

GOVERNMENT NOTICE NO. 350 published on 21/10/2011

THE FERTILIZER ACT
(CAP. 378)

REGULATIONS

(Made under section 51)

PART I
PRELIMINARY PROVISIONS

Short title

1. These Regulations may be cited as the Fertilizer Regulations, 2011.

Interpretation

2.-(1) In these Regulations, unless the context otherwise requires –

“Act” means the Fertilizer Act;

“compendium of fertilizer ” means the compendium of fertilizer-use, as published by the Authority from time to time;

“customer-formula fertilizer” means a fertilizer prepared in accordance with a written formula that sets the name, amount and analysis of each ingredient, the fertilizer grade of the total mixture and the signature of the person it has been prepared for;

“Director of Veterinary Services” means a public official in the ministry responsible for Livestock;

“designated bank means” an established storage facility for the purpose of storing authentic samples of deregistered fertilizer or fertilizer supplement.

“Justice of peace” means a civil public official with a responsibility to conserve peace in a particular area;

“lesser plant nutrient” means any plant nutrient other than nitrogen, phosphorus and potassium;

“liquid fertilizer” means ammoniating solutions and liquid mixed fertilizers including anhydrous ammonia in which the principle materials used in making liquid fertilizers are ammonia, urea,

- phosphoric acid and potassium chloride;
- "major plant nutrient" means nitrogen (N), phosphorous (P) and potassium (K);
- "nitrogen" means elemental nitrogen (N);
- "novel supplement" means:
- (a) a supplement that is not registered and not exempted from registration under the Act or these Regulations, or
 - (b) a supplement that is derived through biotechnology and has a novel trait;
- "novel trait" , in respect of a supplement derived through biotechnology, means a characteristic of the supplement that-
- (a) has been intentionally selected, created or introduced into a distinct, stable population [of supplements] of the same species through a specific genetic change, and
 - (b) based on valid scientific rationale, is not substantially equivalent, in terms of its specific use and safety both for the environment and for human health, to any characteristic of a similar supplement that is in use as a supplement in Tanzania and is considered safe for use as a supplement in Tanzania;
- "official sample" means a representative amount of fertilizer or fertilizer supplements collected for analysis in the presence of the inspector, fertilizer dealer and justice of peace;
- "organic matter" means that substance remaining after removal of the moisture and total ash fractions from partially humified matter of animal or vegetable origin;
- "per cent" means per cent by weight;
- "phosphate" means phosphorus pentoxide (P_2O_5);
- "phosphoric acid (H_3PO_4)" means a product obtained by reacting phosphate rock and concentrated sulphuric acid;
- "potash" means potassium oxide (K_2O);
- "Recognized Certification Authority" means a recognized organization mandated with responsibility to ensure quality of fertilizer and fertilizer supplement;
- "registrant" means a person who has been issued a certificate of registration under these Regulations;
- "sample" means a representative amount of fertilizer or fertilizer

supplement taken by an inspector;

“solid fertilizer” means any fertilizer material in a solid form as opposed to a liquid fertilizer;

“specialty fertilizer” means a fertilizer-

- (a) recommended for use only on household plants, urban gardens, lawns or golf courses or in nurseries or greenhouses, or
- (b) that contains no major plant nutrients and contains lesser plant nutrients other than calcium (Ca), magnesium (Mg) and sulphur (S);

“specified risk material” includes -

- (a) the skull, brain, trigeminal ganglia, eyes, tonsils, spinal cord and dorsal root ganglia of cattle aged 30 months or older, and
- (b) the distal ileum of cattle of all ages;

“supplement” includes substance derived through biotechnology;

PART II

REGISTRATION AND DEREGISTRATION OF FERTILIZER, FERTILIZER SUPPLEMENTS AND STERILIZING PLANTS

(a) registration of fertilizer and fertilizer supplements

Registration of
fertilizer and
fertilizer
supplements

3.-(1) An application for the registration of fertilizer and fertilizer supplements shall be submitted to the Director in a form as set out in the First Schedule to these Regulations and shall be accompanied by-

- (a) the information on the suitability of the fertilizer and fertilizer supplements as to its use and including technical data sheet and directions;
- (b) a sample of the fertilizer, fertilizer supplements and certificate of analysis, if already issued;
- (c) a written declaration that the fertilizer and fertilizer supplements have or have not been banned or restricted in the country of origin;
- (d) three copies of the label that is intended to be used for the fertilizer and fertilizer supplement to which the application relates and such other information as is necessary to determine the safety, merit and value of

such fertilizer or fertilizer supplement; and

(e) such other information or document as may be required by the Director.

