least 50 % to pass through a 0,5 mm sieve.	Usual trade names or alternative names may be added.	Neutralising value Total calcium Total magnesium Reactivity and method of determination (optional) Moisture (optional) Fineness determined by wet sieving (optional) Soil incubation results (optional)
3(b)	Dolomitic limestone — fine quality		Minimum neutralising value: 54 Total magnesium: 12 % MgO Fineness determined by wet sieving: — at least 97 % to pass through a 2 mm sieve; — at least 80 % to pass through a 1 mm sieve; — at least 50 % to pass through a 0,315 mm sieve; and — at least 30 % to pass through a 0,1 mm sieve.	Usual trade names or alternative names may be added.	
4(a)	Marine limestone — standard quality	Product containing as its essential ingredient calcium carbonate, obtained by grinding of natural deposits of limestone of marine origin.	Minimum neutralising value: 30 Fineness determined by wet sieving: — at least 97 % to pass through a 3,15 mm sieve; and — at least 80 % to pass through a 1 mm sieve.	Usual trade names or alternative names may be added.	Neutralising value Total calcium Total magnesium (optional) Reactivity and method of determination (optional) Moisture (optional)

▼M10

1	2	3	4	5	6
4(b)	Marine limestone — fine quality		Minimum neutralising value: 40 Fineness determined by wet sieving: — at least 97 % to pass through a 2 mm sieve; and — at least 80 % to pass through a 1 mm sieve.	Usual trade names or alternative names may be added.	Fineness determined by wet sieving (optional) Soil incubation results (optional)
5(a)	Chalk — standard quality	Product containing as its essential ingredient calcium carbonate, obtained by grinding of natural deposits of chalk.	Fineness determined by wet sieving after disintegration in water: — at least 90 % to pass through a 3,15 mm sieve; — at least 70 % to pass through a 2 mm sieve; and — at least 40 % to pass through a 0,315 mm sieve. Reactivity of fraction 1-2 mm (obtained by dry sieving) at least 40 % in citric acid Minimum neutralising value: 42 Fineness determined by wet sieving: — at least 97 % to pass through a 25 mm sieve; and — at least 30 % to pass through a 2 mm sieve.	Usual trade names or alternative names may be added.	Neutralising value Total calcium Total magnesium (optional) Reactivity and method of determination (optional) Moisture (optional) Fineness determined by wet sieving (optional) Soil incubation results (optional)

▼M10

1	2	3	4	5	6
5(b)	Chalk — fine quality		Fineness determined by wet sieving after disintegration in water: — at least 97 % to pass through a 3,15 mm sieve; — at least 70 % to pass through a 2 mm sieve; and — at least 50 % to pass through a 0,315 mm sieve. Reactivity of fraction 1-2 mm (obtained by dry sieving) at least 65 % in citric acid Minimum neutralising value: 48 Fineness determined by wet sieving: — at least 97 % to pass through a 25 mm sieve; and — at least 30 % to pass through a 2 mm sieve.	Usual trade names or alternative names may be added.	
6	Carbonate suspension	Product containing as its essential ingredients calcium carbonate and/or magnesium carbonate, obtained by grinding and suspending in water of natural deposits of limestone, magnesian limestone, dolomite or chalk.	Minimum neutralising value: 35 Fineness determined by wet sieving: — at least 97 % to pass through a 2 mm sieve; — at least 80 % to pass through a 1 mm sieve; — at least 50 % to pass through a 0,315 mm sieve; and — at least 30 % to pass through a 0,1 mm sieve.	Usual trade names or alternative names may be added.	Neutralising value Total calcium Total magnesium if MgO ≥ 3 % Moisture (optional) Reactivity and method of determination (optional) Fineness determined by wet sieving (optional) Soil incubation results (optional)

▼M10

G.2. *Oxide and Hydroxide limes of natural origin*

No	Type designation	Data on method of production and essential ingredients	Minimum content of nutrients (percentage by weight) Data on the expression of nutrients Other requirements	Other data on the type designation	Nutrient content to be declared Forms and solubilities of the nutrients Other criteria to be declared
1	2	3	4	5	6
1(a)	Burnt lime — basic quality	Product containing as its essential ingredient calcium oxide obtained by burning of natural deposits of limestone.	Minimum neutralising value: 75 Fineness determined by dry sieving: Fine: — at least 97 % to pass through a 4 mm sieve. Screened: — at least 97 % to pass through a 8 mm sieve; and — no more than 5 % to pass through a 0,4 mm sieve.	The type designation must include the fineness type ‘fine’ or ‘screened’. Usual trade names or alternative names may be added.	Neutralising value Total calcium Total magnesium (optional) Fineness determined by dry sieving (optional) Soil incubation results (optional)
1(b)	Burnt lime — premium quality	Product containing as its essential ingredient calcium oxide obtained by burning of natural deposits of limestone.	Minimum neutralising value: 85 Fineness determined by dry sieving: Fine: — at least 97 % to pass through a 4 mm sieve. Screened: — at least 97 % to pass through a 8 mm sieve; and — no more than 5 % to pass through a 0,4 mm sieve.	The type designation must include the fineness type ‘fine’ or ‘screened’. Usual trade names or alternative names may be added.	Neutralising value Total calcium Total magnesium (optional) Fineness determined by dry sieving (optional) Soil incubation results (optional)

▼M10

1	2	3	4	5	6
2(a)	Magnesian burnt lime — basic quality	Product containing as its essential ingredients calcium oxide and magnesium oxide, obtained by burning of natural deposits of magnesian limestone.	Minimum neutralising value: 80 Total Magnesium: 7 % MgO Fineness determined by dry sieving: Fine: — at least 97 % to pass through a 4 mm sieve. Screened: — at least 97 % to pass through a 8 mm sieve; and — no more than 5 % to pass through a 0,4 mm sieve.	The type designation must include the fineness type ‘fine’ or ‘screened’. Usual trade names or alternative names may be added.	Neutralising value Total calcium Total magnesium Fineness determined by dry sieving (optional) Soil incubation results (optional)
2(b)	Magnesian burnt lime — premium quality	Product containing as its essential ingredients calcium oxide and magnesium oxide, obtained by burning of natural deposits of magnesian limestone.	Minimum neutralising value: 85 Total Magnesium: 7 % MgO Fineness determined by dry sieving: Fine: — at least 97 % to pass through a 4 mm sieve. Screened: — at least 97 % to pass through a 8 mm sieve; and — no more than 5 % to pass through a 0,4 mm sieve.	The type designation must include the fineness type ‘fine’ or ‘screened’. Usual trade names or alternative names may be added.	Neutralising value Total calcium Total magnesium Fineness determined by dry sieving (optional) Soil incubation results (optional)

▼M10

1	2	3	4	5	6
3(a)	Dolomitic burnt lime — basic quality	Product containing as its essential ingredients calcium oxide and magnesium oxide, obtained by burning of natural deposits of dolomite.	Minimum neutralising value: 85 Total Magnesium: 17 % MgO Fineness determined by dry sieving: Fine: — at least 97 % to pass through a 4 mm sieve. Screened: — at least 97 % to pass through a 8 mm sieve; and — no more than 5 % to pass through a 0,4 mm sieve.	The type designation must include the fineness type ‘fine’ or ‘screened’. Usual trade names or alternative names may be added.	Neutralising value Total calcium Total magnesium Fineness determined by dry sieving (optional) Soil incubation results (optional)
3(b)	Dolomitic burnt lime — premium quality	Product containing as its essential ingredients calcium oxide and magnesium oxide, obtained by burning of natural deposits of dolomite.	Minimum neutralising value: 95 Total Magnesium: 17 % MgO Fineness determined by dry sieving: Fine: — at least 97 % to pass through a 4 mm sieve. Screened: — at least 97 % to pass through a 8 mm sieve; and — no more than 5 % to pass through a 0,4 mm sieve.	The type designation must include the fineness type ‘fine’ or ‘screened’. Usual trade names or alternative names may be added.	Neutralising value Total calcium Total magnesium Fineness determined by dry sieving (optional) Soil incubation results (optional)

▼M10

1	2	3	4	5	6
4	Hydrated burnt lime (slaked lime)	Product containing as its essential ingredients calcium hydroxide, obtained by burning and slaking of natural deposits of limestone.	Minimum neutralising value: 65 Fineness determined by wet sieving: — at least 95 % to pass through a 0,16 mm sieve.	Usual trade names or alternative names may be added.	Neutralising value Total calcium Total magnesium (optional) Fineness determined by wet sieving (optional) Moisture (optional) Soil incubation results (optional)
5	Hydrated magnesian burnt lime (slaked magnesian lime)	Product containing as its essential ingredients calcium hydroxide and magnesium hydroxide, obtained by burning and slaking of natural deposits of magnesian limestone.	Minimum neutralising value: 70 Total Magnesium: 5 % MgO Fineness determined by wet sieving: — at least 95 % to pass through a 0,16 mm sieve.	Usual trade names or alternative names may be added.	Neutralising value Total calcium Total magnesium Fineness determined by wet sieving (optional) Moisture (optional) Soil incubation results (optional)
6	Hydrated dolomitic burnt lime	Product containing as its essential ingredients calcium hydroxide and magnesium hydroxide, obtained by burning and slaking, of natural deposits of dolomite.	Minimum neutralising value: 70 Total Magnesium: 12 % MgO Fineness determined by wet sieving: — at least 95 % to pass through a 0,16 mm sieve.	Usual trade names or alternative names may be added.	Neutralising value Total calcium Total magnesium Fineness determined by wet sieving (optional) Moisture (optional) Soil incubation results (optional)

▼M10

1	2	3	4	5	6
7	Hydrated lime suspension	Product containing as its essential ingredients calcium hydroxide and/or magnesium hydroxide, obtained by burning, slaking and suspending in water of natural deposits of limestone, magnesian limestone or dolomite.	Minimum neutralising value: 20 Fineness determined by wet sieving: — at least 95 % to pass through a 0,16 mm sieve.	Usual trade names or alternative names may be added.	Neutralising value Total calcium Total magnesium if MgO ≥ 3 % Moisture (optional) Fineness determined by wet sieving (optional) Soil incubation results (optional)

G.3. *Limes from industrial processes*

No	Type designation	Data on method of production and essential ingredients	Minimum content of nutrients (percentage by weight) Data on the expression of nutrients Other requirements	Other data on the type designation	Nutrient content to be declared Forms and solubilities of the nutrients Other criteria to be declared
1	2	3	4	5	6
1(a)	Sugar factory lime	Product from sugar production obtained by carbonation using exclusively burnt lime from natural sources and containing as essential ingredient finely divided calcium carbonate.	Minimum neutralising value: 20	Usual trade names or alternative names may be added.	Neutralising value Total calcium Total magnesium (optional) Moisture (optional) Reactivity and method of determination (optional) Soil incubation results (optional)
1(b)	Sugar factory lime suspension		Minimum neutralising value: 15		

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G.4. *Mixed limes*

No	Type designation	Data on method of production and essential ingredients	Minimum content of nutrients (percentage by weight) Data on the expression of nutrients Other requirements	Other data on the type designation	Nutrient content to be declared Forms and solubilities of the nutrients Other criteria to be declared
1	2	3	4	5	6
1	Mixed lime	Product obtained by mixing types listed in sections G1 and G2.	Minimum carbonate content: 15 % Maximum carbonate content: 90 %	The word ‘magnesian’ shall be added to the type designation if MgO ≥ 5 %. Usual trade names or alternative names may be added.	Types as specified in sections G.1 and G.2 Neutralising value Total calcium Total magnesium if MgO ≥ 3 % Soil incubation results (optional) Moisture (optional)

G.5. *Mixtures of liming materials with other EC fertiliser types*

No	Type designation	Data on method of production and essential ingredients	Minimum content of nutrients (percentage by weight) Data on the expression of nutrients Other requirements	Other data on the type designation	Nutrient content to be declared Forms and solubilities of the nutrients Other criteria to be declared
1	2	3	4	5	6
1	Mixture of [type designation in section G.1 to G.4] with [type designation in section A, B, D].	Product obtained by mixing, compacting or granulating liming materials listed in sections G.1 to G.4 with fertiliser types listed in sections A, B or D. The following mixtures are prohibited: — ammonium sulphate (Type A.1.4) or urea (Type A.1.9) with oxide limes or hydroxide limes listed in Section G.2;	Neutralising value: 15 3 % N for mixtures containing fertiliser types with a minimum N content 3 % P_2O_5 for mixtures containing fertiliser types with a minimum content P_2O_5 3 % K_2O for mixtures containing fertiliser types with a minimum content K_2O Potassium expressed as water-soluble K_2O	Other requirements mentioned in the individual entries.	Neutralising Value Nutrients according to the nutrient declarations of the individual fertiliser types. Total calcium Total magnesium if MgO ≥ 3 % If the chloride content does not exceed 2 % Cl, the words ‘low in chloride’ may be added Moisture (optional) Fineness (optional)

▼M10

1	2	3	4	5	6
		— mixing and then compacting or granulating super phosphates of the types A.2.2(a), (b) or (c) with any of the types described in Section G.1 to G.4.			