(2) Each application made in terms of sub-regulation (1) shall be accompanied by a non-refundable application fee as specified in the Second Schedule to these Regulations.

(3) Where an application is made by an applicant who is not resident in Tanzania, the fertilizer and fertilizer supplement to which the application relates shall not be eligible for registration, unless the application is signed by an agent of the applicant who is permanently resident in Tanzania and to whom any notice or correspondence under the Act may be sent and such agent gives an undertaking to the Director.

Testing of
fertilizers and
fertilizer
supplements

4.-(1) Notwithstanding the provisions of regulation 3, every fertilizer and fertilizer supplement submitted for registration shall prior to its registration be subjected to testing using analytical methods prescribed in a form as shown in the Third Schedule to these Regulations.

(2) For fertilizer or fertilizer supplements already under use, the Director or a person authorised by him, as the case may be, shall carry out laboratory test so as to determine the suitability for use of the fertilizer or fertilizer supplement.

(3) For new fertilizer or fertilizer supplement, the Director or a person authorised by him shall carry out laboratory and field tests for at least three consecutive seasons so as to determine the suitability for use of the fertilizer or fertilizer supplement.

(4) Where the testing is carried out by a person other than the Director, that person shall submit, as soon as the test is completed the results of the test to the Director.

(5) The applicant shall bear the costs of laboratory and field test for new fertilizer or fertilizer supplement as specified in the Second Schedule to these Regulations.

(6) The Director shall within fourteen days and subject to sub-regulations (3) register the fertilizer and fertilizer supplement and issue a registration certificate in a form as shown in the Fourth Schedule to these Regulations upon being satisfied that the product has passed laboratory and field tests and the applicant has paid the prescribed registration fee.

(7) The Director shall within twenty one days and subject to sub-regulations (1) and (2) register the fertilizer and fertilizer

supplement and issue a registration certificate in a form shown in the Fourth Schedule to these Regulations after being satisfied that the applicant has complied with the requirements for registration and upon payment of prescribed registration fee.

(8) Every certificate of registration issued shall expire in time specified in the certificate that is not later than two years from the date of registration unless the registration is sooner cancelled.

Refusal of application or registration

5.-(1) The Director may refuse to register a fertilizer and fertilizer supplements if the applicant has contravened or failed to comply with these Regulations.

(2) An application for the registration of a fertilizer and fertilizer supplement shall be refused if there are reasonable grounds to believe that the fertilizer or supplement does not conform to the requirements of the Act and these Regulations.

(b) registration of sterilizing plants

Registration of sterilizing plant

6.-(1) Any person who desires to set up a sterilizing plant shall make an application in a form as shown in the Fifth Schedule to these Regulations.

(2) The Director, if satisfied that the applicant complied with the requirements for registration of sterilizing plant including payment of fee as specified in the Second Schedule to these Regulations, shall issue the applicant with a licence in a form as shown in the Six Schedule to these Regulations.

(3) A licence issued under this regulation shall be valid for three years from the date the applicant is granted a licence to set up sterilizing plant unless cancelled earlier under the Act.

(4) Any person who manufacture or sale any fertilizer, uses sterilizing plant for the sterilizing of bones or other substances derived from an animal carcass except under and in accordance with the provisions of a licence issued to him in respect of that plant shall be guilty of an offence.

Obligation to obtain Environmental Impact Assessment Certificate

7.-(1) Any person who intends to set up a sterilizing plant for the purpose of manufacturing fertilizer or fertilizer supplement from animal carcass shall obtain an Environmental Impact Assessment Certificate from relevant authority.

(2) Form FR 5 of Fifth Schedule shall be appended to the Environmental Impact Assessment Certificate.

Sterilization procedure

8.-(1) Any materials of animal origin imported or locally produced in Tanzania intended for manufacturing fertilizers shall be sterilized under the following procedure-

- (a) subjection to a dry heat of 140°C for not less than three hours; or
- (b) subjection to a moist heat under steam pressure of not less than 1.4 kilogrammes per sq. centimeter/ 1.3 atmospheres for fifteen minutes; or
- (c) treatment of the bones after they are broken with the vapour of benzene (benzol) boiling between 95°C. and 115°C for not less than four hours; live steam to toe thereafter admitted for one hour, and shall be free of *Bacillus anthracis* and organisms of the gas gangrene type.