▼B

ANNEX II

TOLERANCES

The tolerances given in this Annex are negative values in percentage by mass. The tolerance allowed in respect of the declared nutrient contents in the various types of EC fertiliser are as follows:

1. **Inorganic straight primary nutrient fertilisers absolute value in percentage by mass expressed as N, P_2O_5, K_2O, MgO, Cl**

1.1. *Nitrogenous fertilisers*

calcium nitrate	0,4
calcium — magnesium nitrate	0,4
sodium nitrate	0,4
chile nitrate	0,4
calcium cyanamide	1,0
nitrogenous calcium cyanamide	1,0
ammonium sulphate	0,3
Ammonium nitrate or calcium ammonium nitrate:	
— up to and including 32 %	0,8
— more than 32 %	0,6
ammonium sulphate-nitrate	0,8
magnesium sulphonitrate	0,8
magnesium ammonium nitrate	0,8
urea	0,4
calcium nitrate suspension	0,4
nitrogen fertiliser solution with urea formaldehyde	0,4
nitrogen fertiliser suspension with urea formaldehyde	0,4
urea-ammonium sulphate	0,5
nitrogen fertiliser solution	0,6
ammonium nitrate-urea solution	0,6

1.2. *Phosphatic fertilisers*

Thomas slag:		
— declaration expressed as a range of 2 % by mass		0,0
— declaration expressed as a single number		1,0
Other phosphatic fertilisers		
P_2O_5 solubility in:	(number of fertiliser in Annex I)	
— mineral acid	(3, 6, 7)	0,8
— formic acid	(7)	0,8
— neutral ammonium citrate	(2a, 2b, 2c)	0,8
— alkaline ammonium citrate	(4, 5, 6)	0,8
— water	(2a, 2b, 3)	0,9
	(2c)	1,3

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1.3. *Potassic fertilisers*

►M10 crude potassium salt ◄	1,5
►M10 enriched crude potassium salt ◄	1,0
muriate of potash:	
— up to and including 55 %	1,0
— more than 55 %	0,5
potassium chloride containing magnesium salt	1,5
sulphate of potash	0,5
sulphate of potash containing magnesium salt	1,5

1.4. *Other components*

chloride	0,2

2. **Inorganic compound primary nutrient fertilisers**

2.1. *Nutrient elements*

N	1,1
P_2O_5	1,1
K_2O	1,1

2.2. *Total negative deviations from the declared value*

binary fertilisers	1,5
ternary fertilisers	1,9

3. **Secondary nutrients in fertilisers**

The tolerances allowed in respect of the declared calcium, magnesium, sodium and sulphur contents shall be a quarter of the declared contents of these nutrients up to a maximum of 0,9 % in absolute terms for CaO, MgO, Na_2O, and SO_3, i.e. 0,64 for Ca, 0,55 for Mg, 0,67 for Na and 0,36 for S.

4. **Micro-nutrients in fertilisers**

The tolerance allowed in respect of the declared micro-nutrient content shall be:

— 0,4 % in absolute terms for a content of more than 2 %,

— one fifth of the declared value for a content not exceeding 2 %.

The tolerance allowed in respect of the declared content for the various forms of nitrogen or the declared solubilities of phosphorus pentoxide is one-tenth of the overall content of the nutrient concerned with a maximum of 2 % by mass, provided that the overall content of that nutrient remains within the limits specified in Annex I and the tolerances specified above.

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5. **Liming materials**

The tolerances allowed in respect of the declared calcium and magnesium shall be:

Magnesium oxide:	
— up to and including 8 % MgO	1
— between 8 % and 16 % MgO	2
— more than 16 % MgO	3
Calcium oxide	3

The tolerance allowed in respect of the declared neutralising value shall be:

Neutralising value	3

The tolerance applicable to the declared percentage of material passing a specific sieve shall be:

Fineness	10

▼B

ANNEX III

TECHNICAL PROVISIONS FOR AMMONIUM NITRATE FERTILISERS OF HIGH NITROGEN CONTENT

1. Characteristics of and limits for straight ammonium nitrate fertilisers of high nitrogen content

1.1. *Porosity (oil retention)*

The oil retention of the fertiliser, which must first have undergone two thermal cycles of a temperature ranging from 25 to 50 °C and conforming with the provisions of part 2 of section 3. of this Annex, must not exceed 4 % by mass.

1.2. *Combustible ingredients*

The percentage by mass of combustible material measured as carbon must not exceed 0,2 % for fertilisers having a nitrogen content of at least 31,5 % by mass and must not exceed 0,4 % for fertilisers having a nitrogen content of at least 28 % but less than 31,5 % by mass.

1.3. *pH*

A solution of 10 g of fertiliser in 100 ml of water must have a pH of at least 4.5.

1.4. *Particle size analysis*

Not more than 5 % by mass of the fertiliser must pass through a 1 mm mesh sieve and not more than 3 % by mass must pass through a 0,5 mm mesh sieve.

1.5. *Chlorine*

The maximum chlorine content is set at 0,02 % by mass.

1.6. *Heavy metals*

Heavy metals should not be added deliberately, and any traces which are incidental to the production process should not exceed the limit fixed by the Committee.

The copper content shall not be higher than 10 mg/kg.

No limits are specified for other heavy metals.

2. Description of the test of resistance to detonation concerning ammonium nitrate fertilisers of high nitrogen content

The test must be carried out on a representative sample of fertiliser. Before being tested for resistance to detonation, the whole mass of the sample is to be thermally cycled five times complying with the provisions of part 3 in section 3. of this Annex.

The fertiliser must be subjected to the test of resistance to detonation in a horizontal steel tube under the following conditions:

— seamless steel tube,

— Tube length: 1 000 mm at least,

— Nominal external diameter: 114 mm at least,

— Nominal wall thickness: 5 mm at least,

— Booster: the type and mass of the booster chosen should be such as to maximise the detonation pressure applied to the sample in order to determine its susceptibility to the transmission of detonation,

— Test temperature: 15-25 °C,

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— Witness lead cylinders for detecting detonation: 50 mm diameter and 100 mm high

— placed at 150 mm intervals and supporting the tube horizontally. The test is to be carried out twice. The test is deemed conclusive if in both tests one or more of the supporting lead cylinders is crushed by less than 5 %.

3. **Methods of checking compliance with the limits specified in Annexes III-1 and III-2**

Method 1

Methods for the application of thermal cycles

1. **Scope and field of application**

This document defines the procedures for the application of thermal cycles prior to the execution of the oil retention test for straight ammonium nitrate fertilisers of high nitrogen content and of the test on the resistance to detonation for both, straight and compound ammonium nitrate fertiliser of high nitrogen content.

The methods of the closed thermal cycles as described in this section are regarded as simulating sufficiently the conditions to be taken into account within the scope of application of title II, chapter IV, however, these methods may not necessarily simulate all conditions arising during transport and storage;

2. **Thermal cycles referred to in Annex III-1**

2.1. *Field of application*

This procedure is for thermal cycling prior to determining the oil retention of the fertiliser.

2.2. *Principle and definition*

In an Erlenmeyer flask, heat the sample from ambient temperature to 50 °C and maintain at this temperature for a period of two hours (phase at 50 °C). Thereupon cool the sample until a temperature of 25 °C is achieved and maintain at that temperature for two hours (phase at 25 °C). The combination of the successive phases at 50 °C and 25 °C forms one thermal cycle. After being subjected to two thermal cycles, the test sample is held at a temperature of 20 ± 3 °C for the determination of the oil retention value.

2.3. *Apparatus*

Normal laboratory apparatus, in particular:

— water baths thermostated at 25 (± 1) and 50 (± 1) °C respectively,

— Erlenmeyer flasks with an individual capacity of 150 ml.

2.4. *Procedure*

Put each test sample of 70 (± 5) grams into an Erlenmeyer flask which is then sealed with a stopper.

Move each flask every two hours from the 50 °C bath to the 25 °C bath and vice versa.

Maintain the water in each bath at constant temperature and keep in motion by rapid stirring to ensure the water level comes above the level of the sample. Protect the stopper from condensation by a foam rubber cap.

3. **Thermal cycles to be used for Annex III-2**

3.1. *Field of application*

This procedure is for thermal cycling prior to the execution of the detonability test.

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3.2. *Principle and definition*

In a watertight box heat the sample from ambient temperature to 50 °C and maintain at this temperature for a period of one hour (phase at 50 °C). Thereupon cool the sample until a temperature of 25 °C is achieved and maintain at that temperature for one hour (phase at 25 °C). The combination of the successive phases at 50 °C and 25 °C forms one thermal cycle. After being subjected to the required number of thermal cycles, the test sample is held at a temperature of 20 ± 3 °C pending the execution of the detonability test.

3.3. *Apparatus*

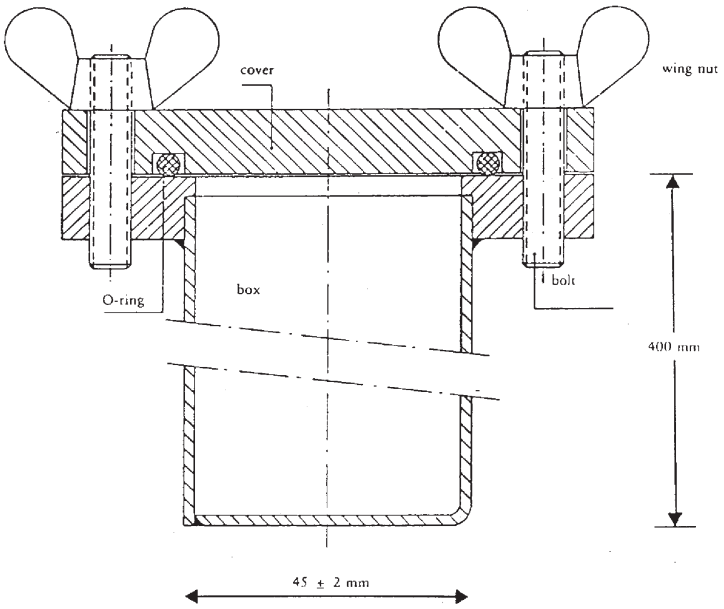
— A water bath, thermostated in a temperature range of 20 to 51 °C with a minimum heating and cooling rate of 10 °C/h, or two water baths, one thermostated at a temperature of 20 °C, the other at 51 °C. The water in the bath(s) is continuously stirred; the volume of the bath should be large enough to guarantee ample circulation of the water.

— A stainless steel box, watertight all around and provided with a thermocouple in the centre. The outside width of the box is 45 (± 2) mm and the wall thickness is 1,5 mm (see Figure 1). The height and length of the box can be chosen to suit the dimensions of the water bath, e.g. length 600 mm, height 400 mm.

3.4. *Procedure*

Place a quantity of fertilisers sufficient for a single detonation into the box and close the cover. Place the box in the water bath. Heat the water to 51 °C and measure the temperature in the centre of the fertiliser. One hour after the temperature at the centre has reached 50 °C cool the water. One hour after the temperature at the centre has reached 25 °C heat the water to start the second cycle. In the case of two water baths, transfer the box to the other bath after each heating/cooling period.

Figure 1



▼B

Method 2

Determination of oil retention

1. **Scope and field of application**

This document defines the procedure for the determination of oil retention of straight ammonium nitrate fertilisers of high nitrogen content.

The method is applicable to both prilled and granular fertilisers which do not contain oil-soluble materials.

2. **Definition**

Oil retention of a fertiliser: the quantity of oil retained by the fertiliser determined under the operating conditions specified, and expressed as a percentage by mass.

3. **Principle**

Total immersion of the test portion in gas oil for a specified period, followed by the draining away of surplus oil under specified conditions. Measurement of the increase in mass of the test portion.

4. **Reagent**

Gas oil

Viscosity max.: 5 mPas at 40 °C

Density: 0,8 to 0,85 g/ml at 20 °C

Sulphur content: ≤ 1,0 % (m/m)

Ash: ≤ 0,1 % (m/m)

5. **Apparatus**

Ordinary laboratory apparatus, and:

5.1. Balance, capable of weighing to the nearest 0,01 gram.

5.2. Beakers, of capacity 500 ml.

5.3. Funnel, of plastic materials, preferably with a cylindrical wall at the upper end, diameter approximately 200 mm.

5.4. Test sieve, aperture 0,5 mm, fitting into the funnel (5.3).

Note: The size of the funnel and sieve is such as to ensure that only a few granules lie one above another and the oil is able to drain easily.

5.5. Filter paper, rapid filtering grade, creped, soft, mass 150 g/m^2.

5.6. Absorbent tissue (laboratory grade).

6. **Procedure**

6.1. Two individual determinations are carried out in quick succession on separate portions of the same test sample.

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6.2. Remove particles smaller than 0,5 mm using the test sieve (5.4). Weigh to the nearest 0,01 gram approximately 50 grams of the sample into the beaker (5.2). Add sufficient gas oil (section 4) to cover the prills or granules completely and stir carefully to ensure that the surfaces of all the prills or granules are fully wetted. Cover the beaker with a watch glass and leave to stand for one hour at 25 (± 2) °C.