Handling and transportation of sterilized materials

9.-(1) After sterilization, every precaution shall be taken to prevent reinfection of the sterilization product and it shall be packed at the factory in new bags.

(2) No vehicle, vessel or boat which has been used for the conveyance of unsterilized bones or other substances derived from animal carcasses shall be used for the transportation of sterilized animal products unless it has been first disinfected with a disinfectant solution equal in disinfective value to a 5 per cent solution of standard phenol.

PART III

REGISTRATION OF FERTILIZER DEALERS AND LICENSING

(a) Registration of fertilizer dealers

Application for registration of fertilizer dealer

10.-(1) Any person operating or wishes to operate fertilizer business shall make an application as fertilizer dealer to the Director.

(2) The application for registration as fertilizer dealer shall be in a form as shown in the Seventh Schedule to these Regulations.

Registration of fertilizer dealers

11. The Director shall within thirty days after receiving application for registration, register the applicant and issue a registration certificate in a form as shown in the Eighth Schedule to

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these Regulations after being satisfied that the applicant has complied with the requirements for registration and upon payment of registration fee provided in the Second Schedule.

Issuance and
validity of
certificate

12. Every certificate of registration issued under regulation 11 shall expire in time specified in the certificate that is not later than two years from the date of registration unless the registration is sooner cancelled.

(b) Licensing of the fertilizer dealers

Licensing of
fertilizer
dealers

13.-(1) An application for licensing of the fertilizer dealer shall be submitted to the Director in a form as shown in the Ninth Schedule to these Regulations and shall be accompanied by:-

(a) the appropriate fees as set out in the of Second Schedule to these Regulations;

(2) The Director shall within thirty days after receiving application for licensing, and upon being satisfied that the applicant has complied with the requirements for licensing and upon payment of registration fee provided in the Second Schedule, issue a licence in a form as shown in the Tenth Schedule to these Regulations.

(3) Every licence issued in terms of sub-regulation (2) shall expire in time specified in the certificate that is not later than two years from the date of issuance, unless the registration of the dealer is sooner cancelled.

Suspension
and
cancellation of
registration

14.-(1) Subject to these Regulations, the Director may suspend or cancel the certificate of registration if he is satisfied that with respect to that fertilizer, fertilizer supplement or sterilizing plant there has been a violation of the Act or these Regulations.

(2) Where the Director intends to cancel or suspend a certificate of registration, he shall forward to the registrant by registered mail a notice stating his intention to suspend or cancel that certificate of registration.

(3) The registrant within thirty days after he has received a notice referred to in subregulation (3) notify the Director that he wishes to have an opportunity to be heard.

(4) The Director shall notify the registrant by registered mail of the time and place of hearing to determine whether the registrant's certificate of registration shall be cancelled or suspended.

(5) The hearing shall be held within thirty days after the date on which the Director receives notice that the registrant wishes to have an opportunity to be heard.

(6) Where a registrant who has received a notice referred to in subregulation (2) fails to notify the Director that he wishes to have an opportunity to be heard or fails to satisfy the Director that his certificate of registration should not be cancelled or suspended, the Director may cancel or suspend registration.

Deregistration of fertilizer, fertilizer supplements or sterilizing plants

15.-(1) The Director may deregister a fertilizer, fertilizer supplements or sterilizing plant if he is satisfied that such a fertilizer or fertilizer supplements is no longer conforming to its original description or has lost its qualitative and quantitative attributes for which it was registered.

(2) The Director may deregister a sterilizing plant upon proof that the licensee has contravened any of the conditions for which the licence was issued.

(3) Authentic sample of deregistered fertilizer, fertilizer supplements shall be sent to the designated bank for preservation until the relevant authority has resolved the matter in accordance with the provisions of the Act.

PART IV

SAMPLING AND TESTING PROCEDURES FOR FERTILIZERS AND FERTILIZER SUPPLEMENT

Fertilizer quality control

16.-(1) No fertilizer or fertilizer supplement shall be used in Tanzania unless it has been sampled, tested, analyzed, evaluated and recommended for use.