▼B

6.3. Filter the entire contents of the beaker through the funnel (5.3) containing the test sieve (5.4). Allow the portion retained by the sieve to remain there for one hour so that most of the excess oil can drain away.

6.4. Lay two sheets of filter paper (5.5) (about 500 × 500 mm) on top of each other on a smooth surface; fold the four edges of both filter papers upwards to a width of about 40 mm to prevent the prills from rolling away. Place two layers of absorbent tissue (5.6) in the centre of the filter papers. Pour the entire contents of the sieve (5.4) over the absorbent tissues and spread the prills evenly with a soft, flat brush. After two minutes lift one side of the tissues to transfer the prills to the filter papers beneath and spread them evenly over these with the brush. Lay another sheet of filter paper, similarly with its edges turned upward, on the sample and roll the prills between the filter papers with circular movements while exerting a little pressure. Pause after every eight circular movements to lift the opposite edges of the filter papers and return to the centre the prills that have rolled to the periphery. Keep to the following procedure: make four complete circular movements, first clockwise and then anticlockwise. Then roll the prills back to the centre as described above. This procedure to be carried out three times (24 circular movements, edges lifted twice). Carefully insert a new sheet of filter paper between the bottom sheet and the one above it and allow the prills to roll onto the new sheet by lifting the edges of the upper sheet. Cover the prills with a new sheet of filter paper and repeat the same procedure as described above. Immediately after rolling, pour the prills into a tared dish and reweigh to the nearest 0,01 gram to determine the mass of the quantity of gas oil retained.

6.5. *Repeating the rolling procedure and reweighing*

If the quantity of gas oil retained in the portion is found to be greater than 2 grams, place the portion on a fresh set of filter papers and repeat the rolling procedure, lifting the corners in accordance with section 6.4 (two times eight circular movements, lifting once). Then reweigh the portion.

7. **Expression of the results**

7.1. *Method of calculation and formula*

The oil retention, from each determination (6.1) expressed as a percentage by mass of the sieved test portion, is given by the equation:

$$\text{Oilretention} = \frac{m_2 - m_1}{m_1} \times 100$$

where:

m_1 is the mass, in grams, of the sieved test portion (6.2),

▼B

m_2 is the mass, in grams, of the test portion according to section 6.4 or 6.5 respectively as the result of the last weighing.

Take as the result the arithmetic mean of the two individual determinations.

Method 3

Determination of the combustible ingredients

1. **Scope and field of application**

This document defines the procedure for the determination of the combustible content of straight ammonium nitrate fertilisers of high nitrogen content.

2. **Principle**

The carbon dioxide produced by inorganic fillers is removed in advance with an acid. The organic compounds are oxidised by means of a chromic acid/sulphuric acid mixture. Carbon dioxide formed is absorbed in a barium hydroxide solution. The precipitate is dissolved in a solution of hydrochloric acid and measured by back-titration with sodium hydroxide solution.

3. **Reagents**

3.1. Analytical-grade chromium (VI) trioxide Cr_2O_3;

3.2. Sulphuric acid, 60 % by volume: pour 360 ml of water into a one-litre beaker and carefully add 640 ml of sulphuric acid (density at 20 °C = 1.83 g/ml).

3.3. Silver nitrate: 0,1 mol/l solution.

3.4. *Barium hydroxide*

Weigh out 15 grams of barium hydroxide [$Ba(OH)_2$. $8H_2O$], and dissolve completely in hot water. Allow to cool and transfer to a one-litre flask. Fill up to the mark and mix. Filter through a pleated filter paper.

3.5. Hydrochloric acid: 0,1 mol/l standard solution.

3.6. Sodium hydroxide: 0,1 mol/l standard solution.

3.7. Bromophenol blue: solution of 0,4 grams per litre in water.

3.8. Phenolphthalein: solution of 2 grams per litre in 60 % by volume ethanol.

3.9. Soda lime: particle dimensions, about 1,0 to 1,5 mm.

3.10. Demineralised water, freshly boiled to remove carbon dioxide.

4. **Apparatus**

4.1. *Standard laboratory equipment, in particular:*

— filter crucible with a plate of sintered glass and a capacity of 15 ml; plate diameter: 20 mm; total height: 50 mm; porosity 4 (pore diameter from 5 to 15 μm),

— 600-ml beaker.

4.2. Compressed nitrogen supply.

4.3. Apparatus made up of the following parts and assembled, if possible, by means of spherical ground joints *(see Figure 2)*.

4.3.1. Absorption tube A about 200 mm long and 30 mm in diameter filled with soda lime (3.9) kept in place by fibreglass plugs.

▼B

4.3.2. 500-ml reaction flask B with side arm and a round bottom.

4.3.3. Vigreux fractionating column about 150 mm long (C').

4.3.4. Double-surface condenser C, 200 mm long.

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4.3.5. Dreschel bottle D acting as a trap for any excess of acid which may distil over.

▼B

4.3.6. Ice bath E to cool the Drechsel bottle.

4.3.7. Two absorption vessels F_1 and F_2, 32 to 35 mm in diameter, the gas distributor of which comprises a 10 mm disc of low-porosity sintered glass.

4.3.8. Suction pump and suction regulating device G comprising a T-shaped glass piece inserted into the circuit, the free arm of which is connected to the fine capillary tube by a short rubber tube fitted with a screw clamp.

Caution: The use of boiling chromic acid solution in an apparatus under reduced pressure is a hazardous operation and requires appropriate precautions.

5. **Procedure**

5.1. *Sample for analysis*

Weigh approximately 10 grams of ammonium nitrate to the nearest 0,001 grams.

5.2. *Removal of carbonates*

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Place the sample for analysis in the reaction flask B. Add 100 ml of H_2SO_4 (3.2). The prills or granules dissolve in about 10 minutes at ambient temperature. Assemble the apparatus as indicated in the diagram: connect one end of the absorption tube (A) to the nitrogen source (4.2) via a non-return flow device containing a pressure of 667 to 800 Pa and the other end to the feed tube which enters the reaction flask. Place the Vigreux fractionating column (C′) and the condenser (C) with cooling water supply in position. Adjust the nitrogen to provide a moderate flow through the solution, bring the solution to boiling point and heat for two minutes. At the end of this time there should be no more effervescence. If effervescence is seen, continue heating for 30 minutes. Allow solution to cool for at least 20 minutes with the nitrogen flowing through it.

▼B

Complete assembly of the apparatus as indicated in the diagram by connecting the condenser tube to the Drechsel bottle (D) and the bottle to the absorption vessels F_1 and F_2. The nitrogen must continue to pass through the solution during the assembly operation. Rapidly introduce 50 ml of barium hydroxide solution (3.4) into each of the absorption vessels (F_1 and F_2).

Bubble a stream of nitrogen through for about 10 minutes. The solution must remain clear in the absorbers. If this does not happen, the carbonate removal process must be repeated.

5.3. *Oxidation and absorption*

After withdrawing the nitrogen feed tube, rapidly introduce 20 grams of chromium trioxide (3.1) and 6 ml of silver nitrate solution (3.3) via the side arm of the reaction flask (B). Connect the apparatus to the suction pump and adjust the nitrogen flow so that a steady stream of gas bubbles passes through the sintered-glass absorbers F_1 and F_2.

▼B

Heat the reaction flask (B) until the liquid boils and keep it boiling for one and a half hours ([1]). It may be necessary to adjust the suction-regulating valve (G) to control the nitrogen flow since it is possible that the barium carbonate precipitated during the test may block the sintered-glass discs. The operation is satisfactory when the barium hydroxide solution in the absorber F_2 remains clear. Otherwise repeat the test. Stop heating and dismantle the apparatus. Wash each of the distributors (3.10) both inside and outside to remove barium hydroxide and collect the washings in the corresponding absorber. Place the distributors one after the other in a 600-ml beaker which will subsequently be used for the determination.

Rapidly filter under vacuum firstly the contents of absorber F_2 and then of absorber F_1 using the sintered-glass crucible. Collect the precipitate by rinsing the absorbers with water (3.10) and wash the crucible with 50 ml of the same water. Place the crucible in the 600-ml beaker and add about 100 ml of boiled water (3.10). Introduce 50 ml of boiled water into each of the absorbers and pass nitrogen through the distributors for five minutes. Combine the water with that from the beaker. Repeat the operation once to ensure that the distributors are rinsed thoroughly.

5.4. *Measurement of the carbonates originating from organic material*

Add five drops of phenolphthalein (3.8) to the contents of the beaker. The solution becomes red in colour. Add hydrochloric acid (3.5) drop by drop until the pink colour just disappears. Stir the solution well in the crucible to check that the pink colour does not reappear. Add five drops of bromphenol blue (3.7) and titrate with hydrochloric acid (3.5) until the solution turns yellow. Add a further 10 ml of hydrochloric acid.

Heat the solution to boiling point and continue boiling for a maximum of one minute. Check carefully that no precipitate remains in the liquid.

Allow to cool and back titrate with the sodium hydroxide solution (3.6).

6. **Blank test**

Carry out a blank test following the same procedure and using the same quantities of all reagents.

7. **Expression of the results**

The content of combustible ingredients (C), expressed as carbon, as a percentage by mass of the sample, is given by the formula:

$$C\ \% = 0{,}06 \times \frac{V_1 - V_2}{E}$$

where:

E = the mass in grams of the test portion,

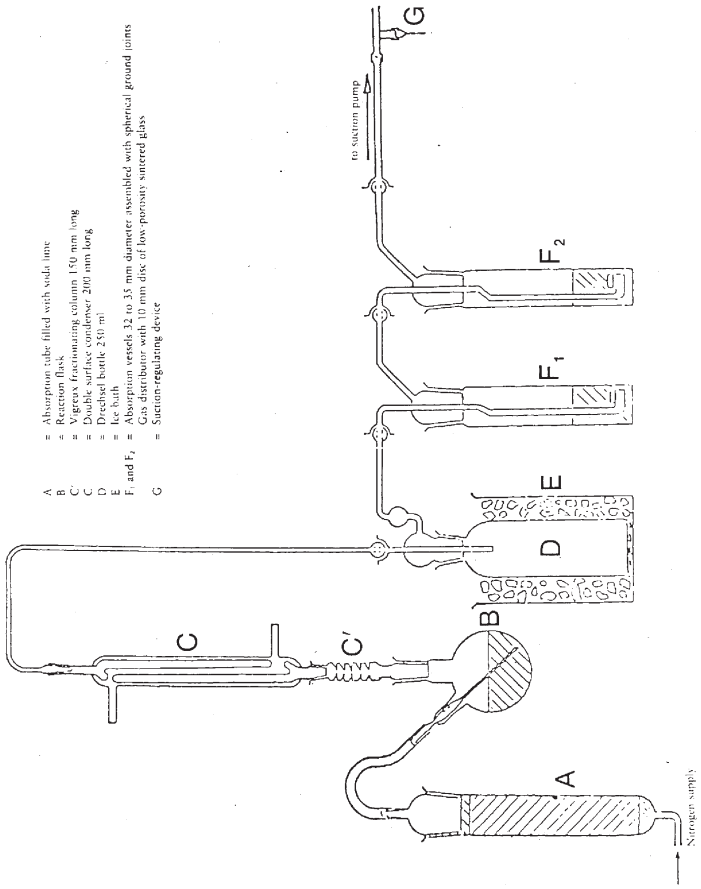
V_1 = the total volume in ml of 0,1 mol/l hydrochloric acid added after the change in colour of the phenolphthalein,

V_2 = the volume in ml of the 0,1 mol/l sodium hydroxide solution used for back titration.

([1]) A reaction time of one and a half hours, is sufficient in the case of most of the organic substances in the presence of silver nitrate catalyst.

▼B

Figure 2



Method 4

Determination of the pH value

1. **Scope and field of application**

This document defines the procedure for measuring the pH value of a solution of a straight ammonium nitrate fertiliser of high nitrogen content.

2. **Principle**

Measurement of the pH of an ammonium nitrate solution by means of a pH meter.

3. **Reagents**

Distilled or demineralised water, free from carbon dioxide.

3.1. *Buffer solution, pH 6,88 at 20 °C*

Dissolve 3,40 ± 0,01 grams of potassium dihydrogen orthophosphate (KH_2PO_4) in approximately 400 ml of water. Then dissolve 3,55 ± 0,01 grams of disodium hydrogen orthophosphate (Na_2HPO_4) in approximately 400 ml of water. Transfer the two solutions without loss into a 1 000-ml graduated flask, make up to the mark and mix. Keep this solution in an airtight vessel.

▼B

3.2. *Buffer solution, pH 4,00 at 20 °C*

Dissolve 10,21 ± 0,01 grams of potassium hydrogen phthalate ($KHC_8O_4H_4$) in water, transfer without loss into a 1 000-ml graduated flask, make up to the mark and mix.

Keep this solution in an airtight vessel.

3.3. Commercially available pH standard solutions may be used.

4. **Apparatus**

pH meter, equipped with glass and calomel electrodes or equivalent, sensitivity 0,05 pH unit.

5. **Procedure**

5.1. *Calibration of the pH meter*

Calibrate the pH meter (4) at a temperature of 20 (± 1) °C, using the buffer solutions (3.1), (3.2) or (3.3). Pass a slow stream of nitrogen onto the surface of the solution and maintain this throughout the test.

5.2. *Determination*

Pour 100,0 ml of water onto 10 (± 0,01) grams of the sample in a 250 ml beaker. Remove the insolubles by filtering, decanting or centrifuging the liquid. Measure the pH value of the clear solution at a temperature of 20 (± 1) °C according to the same procedure as for the calibration of the meter.

6. **Expression of the results**

Express the result in pH units, to the nearest 0,1 unit, and state the temperature used.

Method 5

Determination of the particle size

1. **Scope and field of application**

This document defines the procedure for the test sieving of straight ammonium nitrate fertilisers of high nitrogen content.

2. **Principle**

The test sample is sieved on a nest of three sieves, either by hand or by mechanical means. The mass retained on each sieve is recorded and the percentage of material passing the required sieves are calculated.

3. **Apparatus**

3.1. 200-mm-diameter woven-wire test sieves with apertures of 2,0 mm, 1,0 mm and 0,5 mm respectively of standard ranges. One lid and one receiver for these sieves.

3.2. Balance to weigh to 0,1 gram.

3.3. Mechanical sieve shaker (if available) capable of imparting both vertical and horizontal motion to the test sample.

4. **Procedure**

4.1. The sample is divided representatively into portions of approximately 100 grams.

4.2. Weigh one of these portions to the nearest 0,1 gram.

▼B

4.3. Arrange the nest of sieves in ascending order; receiver, 0,5 mm, 1 mm, 2 mm and place the weighed test portion on the top sieve. Fit the lid to the top of the nest of sieves.

4.4. Shake by hand or machine, imparting both a vertical and horizontal motion and if by hand, tapping occasionally. Continue this process for 10 minutes or until the quantity passing through each sieve in one minute is less than 0,1 gram.

4.5. Remove the sieves from the nest in turn and collect the material retained, brush gently from the reverse side with a soft brush, if necessary.

4.6. Weigh the material retained on each sieve and that collected in the receiver, to the nearest 0,1 gram.

5. **Evaluation of the results**

5.1. Convert the fraction masses to a percentage of the total of the fraction masses (not of the original charge).

Calculate the percentage in the receiver (i.e. < 0,5 mm): A %

Calculate the percentage retained on the 0,5 mm sieve: B %

Calculate the percentage passing 1,0 mm, i.e. (A + B) %

The sum of the fraction masses should be within 2 % of the initial mass taken.

5.2. At least two separate analyses should be carried out and the individual results for A should not differ by more than 1,0 % absolute and for B by more than 1,5 % absolute. Repeat the test if this is not the case.

6. **Expression of the results**

Report the mean of the two values obtained for A on the one hand and for A + B on the other.

Method 6

Determination of the chlorine content (as chloride ion)

1. **Scope and field of application**

This document defines the procedure for the determination of the chlorine content (as chloride ion) of straight ammonium nitrate fertilisers with a high nitrogen content.

2. **Principle**

Chloride ions dissolved in water are determined by potentiometric titration with silver nitrate in an acidic medium.

3. **Reagents**

Distilled or demineralised water, free from chloride ions.

3.1. Acetone AR.

3.2. Concentrated nitric acid (density at 20 °C = 1,40 g/ml)

3.3. Silver nitrate 0,1 mol/l standard solution. Store this solution in a brown glass bottle.

3.4. Silver nitrate 0,004 mol/l standard solution - prepare this solution at the time of use.

▼B

3.5. Potassium chloride 0,1 mol/l standard reference solution. Weigh, to the nearest 0,1 mg, 3,7276 grams of analytical-grade potassium chloride, previously dried for one hour in an oven at 130 °C and cooled in a desiccator to ambient temperature. Dissolve in a little water, transfer the solution without loss into a 500-ml standard flask, dilute to the mark and mix.

3.6. Potassium chloride, 0,004 mol/l standard reference solution — prepare this solution at the time of use.

4. **Apparatus**

4.1. Potentiometer with silver indicating electrode and calomel reference electrode, sensitivity 2 mV, covering the range - 500 to + 500 mV.

4.2. Bridge, containing a saturated potassium nitrate solution, connected to the calomel electrode (4.1), fitted at the ends with porous plugs.

4.3. Magnetic stirrer, with a Teflon-coated rod.

4.4. Microburette with fine-pointed tip, graduated in 0,01 ml divisions.

5. **Procedure**

5.1. *Standardisation of the silver nitrate solution*

Take 5,00 ml and 10,00 ml of the standard reference potassium chloride solution (3.6) and place in two low-form beakers of convenient capacity (for example 250 ml). Carry out the following titration of the contents of each beaker.

Add 5 ml of the nitric acid solution (3.2), 120 ml of the acetone (3.1) and sufficient water to bring the total volume to about 150 ml. Place the rod of the magnetic stirrer (4.3) in the beaker and set the stirrer in motion. Immerse the silver electrode (4.1) and the free end of the bridge (4.2) in the solution. Connect the electrodes to the potentiometer (4.1) and, after verifying the zero of the apparatus, note the value of the starting potential.

Titrate, using the microburette (4.4), adding initially 4 or 9 ml respectively of the silver nitrate solution corresponding to the standard reference potassium chloride solution used. Continue the addition in 0,1 ml portions for the 0,004 mol/l solutions and in 0,05 ml portions for the 0,1 mol/l solutions. After each addition, await the stabilisation of the potential.

Record the volumes added and the corresponding values of the potential in the first two columns of a table.

In a third column of the table, record the successive increments ($\Delta_1 E$) of the potential E. In a fourth column, record the differences ($\Delta_2 E$) positive or negative, between the potential increments ($\Delta_1 E$). The end of the titration corresponds to the addition of the 0,1 or 0,05 ml portion (V_1) of the silver nitrate solution which gives the maximum value of $\Delta_1 E$.

In order to calculate the exact volume (V_{eq}) of the silver nitrate solution corresponding to the end of the reaction, use the formula:

$$V_{eq} = V_0 + \left(V_1 \times \frac{b}{B} \right)$$

where:

V_0 is the total volume, in ml, of the silver nitrate solution immediately lower than the volume which gives the maximum increment of $\Delta_1 E$,

V_1 is the volume, in ml, of the last portion of the silver nitrate solution added (0,1 or 0,05 ml),

▼B

b is the last positive value of $\Delta_2 E$,

B is the sum of the absolute values of the last positive values of $\Delta_2 E$ and the first negative value of $\Delta_2 E$ (see example in Table 1).

5.2. *Blank test*

Carry out a blank test and take account thereof when calculating the final result.

The result V_4 of the blank test on the reagents is given, in ml, by the formula:

$$V_4 = 2V_3 - V_2$$

where:

V_2 is the value, in ml, of the exact volume (V_{eq}) of the silver nitrate solution corresponding to the titration of 10 ml of the potassium chloride standard reference solution used,

V_3 is the value, in ml, of the exact volume (V_{eq}) of the silver nitrate solution corresponding to the titration of 5 ml of the potassium chloride standard reference solution used.

5.3. *Check test*

The blank test can at the same time serve as a check that the apparatus is functioning satisfactorily and that the test procedure is being implemented correctly.

5.4. *Determination*

Take a portion of sample in the range 10 to 20 grams and weigh to the nearest 0,01 gram. Transfer quantitatively to a 250-ml beaker. Add 20 ml of water, 5 ml of nitric acid solution (3.2), 120 ml of acetone (3.1) and sufficient water to bring the total volume to about 150 ml.

Place the rod of the magnetic stirrer (4.3) in the beaker, place the beaker on the stirrer and set the stirrer in motion. Immerse the silver electrode (4.1) and the free end of the bridge (4.2) in the solution, connect the electrodes to the potentiometer (4.1) and, after having verified the zero of the apparatus, note the value of the starting potential.

Titrate with the silver nitrate solution, by additions from the microburette (4.4) in increments of 0,1 ml. After each addition, await the stabilisation of the potential.

Continue the titration as specified in 5.1, starting from the fourth paragraph: ‘Record the volumes added and the corresponding values of the potential in the first two columns of a table …’.

6. **Expression of the results**

Express the result of the analysis as the percentage of chlorine contained in the sample as received for analysis. Calculate the percentage of chlorine (Cl) content from the formula:

$$\text{Cl \%} = \frac{0{,}3545 \times T \times (V_5 - V_4) \times 100}{m}$$

where:

T is the concentration of silver nitrate solution used, in mol/l

V_4 is the result, in ml, of the blank test (5.2),

▼B

V_5 is the value, in ml, of V_{eq} corresponding to the determination (5.4),

m is the mass, in grams, of the test portion.

Table 1: Example

Volume of the silver nitrate solution V (ml)	Potential E (mV)	$\Delta_1 E$	$\Delta_2 E$
4,80	176		
4,90	211	35	+ 37
5,00	283	72	– 49
5,10	306	23	– 10
5,20	319	13	

$$V_{eq} = 4{,}9 + 0{,}1 \times \frac{37}{37 + 49} = 4{,}943$$

Method 7

Determination of copper

1. **Scope and field of application**

This document defines the procedure for the determination of copper content of straight ammonium nitrate fertilisers of high nitrogen content.

2. **Principle**

The sample is dissolved in dilute hydrochloric acid and the copper is determined by atomic absorption spectrophotometry.

3. **Reagents**

3.1. Hydrochloric acid (density at 20 °C = 1,18 g/ml).

3.2. Hydrochloric acid, 6 mol/l solution.

3.3. Hydrochloric acid 0,5 mol/l solution.

3.4. Ammonium nitrate.

3.5. Hydrogen peroxide, 30 % w/v

3.6. Copper solution ([1]) (stock): weigh, to the nearest 0,001 gram, 1 gram of pure copper, dissolve in 25 ml 6 mol/l hydrochloric acid solution (3.2), add 5 ml of hydrogen peroxide (3.5) in portions and dilute to 1 litre with water. 1 ml of this solution contains 1 000 µg of copper (Cu).

3.6.1. Copper solution (dilute): dilute 10 ml of stock solution (3.6) to 100 ml with water and then dilute 10 ml of the resulting solution, to 100 ml with water, 1 ml of the final dilution contains 10 µg of copper (Cu).

Prepare this solution at the time of use.

4. **Apparatus**

Atomic absorption spectrophotometer with a copper lamp (324,8 nm).

5. **Procedure**

5.1. *Preparation of the solution for analysis*

Weigh, to the nearest 0,001 gram, 25 grams of the sample, place it in a 400-ml beaker, add carefully 20 ml of hydrochloric acid (3.1) (there may be a vigorous reaction due to carbon dioxide formation). Add more hydrochloric acid, if necessary. When effervescence has stopped,

([1]) Commercially available standard copper solution may be used.

▼B

evaporate to dryness on a steam bath, stirring occasionally with a glass rod. Add 15 ml 6 mol/l hydrochloric acid solution (3.2) and 120 ml of water. Stir with the glass rod, which should be left in the beaker, and cover the beaker with a watch glass. Boil the solution gently until dissolution is complete and then cool.

Transfer the solution quantitatively into a 250-ml graduated flask, by washing the beaker with 5 ml 6 mol/l hydrochloric acid (3.2), and twice with 5 ml of boiling water, make up to the mark with 0,5 mol/l hydrochloric acid (3.3) and mix carefully.

Filter through a copper-free filter paper ([1]), discarding the first 50 ml.

5.2. *Blank solution*

Prepare a blank solution from which only the sample has been omitted and allow for this in the calculation of the final results.

5.3. *Determination*

5.3.1. Preparation of sample and blank test solutions

Dilute the sample solution (5.1) and the blank test solution (5.2) with 0,5 mol/l hydrochloric acid solution (3.3) to a concentration of copper within the optimal measuring range of the spectrophotometer. Normally no dilution is needed.

5.3.2. Preparation of the calibration solutions

By diluting the standard solution (3.6.1) with 0,5 mol/l hydrochloric acid solution (3.3), prepare at least five standard solutions corresponding to the optimal measuring range of the spectrophotometer (0 to 5,0 mg/l Cu). Before making up to the mark, add to every solution ammonium nitrate (3.4) to give concentration of 100 mg per ml.

5.4. *Measurement*

Set up the spectrophotometer (4) at a wavelength of 324,8 nm. Use an oxidising air-acetylene flame. Spray successively, in triplicate, the calibration solution (5.3.2), the sample solution and the blank solution (5.3.1), washing the instrument through with distilled water between each spraying. Plot the calibration curve using the mean absorbances of every standard used as the ordinates and the corresponding concentrations of copper in µg/ml as the abscissae.