(2) Any fertilizer dealer shall be required to submit to the Director an application for test and analysis of fertilizer or fertilizer supplement in a form as shown in the Eleventh Schedule to these Regulations.

(3) An application for test and analysis shall be made and supported by testing fees as specified in the Second Schedule to these Regulations.

Procedure for sampling

17. Every sample of fertilizer or fertilizer supplement taken by inspector for analysis shall be taken in manner that conforms to standards prescribed in this part of these regulations as may be amended from time to time.

General
requirement of
fertilizer
sampling

18.-(1) In drawing samples, the following precautions and directions shall be observed-

- (a) the inspector, fertilizer dealer and justice of peace shall be present when official sample is drawn.
- (b) samples shall be taken from the place of storage, and the process of sampling shall not be exposed to undesirable weather conditions and-
 - (i) the sampling equipment shall be clean, dry and should not be a source of contamination;
 - (ii) the material being sampled, the sampling equipment and the containers for samples shall be protected from contamination;
 - (iii) metallic containers must be avoided; and
 - (iv) the sample immediately after being drawn shall be placed in wide-mouthed clean, dry and airtight glass or other suitable containers, for example Poly Vinyl Chloride (PVC) or polyethylene, which must not react with fertilizer.
- (c) a fertilizer dealer shall arrange the packages in such a way to enable the Inspector to reach all packages and draw samples;
- (d) where the fertilizer to be sampled is in a fluid or semi fluid condition it shall be well mixed by stirring or shaking;
- (e) the sample shall be divided into three equal parts and each sample container shall be completely filled by the sample (but not tightly packed); each container shall be air-tight sealed and affixed with a certificate signed by the inspector, fertilizer dealer and justice of peace with following details -
 - (i) name and physical address of the fertilizer dealer;
 - (ii) location of sampling;
 - (iii) the date of sampling;
 - (iv) common name of fertilizer;
 - (v) the physical condition of the products;
 - (vi) name of the Inspector who took the sample; and
 - (vii) Remarks.

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(2) All samples shall be stored in shade under dry weather conditions and immediately taken to laboratory for analysis.

Scale of sampling

19.-(1) All bags containers in a single consignment of the material of the same grade and type coming out from the single batch of manufacture shall constitute a lot.

(2) Where a consignment is declared to consist of different batches or sources of manufacture, the batches shall be marked separately and the groups of containers in each batch shall constitute separate lots.

(3) In case of a consignment drawn from a continuous process, 2000 bags or 100 tones of the material shall constitute a lot.

(4) During sampling, containers shall be selected at random from the lot.

(5) In order to ensure randomness of the selection, the following procedure shall be adopted: Starting from any container in the lot, count them as 1, 2, 3, up to r and so on, r being the integral part of N/n . Every r^{th} container thus counted shall be withdrawn till the requisite numbers of containers are obtained.

(6) The number of containers to be chosen for sampling from a lot shall depend on the size of the lot and shall be prescribed as follows -

Lot size (N) selected (n)	Number of containers/packages to be selected
2 - 8	2
9 - 27	3
28 - 64	4
65 - 100	5
101 - 300	6
301 - 500	7
501 - 800	8
801 - 1300	9
1301 and above	10

Apparatus for sampling Solid bagged fertilizer

20.-(1) The apparatus to be used for sampling of solid bagged fertilizer shall be made of -

- (a) slotted single tube probe; and
- (b) solid cone tip constructed of stainless steel or brass.

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- (2) The length of the probe exclusive of handle, shall approximately be equal to the diagonal of a bag to be sampled.
- (3) The fertilizers shall be marketed in fifty kilograms bags.
- (4) An overall length of 110 cm shall be adequate for fertilizers of low bulk density.
- (5) A slot length of 105 cm and a width of 1.5 cm shall be appropriate.
- (6) The inside diameter of the probe shall be 1.5 cm minimum.