Determine the concentration of copper in the final sample and blank solutions by reference to the calibration curve.

6. **Expression of the results**

Calculate the copper content of the sample taking into account the mass of the test sample, the dilutions carried out in the course of the analysis and the value of the blank. Express the result as mg Cu/kg.

4. **Determination of resistance to detonation**

4.1. *Scope and field of application*

This document defines the procedure for the determination or resistance to detonation of ammonium nitrate fertilisers of high nitrogen content.

([1]) Whatman 541 or equivalent.

▼B

4.2. *Principle*

The test sample is confined in a steel tube and subjected to detonation shock from an explosive booster charge. Propagation of the detonation is determined from the degree of crushing of lead cylinders on which the tube rests horizontally during the test.

4.3. *Materials*

4.3.1. Plastic explosive containing 83 to 86 % penthrite

Density: 1 500 to 1 600 kg/m^3

Detonation velocity: 7 300 to 7 700 m/s

Mass: 500 (± 1) gram.

4.3.2. Seven lengths of flexible detonating cord with non-metallic sleeve

Filling mass: 11 to 13 g/m

Length of each cord: 400 (± 2) mm.

4.3.3. Compressed pellet of secondary explosive, recessed to receive detonator

Explosive: hexogen/wax 95/5 or tetryl or similar secondary explosive, with or without added graphite.

Density: 1 500 to 1 600 kg/m^3

Diameter: 19 to 21 mm

Height: 19 to 23 mm

Central recess to receive detonator: diameter 7 to 7,3 mm, depth 12 mm.

4.3.4. Seamless steel tube as specified in ISO 65 — 1981 — Heavy Series, with nominal dimensions DN 100 (4")

Outside diameter: 113,1 to 115,0 mm

Wall thickness: 5,0 to 6,5 mm

Length: 1 005 (± 2) mm.

4.3.5. Bottom place

Material: steel of good weldable quality

Dimensions: 160 × 160 mm

Thickness: 5 to 6 mm

4.3.6. Six lead cylinders

Diameter: 50 (± 1) mm

Height: 100 to 101 mm

Materials: soft lead, at least 99,5 % purity.

4.3.7. Steel block

Length: at least 1 000 mm

▼B

Width: at least 150 mm

Height: at least 150 mm

Mass: at least 300 kg if there is no firm base for the steel block.

4.3.8. Plastic or cardboard cylinder for booster charge

Wall thickness: 1,5 to 2,5 mm

Diameter: 92 to 96 mm

Height: 64 to 67 mm

4.3.9. Detonator (electric or non-electric) with initiation force 8 to 10

4.3.10. Wooden disc

Diameter: 92 to 96 mm. Diameter to be matched to the internal diameter of the plastic or cardboard cylinder (4.3.8)

Thickness: 20 mm

4.3.11. Wooden rod of same dimensions as detonator (4.3.9)

4.3.12. Dressmaking pins (maximum length 20 mm)

4.4. *Procedure*

4.4.1. Preparation of booster charge for insertion into steel tube

There are two methods of initiation of the explosive in the booster charge, depending on the availability of equipment.

4.4.1.1. Seven-point simultaneous initiation

The booster charge prepared for use is shown in Figure 1.

4.4.1.1.1. Drill holes in the wooden disc (4.3.10) parallel to the axis of the disc through the centre and through six points symmetrically distributed around a concentric circle 55 mm in diameter. The diameter of the holes must be 6 to 7 mm (see Section A-B in Figure 1), depending on the diameter of the detonating cord used (4.3.2).

4.4.1.1.2. Cut seven lengths of flexible detonating cord (4.3.2) each 400 mm long, avoiding any loss of explosive at each end by making a clean cut and immediately sealing the end with adhesive. Push each of the seven lengths through the seven holes in the wooden disc (4.3.10) until their ends project a few centimetres on the other side of the disc. Then insert a small dressmaking pin (4.3.12) transversally into the textile sleeve of each length of cord 5 to 6 mm from the end and apply adhesive around the outside of the lengths of cord in a band 2 cm wide adjacent to the pin. Finally, pull the long piece of each cord to bring the pin into contact with the wooden disc.

4.4.1.1.3. Shape the plastic explosive (4.3.1) to form a cylinder 92 to 96 mm in diameter, depending on the diameter of the cylinder (4.3.8). Stand this cylinder upright on a level surface and insert the shaped explosive. Then insert the wooden disc [1] carrying the seven lengths of detonating cord into the top of the cylinder and press it down onto the explosive. Adjust the height of the cylinder (64 to 67 mm) so that its top edge does not extend beyond the level of the wood. Finally, fix the cylinder to the wooden disc for instance with staples or small nails, around its entire circumference.

[1] The diameter of the disc must always correspond to the inside diameter of the cylinder.

▼B

4.4.1.1.4. Group the free ends of the seven lengths of detonating cord around the circumference of the wooden rod (4.3.11) so that their ends are all level in a plane perpendicular to the rod. Secure them in a bundle around the rod by means of adhesive tape ([1]).

4.4.1.2. Central initiation by a compressed pellet

The booster charge prepared for use is shown in Figure 2.

4.4.1.2.1. Preparing a compressed pellet

Taking the necessary safety precautions, place 10 grams of a secondary explosive (4.3.3) in a mould with an inside diameter of 19 to 21 mm and compress to the correct shape and density.

(The ratio of diameter: height should be roughly 1:1).

In the centre of the bottom of the mould there is a peg, 12 mm in height and 7,0 to 7,3 mm in diameter (depending on the diameter of the detonator used), which forms a cylindrical recess in the compressed cartridge for subsequent insertion of the detonator.

4.4.1.2.2. Preparing the booster charge

Place the explosive (4.3.1) into the cylinder (4.3.8) standing upright on a level surface, then press it down with a wooden die to give the explosive a cylindrical shape with a central recess. Insert the compressed pellet into this recess. Cover the cylindrically shaped explosive containing the compressed pellet with a wooden disc (4.3.10) having a central hole 7,0 to 7,3 mm in diameter for insertion of a detonator. Fix the wooden disc and the cylinder together with a cross of adhesive tape. Ensure that the hole drilled in the disc and the recess in the compressed pellet are coaxial by inserting the wooden rod (4.3.11).

4.4.2. Preparing steel tubes for the detonation tests

At one end of the steel tube (4.3.4), drill two diametrically opposed holes 4 mm in diameter perpendicularly through the side wall at a distance of 4 mm from the edge.

Butt weld the bottom plate (4.3.5) to the opposite end of the tube, completely filling the right angle between the bottom place and the wall of the tube with weld metal around the entire circumference of the tube.

4.4.3. Filling and charging the steel tube

See Figures 1 and 2.

4.4.3.1. The test sample, the steel tube and the booster charge must be conditioned to temperatures of 20 (± 5) °C. 16 to 18 kg of the test sample are needed for two detonation tests.

4.4.3.2. Place the tube upright with its square bottom place resting on a firm, flat surface, preferably concrete. Fill the tube to about one-third of its height with the test sample and drop it 10 cm vertically onto the floor five times to compact the prills or granules as densely as possible in the tube. To accelerate compaction, vibrate the tube by striking the side wall with a 750 to 1 000-gram hammer between drops for a total of 10 times.

([1]) *NB:* When the six peripheral lengths of cord are taut after assembly, the central cord must remain slightly slack.

▼B

Repeat this charging method with another portion of the test sample. Finally, a further addition shall be made such that, after compaction by raising and dropping the tube 10 times and a total of 20 intermittent hammer blows, the charge fills the tube to a distance of 70 mm from its orifice.

The filling height of the sample must be adjusted in the steel tube so that the booster charge (4.4.1.1 or 4.4.1.2) to be inserted later will be in close contact with the sample over its entire surface.

4.4.3.3. Insert the booster charge into the tube so that it is in contact with the sample; the top surface of the wooden disc must be 6 mm below the end of the tube. Ensure essential close contact between explosive and test sample by adding or removing small quantities of sample. As shown in Figures 1 and 2, split pins should be inserted through the holes near the open end of the tube and their legs opened flat against the tube.

4.4.4. Positioning of the steel tube and lead cylinders (see figure 3)

4.4.4.1. Number the bases of the lead cylinders (4.3.6) 1 to 6. Make six marks 150 mm apart on the centre line of a steel block (4.3.7) lying on a horizontal base, with the first mark at least 75 mm from the edge of the block. Place a lead cylinder upright on each of these marks, with the base of each cylinder centred on its mark.

4.4.4.2. Lay the steel tube prepared according to 4.4.3 horizontally on the lead cylinders so that the axis of the tube is parallel to the centre line of the steel block and the welded end of the tube extends 50 mm beyond lead cylinder No 6. To prevent the tube from rolling, insert small wooden wedges between the tops of the lead cylinders and the tube wall (one on each side) or place a cross of wood between the tube and the steel block.

Note: Make sure that the tube is in contact with all six lead cylinders; a slight curvature of the tube surface can be compensated for by rotating the tube about its longitudinal axis; if any of the lead cylinders is too tall, tap the cylinder in question carefully with a hammer until it is the required height.

4.4.5. Preparation for detonation

4.4.5.1. Set up the apparatus according to the 4.4.4 in a bunker or suitably prepared underground site (e.g. mine or tunnel). Ensure that the temperature of the steel tube is kept at 20 (± 5) °C before detonation.

Note: Should such firing sites not be available, the work can, if necessary, be done in a concrete-lined pit covered over with wooden beams. Detonation can cause steel fragments to be projected with high kinetic energy, therefore, firing must be carried out at a suitable distance from dwellings or thoroughfares.

4.4.5.2. If the booster charge with seven-point initiation is used, ensure that the detonation cords are stretched out as described in the footnote to 4.4.1.1.4 and arranged as horizontally as possible.

4.4.5.3. Finally, remove the wooden rod and replace with the detonator. Do not carry out firing until the danger zone has been evacuated and the test personnel have taken cover.

▼B

4.4.5.4. Detonate the explosive.

4.4.6. Allow sufficient time for the fumes (gaseous and sometimes toxic decomposition products such as nitrous gases) to disperse, then collect the lead cylinders and measure their heights with a Vernier caliper

Record for each of the marked lead cylinders, the degree of crushing expressed as a percentage of the original height of 100 mm. If the cylinders are crushed obliquely, record the highest and the lowest values and calculate the average.

4.4.7. A probe for continuous measurement of the detonation velocity can be used; the probe should be inserted longitudinally to the axis of the tube or along its side wall

4.4.8. Two detonation tests per sample are to be carried out

4.5. *Test report*

Values for the following parameters are to be given in the test report for each of the detonation tests:

— the values actually measures for the outside diameter of the steel tube and for the wall thickness,

— the Brinell hardness of the steel tube,

— the temperature of the tube and the sample shortly before firing,

— the packing density (kg/m^3) of the sample in the steel tube,

— the height of each lead cylinder after firing, specifying the corresponding cylinder number,

— method of initiation employed for the booster charge.

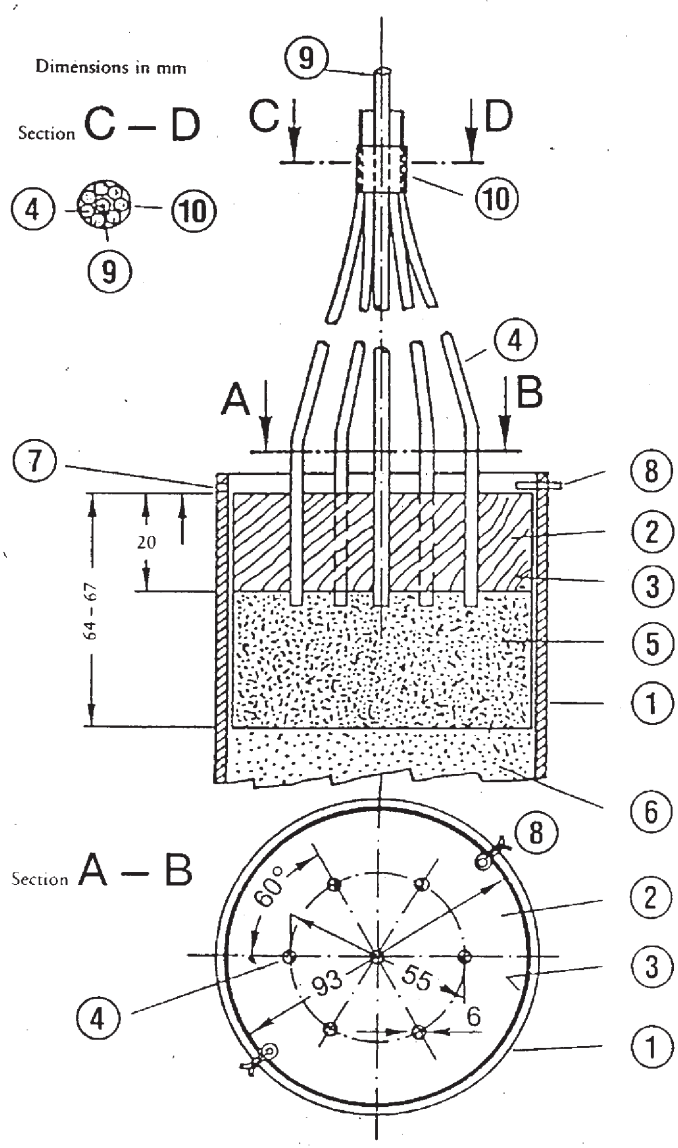
4.5.1. Evaluation of test results

If, in each firing, the crushing of at least one lead cylinder is less than 5 %, the test shall be considered conclusive and the sample in conformity with the requirements of Annex III.2.