Procedure for
sampling solid
bagged
fertilizer

21. Where sampling undertaken is of solid bagged fertilizer, the procedure shall be by -
 - (a) placing the bag in horizontal position, then roll or flip over three or more times;
 - (b) opening the bag by cutting a couple of stitches at one corner. Inserting the probe so that it extends diagonally from corner to corner with slot down. It should not pierce through the bag;
 - (c) turning it one half to bring the slot up. Jar bag slightly to fill the probe, and remove carefully not to drag material out of it with bag edges;
 - (d) emptying entire contents of each probe into a suitable container;
 - (e) taking one core per bag combine contents of all probes of the lot being sampled and place in a container with moisture seal;
 - (f) label the contents before another lot is sampled; and
 - (g) in case the material in bag is found to be in cake condition the bag is dropped several times from a height of 1 metre till lumps are all broken up before sampling with the probe. Mild strokes with a wooden hammer may be helpful. In case of extreme difficulty the bag may be opened out and a sample taken either by piffing or coning and quartering.

Apparatus for
Sampling solid
bulk fertilizers

22. All bulk fertilizer in wagons, storage, bins, truck and trailers shall be sampled by using double tube probe.

Procedure for sampling bulk fertilizer

23. Where sampling undertaken is of bulk fertilizer the procedure shall be by inserting the double probe tube vertically to its full depth in the open portion at the location desired and from each lot or batch take 20 samples (cores) at random portions.

Apparatus for sampling fertilizer from conveyor belt or chute

24.-(1) The apparatus to be used for sampling of fertilizer from conveyor belt or chute shall be stream sampling cup.

(2) The length must be as long as maximum diameter of stream.

Procedure for sampling of fertilizer from conveyor or chute

25. Where the sampling undertaken is of fertilizer from conveyor or chute the procedure shall be by taking 20 samples at interval through the whole period of passage of a lot or batch using the stream sampling cup. In-ship, sample separately from each compartment.

Apparatus for sampling of liquid fertilizer

26. The apparatus to be used for sampling of liquid fertilizer shall be glass or Polyethylene bottle 500ml, nylon cord and fluid intake tube.

Procedure for sampling liquid fertilizer

27. Where the sampling undertaken is of liquid fertilizer from mixing vat, storage tank or delivery tank-

- (a) mix the fertilizer thoroughly;
- (b) flush direct tap or delivery line and collect sample in a glass/ polyethylene bottle or lower the sample bottle by a nylon cord from the top opening of the storage tank to the bottom of the tank;
- (c) raise slowly while filling at such a rate that a bottle is not quite full when withdrawn;
- (d) transfer to sample container and seal tightly;
- (e) repeat process to obtain three such representative samples.

Preparation of solid fertilizer sample

28.-(1) Preparation of solid fertilizer sample in the laboratory shall be as follows -

- (a) pass the fertilizer sample through a sieve 1.7 mm;
- (b) reduce the material to an amount sufficient for analysis;

- (c) sieve through 1.0 mm aperture and grind in a mortar the part remaining on the sieve until all particles pass through;
 - (d) mix thoroughly, transfer immediately to a stoppered wide mouth bottle and preserve this as the prepared samples for analysis.
- (2) Grinding and sieving shall be done as rapidly as possible to minimize gain or loss of moisture.

Testing
procedure

29. The methods of analysis of fertilizer and fertilizer supplements are as shown in the Third Schedule to these regulations.

Guaranteed
analysis of a
fertilizer or
fertilizer
supplement

30. The guaranteed analysis of a fertilizer or a fertilizer supplement shall include:-

- (a) in respect of each fertilizer, the minimum amount of total nitrogen, total phosphate and total potash expressed in percent;
- (b) in respect of each mixed fertilizer, other than customer-formula fertilizers and fertilizers represented for dairy feeding and not for further dilution, the minimum amount of total nitrogen, total phosphate and total potash expressed in per cent in whole numbers only;
- (c) in respect of each lesser plant nutrient for each fertilizer, the minimum amount of calcium, magnesium and sulphur expressed in per cent on elemental basis;
- (d) in respect of each fertilizer, the amount of each lesser plant nutrient, other than calcium, magnesium and sulphur, expressed in per cent on elemental basis;
- (e) in respect of each tobacco fertilizer, the minimum amount of nitrate nitrogen, ammoniacal nitrogen and organic nitrogen expressed in per cent;
- (f) in respect of each tobacco fertilizer, the minimum and maximum amounts of chloride expressed in per cent on elemental basis;
- (g) in respect of each mixed fertilizer containing at least 25 per cent of the nitrogen contained therein in water-insoluble form of plant or animal origin or other source of slowly available nitrogen, the minimum amount of water-insoluble nitrogen expressed in per cent;