▼B

Figure 1

Booster charge with seven-point initiation



① Steel tube

② Wooden disc with seven holes

③ Plastic or cardboard cylinder

④ Detonating cords

⑤ Plastic explosive

⑥ Test sample

⑦ 4-mm-diameter hole drilled to receive split pin ⑧

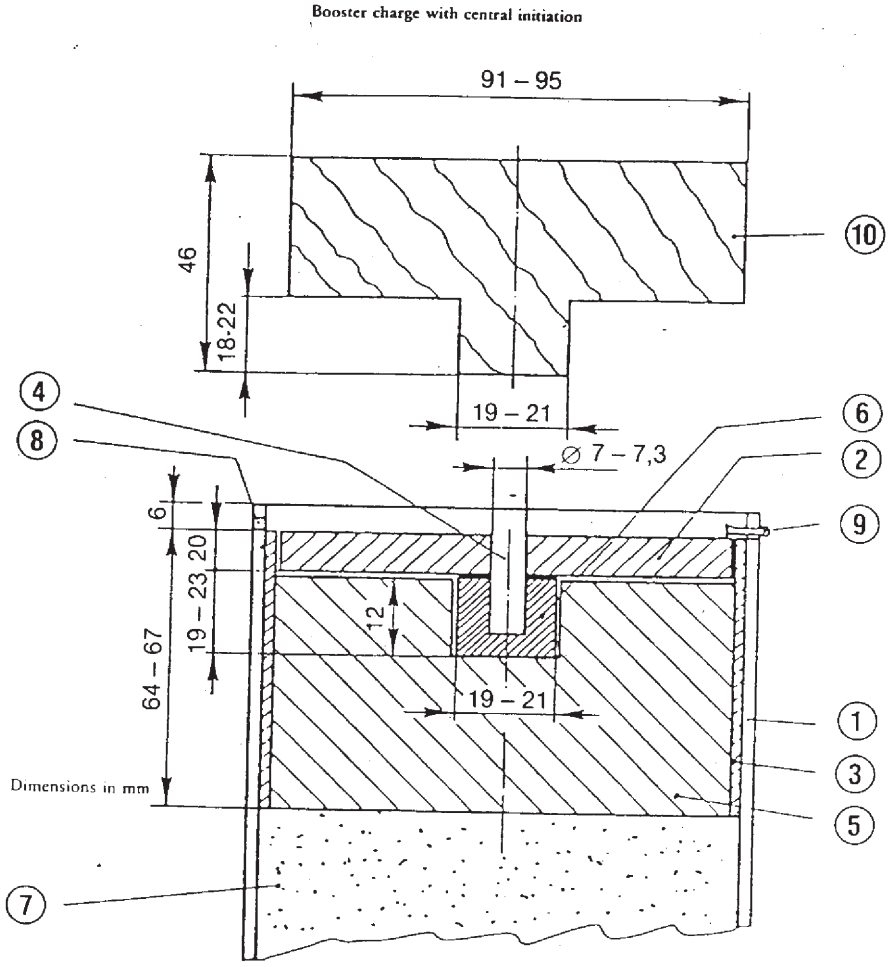
⑧ Split pin

⑨ Wooden rod surrounded by ④

⑩ Adhesive tape for securing ④ around ⑨

▼B

Figure 2



① Steel tube

② Wooden disc

③ Plastic or cardboard cylinder

④ Wooden rod

⑤ Plastic explosive

⑥ Compressed pellet

⑦ Test sample

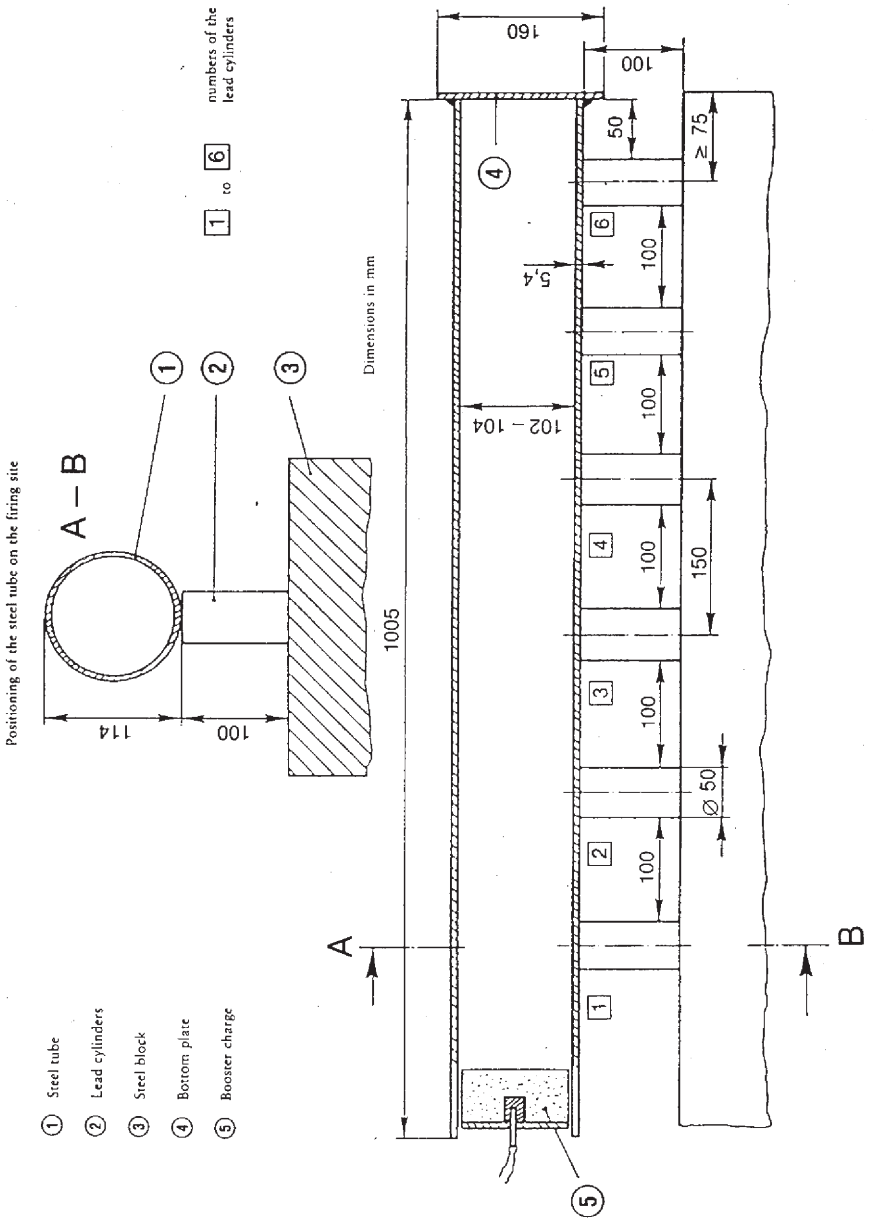
⑧ 4-mm-diameter hole drilled to receive split pin ⑨

⑨ Split pin

⑩ Wooden die for ⑤

▼B

Figure 3


Positioning of the steel tube on the firing site
A – B
114
100
Dimensions in mm
numbers of the lead cylinders
1 to 6
160
100
50
≥ 75
5,4
100
102 – 104
150
1005
Ø 50
A
B
① Steel tube
② Lead cylinders
③ Steel block
④ Bottom plate
⑤ Booster charge

▼B

ANNEX IV

METHODS OF SAMPLING AND ANALYSIS

A. METHOD OF SAMPLING FOR THE CONTROL OF FERTILISERS

INTRODUCTION

Correct sampling is a difficult operation which requires the greatest of care. The need to obtain a sufficiently representative sample for the official testing of fertilisers cannot, therefore, be stressed too much.

The sampling method described below must be applied with strict accuracy by specialists with experience of the conventional sampling procedure.

1. **Purpose and scope**

Samples intended for the official control of fertilisers, for quality and composition, shall be taken according to the methods described below. Samples thus obtained shall be considered as representative of the sampled portions.

2. **Sampling officers**

The samples shall be taken by specialist officers authorised for that purpose by the Member States.

3. **Definitions**

Sampled portion: A quantity of product constituting a unit, and having characteristics presumed to be uniform.

Incremental sample: A quantity taken from one point in the sampled portion.

Aggregate sample: An aggregate of incremental samples taken from the same sampled portion.

Reduced sample: A representative part of the aggregate sample, obtained from the latter by a process of reduction.

Final sample: A representative part of the reduced sample.

4. **Apparatus**

4.1. The sampling apparatus must be made of materials which cannot affect the characteristics of the products to be sampled. Such apparatus may be officially approved by the Member States.

4.2. *Apparatus recommended for the sampling of solid fertilisers*

4.2.1. Manual sampling

4.2.1.1. Flat-bottomed shovel with vertical sides.

4.2.1.2. Sampling spear with a long split or compartments. The dimensions of the sampling spear must be appropriate to the characteristics of the sampled portion (depth of container, dimensions of sack, etc.) and to the particle size of the fertiliser.

4.2.2. Mechanical sampling

Approved mechanical apparatus may be used for the sampling of moving fertilisers.

4.2.3. Divider

Apparatus designed to divide the sample into equal parts may be used for taking incremental samples and for the preparation of reduced and final samples.

▼B

4.3. *Apparatus recommended for the sampling of fluid fertilisers*

4.3.1. Manual sampling

Open tube, probe, bottle or another appropriate equipment able to take samples at random from the sampled portion.

4.3.2. Mechanical sampling

Approved mechanical apparatus may be used for sampling of moving fluid fertilisers.

5. **Quantitative requirements**

5.1. *Sampled portion*

The size of the sampled portion must be such that each of its constituent parts can be sampled.

5.2. *Incremental samples*

5.2.1. Loose solid fertilisers or fluid fertilisers in containers exceeding 100 kg

5.2.1.1. Sampled portions not exceeding 2,5 tonnes:

Minimum number of incremental samples: seven

5.2.1.2. Sampled portions exceeding 2,5 tonnes and up to 80 tonnes:

Minimum number of incremental samples:

$\sqrt{20 \text{ times the number of tonnes making up the sampled portion}}$ (1)

5.2.1.3. Sampled portions exceeding 80 tonnes:

Minimum number of incremental samples: 40

5.2.2. Packaged solid fertilisers or fluid fertilisers in containers (= packages each not exceeding 100 kg)

5.2.2.1. Packages of more than 1 kg

5.2.2.1.1. Sampled portions of less than five packages:

Minimum number of packages to be sampled (2): all packages.

5.2.2.1.2. Sampled portions of five to 16 packages:

Minimum number of packages to be sampled (2): four.

5.2.2.1.3. Sampled portions of 17 to 400 packages:

Minimum number of packages to be sampled (2):

$\sqrt{\text{number of packages making up the sampled portion}}$ (1)

5.2.2.1.4. Sampled portions exceeding 400 packages:

Minimum number of packages to be sampled (2): 20.

5.2.2.2. Packages not exceeding 1 kg:

Minimum number of packages to be sampled (2): four.

5.3. *Aggregate sample*

A single aggregate sample per sampled portion is required. The total mass of the incremental samples making up the aggregate sample shall be not less than the following:

5.3.1. Loose solid fertilisers or fluid fertilisers in containers exceeding 100 kg: 4 kg.

(1) Where the number obtained is a fraction, it should be rounded up to the next whole number.

(2) For packages whose contents do not exceed 1 kg, an incremental sample shall be the contents of one original package.

▼B

5.3.2. Packaged solid fertilisers or fluid fertilisers in containers (= packages) each not exceeding 100 kg

5.3.2.1. Packages of more than 1 kg: 4 kg

5.3.2.2. Packages not exceeding 1 kg: mass of the contents of four original packages.

5.3.3. Ammonium nitrate fertiliser sample for tests according to Annex III.2: 75 kg

5.4. *Final samples*

The aggregate sample gives the final samples on reduction when necessary. Analysis of at least one final sample is required. The mass of the sample for analysis shall not be less than 500 g.

5.4.1. Solid and fluid fertilisers

5.4.2. Ammonium nitrate fertiliser sample for tests

The aggregate sample gives the final sample for tests on reduction when necessary.