- (h) in respect of an untreated organic or inorganic phosphatic fertilizer, the minimum amount of total phosphoric acid expressed in per cent;
- (i) where applicable, in respect of each supplement to which the analysis refers:
 - (i) the minimum amount of the active ingredient expressed in per cent;
 - (ii) the genus and, where known, the species of the active microorganism;
 - (iii) the minimum number of active viable cells per gram of product of the genus and, where known, the species of the active microorganism in the product.
- (j) in respect of each fertilizer containing a pesticide, the amount of the active ingredient of the pesticide expressed in per cent;
- (k) in respect of agricultural liming materials whose calcium and magnesium compounds are capable of neutralizing soil acidity-
 - (i) the minimum amount of calcium and magnesium expressed in per cent on elemental basis;
 - (ii) the minimum neutralizing value expressed in per cent of the acid neutralizing capacity of calcium carbonate;
 - (iii) the per cent passing through a sieve having openings that are each 0.149 mm and 1.68 mm in width;
- (l) in respect of acidifying materials capable of increasing hydrogen ion concentration of a growing medium, the minimum acidifying value expressed in percent of the basic neutralizing capacity of calcium carbonate, where such ingredients are intentionally incorporated in that fertilizer or represented to be contained therein;
- (m) in respect of natural rock phosphate, basic slag, a mixture of natural rock phosphate and basic slag, hoof and horn meal, the percent passing through a sieve having openings that are 0.149mm in width;
- (n) in respect of each fertilizer, the maximum amount, expressed in percent of leather, hoof, horn, hair, wool waste, garbage or any similar organic material or its

constituents have been treated in a manner to make the phosphorous available and the potash soluble; and

- (o) in respect of manure, compost, humus or leaf mould, the minimum amount of organic matter expressed in per cent and the maximum amount of moisture expressed in per cent.

Qualifications of Analyst or Inspector

31.-(1) A person shall not be appointed as Analyst or Inspector for the purpose of sampling and testing of fertilizer, fertilizer supplement or sterilizing plant unless that person has the minimum qualifications for a person to be registered as an Inspector or Analyst and shall include, but not limited to the following-

- (a) in the case of an inspector he must hold at least a degree in agronomy, general agriculture or science majoring chemistry;
- (b) in the case of an analyst he must have successfully completed a course in analytical chemistry or equivalent ;

(2) The appointed person while holding the office shall not engage in any business connected with the manufacture, sale or distribution of fertilizer, fertilizer supplement or sterilizing plant.

(3) The Analyst or Inspector shall carry an identification which he shall produce whenever necessary during all times of executing his duties.

PART V

PACKAGING AND LABELING

Packaging of fertilizer or fertilizer supplement

32.-(1) The solid fertilizer shall be packed in UV stabilized woven polypropylene (wpp) bags with polyethylene (pe) inner lining with the following description-

- (a) at the bottom of the bag the woven fabric and polyethylene (pe) shall be hemmed then folded and secured together in lock stitches;
- (b) at the top the inner lining and outer bag shall be hemmed together; and
- (c) the bag shall be secured in lock stitches and without any opening
- (d) the stitching thread must be acid and heat resistant and of sufficient strength to hold the package secure and with stand multiple stages of handling.

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(2) The outer fabric shall measure not less than 12 x 12 mesh weave of minimum 900 denier.

(3) The inner pe lining shall be of minimum of 70 microns thickness.

(4) The solid fertilizer shall be packed in weight of 5kg, 10kg, 25kg and 50kg.

(5) The fertilizer supplement shall be packed in ampules/volumes of 5ml, 10ml, 20ml, 50ml and 100ml.

Packaging of
liquid fertilizer

33.-(1) The liquid fertilizers shall be packed in 0.5 litre, 1 litre, 5 litre and 10 litre.

(2) The liquid fertilizer shall be packed in plastic materials or any other containers that will prevent oxidation of liquid fertilizer.

Labeling
fertilizer or
fertilizer
supplements

34.-(1) A person shall not pack fertilizer and fertilizer supplements with other names, unless that fertilizer or fertilizer supplement is of the constitution to which the fertilizer name refers.

(2) A person shall not alter the name of a fertilizer or fertilizer supplements provided on the label of a package or container.

(3) The information on the label or outside of a package of fertilizer or fertilizer supplements shall be conspicuously, legibly and indelibly written or printed in both English and Swahili, and shall appear on one exposed face of the package or label and shall be of a size and colour that can be easily read.