5.4.2.1. Minimum final sample mass for Annex III.1 tests: 1 kg

5.4.2.2. Minimum final sample mass for Annex III.2 tests: 25 kg

6. **Instructions for taking, preparing and packaging the samples**

6.1. *General*

The samples must be taken and prepared as quickly as possible bearing in mind the precautions necessary to ensure that they remain representative of the fertiliser sampled. Instruments and also surfaces and containers intended to receive samples must be clean and dry.

In the case of fluid fertilisers, if possible the sampled portion should be mixed prior to sampling.

6.2. *Incremental samples*

Incremental samples must be taken at random throughout the whole sampled portion and they must be of approximately equal sizes.

6.2.1. Loose solid fertilisers or fluid fertilisers in containers exceeding 100 kg

An imaginary division shall be made of the sampled portion into a number of approximately equal parts. A number of parts corresponding to the number of incremental samples required in accordance with 5.2 shall be selected at random and at least one sample taken from each of these parts. Where it is not possible to comply with the requirements of 5.1 when sampling bulk fertilisers or fluid fertilisers in containers exceeding 100 kg the sampling should be carried out when the sampled portion is being moved (loading or unloading). In this case samples shall be taken from the randomly selected notional parts as defined above while these are being moved.

6.2.2. Packaged solid fertilisers or fluid fertilisers in containers (= packages) each not exceeding 100 kg

Having selected the required number of packages for sampling as indicated in 5.2, part of the contents of each package shall be removed. Where necessary, the samples shall be taken after emptying the packages separately.

6.3. *Preparation of aggregate sample*

The incremental samples shall be mixed to form a single aggregate sample.

▼B

6.4. *Preparation of the final sample*

The material in the aggregate sample shall be carefully mixed ([1]).

If necessary the aggregate sample should first be reduced to at least 2 kg (reduced sample) either by using a mechanical divider or by the quartering method.

At least three final samples shall then be prepared, of approximately the same amount and conforming to the quantitative requirements of 5.4. Each sample shall be put into an appropriate air tight container. All necessary precautions shall be taken to avoid any change in the characteristics of the sample.

For the tests of Annex III, sections 1 and 2, the final samples shall be kept at a temperature between 0 °C and 25 °C.

7. **Packaging of final samples**

The containers or packages shall be scaled and labelled (the total label must be incorporated in the seal) in such a manner that they cannot be opened without damaging the seal.

8. **Sampling record**

A record must be kept of each sampling, permitting each sampled portion to be identified unambiguously.

9. **Destination of samples**

For each sample portion at least one final sample shall be sent as quickly as possible to an authorised analytical laboratory or to the test institution, together with the information necessary for the analysis or the test.

B. METHODS FOR THE ANALYSIS OF FERTILISERS

(See table of contents p. 2.)

General observations

Laboratory equipment

In the descriptions of the methods, general laboratory equipment has not been precisely defined, except that the sizes of flasks and pipettes are given. In all cases laboratory apparatus must be well cleaned, particularly when small quantities of elements are to be determined.

Control tests

Before analysis it is necessary to ensure that all apparatus functions well and that the analytical technique is carried out correctly, using where appropriate chemical compounds of known composition (e.g. ammonium sulphate, mono potassium phosphate, etc.). Nevertheless, the results from analysed fertilisers can indicate wrong chemical composition if the analytical technique is not rigorously followed. On the other hand, a certain number of determinations are empirical and are relative to products of complex chemical composition. It is recommended that where available, laboratories should make use of standard reference fertilisers of well defined composition.

General provisions relating to methods of analysing fertilisers

1. Reagents

Unless otherwise specified in the method of analysis, all of the reagents must be analysis-pur (a.p.). Where micro-nutrients are to be analysed the purity of the reagents must be checked by means of a blank test. Depending upon the result obtained, it might be necessary to conduct a further purification.

([1]) Any lumps shall be broken up (if necessary by separating them out and returning them to the sample).

▼B

2. Water

Where dissolution, dilution, rinsing or washing operations referred to in the methods of analysis do not specify the nature of solvents or diluents the use of water is implied. Normally, the water will have to be demineralised or distilled. In these specific instances, as mentioned in the method of analysis, that water will have to be subjected to specific purification processes.

3. Laboratory equipment

In view of the equipment normally used in inspection laboratories, the apparatus described in the methods of analysis is restricted to special instruments and apparatus or to such demanded by any specific requirements. This equipment must be perfectly clean, above all where small quantities are to be determined. The laboratory will have to ensure the accuracy of any graduated glassware used by referring to appropriate metrological standards.

▼M13

Methods 1

Sample preparation and sampling

Method 1.1

Sampling for analysis

EN 1482-1, Fertilizers and liming materials — Sampling and sample preparation — Part 1: Sampling

Method 1.2

Preparation of sample for analysis

EN 1482-2, Fertilizers and liming materials — Sampling and sample preparation — Part 2: Sample preparation

Method 1.3

Sampling of static heaps for analysis

EN 1482-3, Fertilizers and liming materials — Sampling and sample preparation — Part 3: Sampling of static heaps

▼B

Methods 2

Nitrogen

▼M7

Method 2.1

Determination of ammoniacal nitrogen

EN 15475: Fertilisers — Determination of ammoniacal nitrogen

This method of analysis has been ring-tested.

▼B

Methods 2.2

Determination of nitric and ammoniacal nitrogen

▼M7

Method 2.2.1

Determination of nitric and ammoniacal nitrogen according to Ulsch

EN 15558: Fertilisers — Determination of nitric and ammoniacal nitrogen according to Ulsch

This method of analysis has not been ring-tested.

Method 2.2.2

Determination of nitric and ammoniacal nitrogen according to Arnd

EN 15559: Fertilisers – Determination of nitric and ammoniacal nitrogen according to Arnd

This method of analysis has not been ring-tested.

▼M7

Method 2.2.3

Determination of nitric and ammoniacal nitrogen according to Devarda

EN 15476: Fertilisers — Determination of nitric and ammoniacal nitrogen according to Devarda

This method of analysis has been ring-tested.

▼B

Method 2.3

Determination of total nitrogen

▼M7

Method 2.3.1

Determination of the total nitrogen in calcium cyanamide nitrate free

EN 15560: Fertilisers — Determination of total nitrogen in calcium cyanamide nitrate free

This method of analysis has not been ring-tested.

Method 2.3.2

Determination of total nitrogen in calcium cyanamide containing nitrates

EN 15561: Fertilisers — Determination of total nitrogen in calcium cyanamide containing nitrates

This method of analysis has not been ring-tested.

Method 2.3.3

Determination of total nitrogen in urea

EN 15478: Fertilisers — Determination of total nitrogen in urea

This method of analysis has been ring-tested.

Method 2.4

Determination of cyanamide nitrogen

EN 15562: Fertilisers — Determination of cyanamide nitrogen

This method of analysis has not been ring-tested.

Method 2.5

Spectrophotometric determination of biuret in urea

EN 15479: Fertilisers — Spectrophotometric determination of biuret in urea

This method of analysis has been ring-tested.

▼B

Methods 2.6

Determination of different forms of nitrogen in the same sample

▼M7

Method 2.6.1

Determination of different forms of nitrogen in the same sample in fertilisers containing nitrogen as nitric, ammoniacal, urea and cyanamide nitrogen

EN 15604: Fertilisers — Determination of different forms of nitrogen in the same sample containing nitrogen, as nitric, ammoniacal, urea and cyanamide nitrogen

This method of analysis has not been ring-tested.

▼M8

Method 2.6.2

Determination of total nitrogen in fertilisers containing nitrogen only as nitric, ammoniacal and urea nitrogen by two different methods

EN 15750: Fertilizers. Determination of total nitrogen in fertilizers containing nitrogen only as nitric, ammoniacal and urea nitrogen by two different methods.

This method of analysis has been ring-tested.

▼M8

Method 2.6.3

Determination of urea condensates using HPLC — Isobutylenediurea and crotonylidenediurea (method A) and methylen-urea oligomers (method B)

EN 15705: Fertilizers. Determination of urea condensates using high-performance liquid chromatography (HPLC). Isobutylenediurea and crotonylidenediurea (method A) and methylen-urea oligomers (method B)

This method of analysis has been ring-tested.

▼B

Methods 3

Phosphorus

Methods 3.1

Extractions

▼M9

Method 3.1.1

Extraction of phosphorus soluble in mineral acids

EN 15956: Fertilizers – Extraction of phosphorus soluble in mineral acids

This method of analysis has been ring-tested.

Method 3.1.2

Extraction of phosphorus soluble in 2 % formic acid

EN 15919: Fertilizers – Extraction of phosphorus soluble in 2 % formic acid

This method of analysis has not been ring-tested.

Method 3.1.3

Extraction of phosphorus soluble in 2 % citric acid

EN 15920: Fertilizers – Extraction of phosphorus soluble in 2 % citric acid

This method of analysis has not been ring-tested.

Method 3.1.4

Extraction of phosphorus which is soluble in neutral ammonium citrate

EN 15957: Fertilizers – Extraction of phosphorus which is soluble in neutral ammonium citrate

This method of analysis has been ring-tested.

▼B

Methods 3.1.5

Extraction by alkaline ammonium citrate

▼M9

Method 3.1.5.1

Extraction of soluble phosphorus according to Petermann at 65 °C

EN 15921: Fertilizers – Extraction of phosphorus according to Petermann at 65 °C

This method of analysis has not been ring-tested.

▼M9

Method 3.1.5.2

Extraction of the soluble phosphorus according to Petermann at ambient temperature

EN 15922: Fertilizers – Extraction of phosphorus according to Petermann at ambient temperature

This method of analysis has not been ring-tested.

Method 3.1.5.3

Extraction of phosphorus soluble in Joulie's alkaline ammonium citrate

EN 15923: Fertilizers – Extraction of phosphorus in Joulie's alkaline ammonium citrate

This method of analysis has not been ring-tested.

Method 3.1.6

Extraction of water soluble phosphorus

EN 15958: Fertilizers – Extraction of water soluble phosphorus

This method of analysis has been ring-tested.

Method 3.2

Determination of extracted phosphorus

EN 15959: Fertilizers – Determination of extracted phosphorus

This method of analysis has been ring-tested.

▼B

Method 4

Potassium

▼M7

Method 4.1

Determination of the water-soluble potassium content

EN 15477: Fertilisers — Determination of the water-soluble potassium content

This method of analysis has been ring-tested.

▼B

Method 5

▼M8

Carbon dioxide

Method 5.1

Determination of carbon dioxide — Part I: method for solid fertilisers

EN 14397-1: Fertilizers and liming materials. Determination of carbon dioxide. Part I: method for solid fertilisers

This method of analysis has been ring-tested.

▼B

Method 6

Chlorine

▼M10

Method 6.1

Determination of chlorides in the absence of organic material

EN 16195: Fertilisers — Determination of chlorides in the absence of organic material

This method of analysis has been ring-tested.

▼B

Methods 7

Fineness of grinding

▼M9

Method 7.1

Determination of the fineness of grinding (dry procedure)

EN 15928: Fertilizers – Determination of the fineness of grinding (dry procedure)

This method of analysis has not been ring-tested.

Method 7.2

Determination of the fineness of grinding of soft natural phosphates

EN 15924: Fertilizers – Determination of the fineness of grinding of soft natural phosphates

This method of analysis has not been ring-tested.

▼B

Methods 8

Secondary nutrients

▼M9

Method 8.1

Extraction of total calcium, total magnesium, total sodium and total sulphur in the forms of sulphates

EN 15960: Fertilizers – Extraction of total calcium, total magnesium, total sodium and total sulphur in the forms of sulphates

This method of analysis has not been ring-tested.

Method 8.2

Extraction of total sulphur present in various forms

EN 15925: Fertilizers – Extraction of total sulphur present in various forms

This method of analysis has not been ring-tested.

Method 8.3

Extraction of water soluble calcium, magnesium, sodium and sulphur (in the form of sulphates)

EN 15961: Fertilizers – Extraction of water soluble calcium, magnesium, sodium and sulphur (in the form of sulphates)

This method of analysis has not been ring-tested.

Method 8.4

Extraction of water soluble sulphur where the sulphur is in various forms

EN 15926: Fertilizers – Extraction of water soluble sulphur where the sulphur is in various forms

This method of analysis has not been ring-tested.

▼M9

Method 8.5

Extraction and determination of elemental sulphur

EN 16032: Fertilizers – Extraction and determination of elemental sulphur

This method of analysis has not been ring-tested.

▼M10

Method 8.6

Manganimetric determination of extracted calcium following precipitation in the form of oxalate

EN 16196: Fertilisers — Manganimetric determination of extracted calcium following precipitation in the form of oxalate

This method of analysis has been ring-tested.

Method 8.7

Determination of magnesium by atomic absorption spectrometry

EN 16197: Fertilisers — Determination of magnesium by atomic absorption spectrometry

This method of analysis has been ring-tested.

Method 8.8

Determination of magnesium by complexometry

EN 16198: Fertilisers — Determination of magnesium by complexometry

This method of analysis has been ring-tested.

▼M8

Method 8.9

Determination of the sulfates content using three different methods

EN 15749: Fertilizers. Determination of sulfates content using three different methods

This method of analysis has been ring-tested.

▼M10

Method 8.10

Determination of the sodium extracted by flame-emission spectrometry

EN 16199: Fertilisers — Determination of the sodium extracted by flame-emission spectrometry

This method of analysis has been ring-tested.

▼M9

Method 8.11

Determination of calcium and formate in calcium formate

EN 15909: Fertilizers – Determination of calcium and formate in calcium foliar fertilizers

This method of analysis has been ring-tested.

▼M13

Methods 9

Micro-nutrients at a concentration of less than or equal to 10 %

Method 9.1

Extraction of total micro-nutrients in fertilisers using aqua regia

EN 16964: Fertilizers — Extraction of total micro-nutrients in fertilizers using aqua regia

This method of analysis has been ring-tested.

Method 9.2

Extraction of water soluble micro-nutrients in fertilisers and removal of organic compounds from fertilizer extracts

EN 16962: Fertilizers — Extraction of water soluble micro-nutrients in fertilizers and removal of organic compounds from fertilizer extracts

This method of analysis has been ring-tested.

Method 9.3

Determination of cobalt, copper, iron, manganese and zinc using flame atomic absorption spectrometry (FAAS)

EN 16965: Fertilizers — Determination of cobalt, copper, iron, manganese and zinc using flame atomic absorption spectrometry (FAAS)

This method of analysis has been ring-tested

Method 9.4

Determination of boron, cobalt, copper, iron, manganese, molybdenum and zinc using ICP-AES

EN 16963: Fertilizers — Determination of boron, cobalt, copper, iron, manganese, molybdenum and zinc using ICP-AES

This method of analysis has been ring-tested.

Method 9.5

Determination of boron using spectrometry with azomethine-H

EN 17041: Fertilizers — Determination of boron in concentrations ≤ 10 % using spectrometry with azomethine-H

This method of analysis has been ring-tested.

Method 9.6

Determination of molybdenum using spectrometry of a complex with ammonium thiocyanate

EN 17043: Fertilizers — Determination of molybdenum in concentrations in concentrations ≤ 10 % using spectrometry of a complex with ammonium thiocyanate

This method of analysis has been ring-tested.

▼M13

Methods 10

Micro-nutrients at a concentration greater than 10 %

Method 10.1

Extraction of total micro-nutrients in fertilisers using aqua regia

EN 16964: Fertilizers — Extraction of total micro-nutrients in fertilizers using aqua regia

This method of analysis has been ring-tested.

Method 10.2

Extraction of water soluble micro-nutrients in fertilisers and removal of organic compounds from fertilizer extracts

EN 16962: Fertilizers — Extraction of water soluble micro-nutrients in fertilizers and removal of organic compounds from fertilizer extracts

This method of analysis has been ring-tested.

Method 10.3

Determination of cobalt, copper, iron, manganese and zinc using flame atomic absorption spectrometry (FAAS)

EN 16965: Fertilizers — Determination of cobalt, copper, iron, manganese and zinc using flame atomic absorption spectrometry (FAAS)

This method of analysis has been ring-tested.

Method 10.4

Determination of boron, cobalt, copper, iron, manganese, molybdenum and zinc using ICP-AES

EN 16963: Fertilizers — Determination of boron, cobalt, copper, iron, manganese, molybdenum and zinc using ICP-AES

This method of analysis has been ring-tested.

Method 10.5

Determination of boron using acidimetric titration

EN 17042: Fertilizers — Determination of boron in concentrations > 10 % using acidimetric titration

This method of analysis has not been ring-tested.

Method 10.6

Determination of molybdenum using gravimetric method with 8-hydroxyquinoline

CEN/TS 17060: Fertilizers — Determination of molybdenum in concentration > 10 % using gravimetric method with 8-hydroxyquinoline

This method of analysis has not been ring-tested.

▼M7

Methods 11

▼M12

Chelating and complexing agents

▼M7

Method 11.1

Determination of the chelated micro-nutrient content and of the chelated fraction of micro-nutrients

EN 13366: Fertilisers — Treatment with a cation exchange resin for the determination of the chelated micro-nutrient content and of the chelated fraction of micro-nutrients

This method of analysis has been ring-tested.

Method 11.2

Determination of EDTA, HEDTA and DTPA

EN 13368-1: Fertilisers — Determination of chelating agents in fertilisers by ion chromatography — Part 1: EDTA, HEDTA and DTPA

This method of analysis has been ring-tested.

▼M9

Method 11.3

Determination of iron chelated by o,o-EDDHA, o,o-EDDHMA and HBED

EN 13368-2: Fertilizers – Determination of chelating agents in fertilizers by chromatography. Part 2: Determination of Fe chelated by o,o-EDDHA, o,o-EDDHMA and HBED by ion pair-chromatography

This method of analysis has been ring-tested.

▼M7

Method 11.4

Determination of iron chelated by EDDHSA

EN 15451: Fertilisers — Determination of chelating agents-Determination of iron chelated by EDDHSA by ion pair-chromatography

This method of analysis has been ring-tested.

Method 11.5

Determination of iron chelated by o,p EDDHA

EN 15452: Fertilisers — Determination of chelating agents-Determination of iron chelated by o,p EDDHA by reversed phase HPLC

This method of analysis has been ring-tested.

▼M9

Method 11.6

Determination of IDHA

EN 15950: Fertilizers – Determination of N-(1,2-dicarboxyethyl)-D,L-aspartic acid (Iminodisuccinic acid, IDHA) using high-performance liquid chromatography (HPLC)

This method of analysis has been ring-tested.

Method 11.7

Determination of lignosulfonates

EN 16109: Fertilizers – Determination of micro-nutrient ions complexed in fertilizers – Identification of lignosulfonates

This method of analysis has been ring-tested.

▼M9

Method 11.8

Determination of the complexed micro-nutrient content and of the complexed fraction of micro-nutrients

EN 15962: Fertilizers – Determination of the complexed micro-nutrient content and of the complexed fraction of micro-nutrients

This method of analysis has been ring-tested.

▼M12

Method 11.9

Determination of [S,S]-EDDS

EN 13368-3 Part 3: Fertilizers — Determination of chelating agents in fertilizers by chromatography: Determination of [S,S]-EDDS by ion pair chromatography

This method of analysis has been ring-tested.

Method 11.10

Determination of HGA

EN 16847: Fertilizers — Determination of complexing agents in fertilizers — Identification of heptagluconic acid by chromatography

This method of analysis has been ring-tested.

▼M7

Methods 12

Nitrification and urease inhibitors

Method 12.1

Determination of dicyandiamide

EN 15360: Fertilisers — Determination of dicyandiamide – Method using high-performance liquid chromatography (HPLC)

This method of analysis has been ring-tested.

Method 12.2

Determination of NBPT

EN 15688: Fertilisers — Determination of urease inhibitor N-(n-butyl)thiophosphoric triamide (NBPT) using high-performance liquid chromatography (HPLC)

This method of analysis has been ring-tested.

▼M9

Method 12.3

Determination of 3-methylpyrazole

EN 15905: Fertilizers – Determination of 3-methylpyrazole (MP) using high-performance liquid chromatography (HPLC)

This method of analysis has been ring-tested.

Method 12.4

Determination of TZ

EN 16024: Fertilizers – Determination of 1H,1,2,4-triazole in urea and in fertilizers containing urea – Method using high-performance liquid chromatography (HPLC)

This method of analysis has been ring-tested.

Method 12.5

Determination of 2-NPT

EN 16075: Fertilizers – Determination of N-(2-nitrophenyl)phosphoric triamide (2-NPT) in urea and fertilizers containing urea – Method using high-performance liquid chromatography (HPLC)

This method of analysis has been ring-tested.

▼M11

Method 12.6

Determination of DMPP

EN 16328: Fertilizers — Determination of 3, 4-dimethyl-1H-pyrazole phosphate (DMPP) — Method using high-performance liquid chromatography (HPLC)

This method of analysis has been ring-tested.

Method 12.7

Determination of NBPT/NPPT

EN 16651: Fertilizers — Determination of N-(n-Butyl)thiophosphoric acid triamide (NBPT) and N-(n-Propyl)thiophosphoric acid triamide (NPPT) — Method using high-performance liquid chromatography (HPLC)

This method of analysis has been ring-tested.

▼M13

Method 12.8

Determination of DMPSA

EN 17090: Fertilizers — Determination of nitrification inhibitor DMPSA in fertilizers — Method using high-performance liquid chromatography (HPLC)

This method of analysis has been ring-tested.

▼M7

Methods 13

Heavy metals

Method 13.1

Determination of cadmium content

EN 14888: Fertilisers and liming materials — Determination of cadmium content

This method of analysis has been ring-tested.

▼M10

Methods 14

Liming materials

Method 14.1

Determination of size distribution of liming materials by dry and wet sieving

EN 12948: Liming materials — Determination of size distribution by dry and wet sieving

This method of analysis has been ring-tested.

Method 14.2

Determination of the reactivity of carbonate and silicate liming materials with hydrochloric acid

EN 13971: Carbonate and silicate liming materials — Determination of reactivity — Potentiometric titration method with hydrochloric acid

This method of analysis has been ring-tested.

Method 14.3

Determination of the reactivity by automatic titration method with citric acid

EN 16357: Carbonate liming materials — Determination of reactivity — Automatic titration method with citric acid

This method of analysis has been ring-tested.

▼M10

Method 14.4

Determination of the neutralising value of liming materials

EN 12945: Liming materials — Determination of neutralising value — Titrimetric methods

This method of analysis has been ring-tested.

Method 14.5

Determination of calcium in liming materials by the oxalate method

EN 13475: Liming materials — Determination of calcium content — Oxalate method

This method of analysis has been ring-tested.

Method 14.6

Determination of calcium and magnesium in liming materials by complexometry

EN 12946: Liming materials — Determination of calcium and magnesium content — Complexometric method

This method of analysis has been ring-tested.

Method 14.7

Determination of magnesium in liming materials by atomic absorption spectrometric method

EN 12947: Liming materials — Determination of magnesium content — Atomic absorption spectrometric method

This method of analysis has been ring-tested.

Method 14.8

Determination of moisture content

EN 12048 Solid fertilisers and liming materials — Determination of moisture content — Gravimetric method by drying at 105 °C +/– 2 °C

This method of analysis has been ring-tested.

Method 14.9

Determination of the breakdown of granules

EN 15704: Liming materials — Determination of the breakdown of granulated calcium and calcium/magnesium carbonates under the influence of water

This method of analysis has been ring-tested.

Method 14.10

Determination of product effect by soil incubation

EN 14984: Liming materials — Determination of product effect on soil pH — Soil incubation method

This method of analysis has been ring-tested.

▼B

ANNEX V

A. **LIST OF DOCUMENTS TO BE CONSULTED BY MANUFACTURERS OR THEIR REPRESENTATIVES IN ORDER TO COMPILE A TECHNICAL FILE FOR A NEW TYPE OF FERTILISERS TO BE ADDED TO ANNEX I OF THIS REGULATION**

1. Guide to the compilation of a technical file on application to designate fertilisers 'EC fertiliser'.

   Official Journal of the European Communities, C 138 of 20.5.1994, p. 4.

2. Commission Directive 91/155/EEC of 5 March 1991 on defining and laying down the detailed arrangements for the system of specific information relating to dangerous preparations in implementation of Article 10 of Directive 88/379/EEC.

   Official Journal of the European Communities, L 76/35 of 22.3.1991, p. 35.

3. Commission Directive 93/112/EC of 10 December 1993 on amending Commission Directive 91/155/EEC defining and laying down detailed arrangements for the system of specific information relating to dangerous preparations in implementation of Article 10 of Council Directive 88/379/EEC.

   Official Journal of the European Communities, L 314 of 16.12.1993, p. 38.

▼M7

B. **REQUIREMENTS TO AUTHORISE LABORATORIES THAT ARE COMPETENT TO PROVIDE THE NECESSARY SERVICE FOR CHECKING COMPLIANCE OF EC FERTILISERS WITH THE REQUIREMENTS OF THIS REGULATION AND ITS ANNEXES**

1. Standard applicable at the level of the laboratories.

   — Laboratories accredited in accordance with EN ISO/IEC 17025, General requirements for the competence of testing and calibration laboratories, for at least one of the methods of Annexes III or IV.

   — Until 18 November 2014, laboratories not yet accredited provided that the laboratory:

      — demonstrates that it has initiated and is pursuing the necessary accreditation procedures in accordance with EN ISO/IEC 17025 in one or more of the methods of Annexes III or IV, and

      — provides the competent authority with evidence that the laboratory is participating in inter-laboratory tests with good results.

2. Standard applicable at the level of accreditation bodies:

   EN ISO/IEC 17011, Conformity assessment: General requirements for accreditation bodies accrediting conformity assessment bodies.