(4) No label shall contain any incorrect or misleading information, mark or brand name that might be construed as a variety name.

(5) Every package of fertilizer shall be labeled with the following information-

- (a) name of the fertilizer;
- (b) name and address of the manufacturer/packer and importer/distributor;
- (c) nutrient content;
- (d) net content by mass in kilogram;
- (e) country of origin;
- (f) handling instructions-including the words "Use No Hooks";
- (g) batch number;
- (h) production date and expiry date.

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Marking of
brand or grade
name

35.-(1) Every package of fertilizer or fertilizer supplements marked with a brand or grade name shall have on its label a description that specifies the fertilizer standard as provided for in these Regulations.

(2) All the information on the label shall be accurate and free from any statements which cannot be substantiated or which could falsely inform a purchaser or user and the label shall not describe a product by such terms as harmless, non-toxic, the best, superior or most effective.

Affixing of
label

36.-(1) Every package containing a fertilizer shall have a label affixed to it on which shall be printed-

- (a) the name and address of the manufacturer of the fertilizer or of the registrant;
- (b) in the case of a fertilizer that is not registered under these Regulations, the name and address of the person who caused the fertilizer to be packaged;
- (c) the brand of the fertilizer, if any;
- (d) the common name of the fertilizer;
- (e) the registration number of the fertilizer, where applicable;
- (f) the guaranteed analysis prescribed in regulation 31
- (g) in the case of a fertilizer-pesticide, a product represented to contain lesser plant nutrients other than calcium, magnesium or sulphur, a specialty fertilizer or a product represented for foliar feeding, the directions for use;
- (h) where the fertilizer is a fertilizer-pesticide, all statements required by the Compendium of Fertilizer-Use Pesticides;
- (i) the weight of the fertilizer;
- (j) in case the fertilizer is other than a specialty fertilizer and it contain boron, copper, manganese, molybdenum or zinc or, in the opinion of the Director, has a natural high content of one or more of these lesser plant nutrients, cautionary statement which shall be written as follows -

"CAUTION: This fertilizer contains (*specify name of lesser plant nutrient*) and should be used only as recommended. It may prove harmful when misused." or TAHADHARI: Mbolea hii ina kirutubisho cha (*taja jina la kirutubisho*) ambacho

kinaweza kuleta madhara kama itatumika pasipo kuzingatia masharti”

- (k) in the case of a fertilizer that is or contains any prohibited material, other than a rendered fat, conspicuous statements written legibly and indelibly in both official languages that indicate that:
- (i) feeding the product to cattle, sheep, deer or other ruminants is illegal and subject to fines or other punishments under the Act;
 - (ii) the product is not to be used on pasture land or other grazing areas for ruminants;
 - (iii) the product is not to be ingested, and
 - (iv) a person should wash his or her hands after using the product.
- (l) the lot number of the fertilizer or fertilizer supplement, unless the fertilizer or fertilizer supplement is a customer-formula fertilizer.
- (2) Where a fertilizer is sold in bulk, the information required by this regulation shall be shown on the shipping bill or on a statement accompanying the shipment.
- (3) Subject to sub-regulation (2), every package containing a customer-formula fertilizer that contains a pesticide or lesser plant nutrient with toxic properties shall have a label affixed to it on which shall be printed -
- (a) the name and address of the manufacturer of the fertilizer;
 - (b) the cautions to be observed in using the fertilizer;
 - (c) the grade of the fertilizer in the total mixture;
 - (d) the guaranteed analysis prescribed in rRegulation 31
 - (e) the name and amount of each active ingredient of any pesticide in the fertilizer expressed in per cent;
 - (f) the directions for use, in the case of a fertilizer containing a pesticide;
 - (g) the name and address of the person who is to use for fertilizing purposes;
 - (h) the weight of the fertilizer; and
 - (i) where the fertilizer is a fertilizer-pesticide, all statements required by the *Compendium of Fertilizer-Use Pesticides*.
- (4) Subject to sub regulation (2), at least one package in each lot or shipment of a customer-formula fertilizer that does not

contain a pesticide or lesser plant nutrient with toxic properties shall have a label affixed to it on which shall be printed-

- (a) the name and address of the manufacturer of the fertilizer and the name of the person who is to use the fertilizer for fertilizing purposes;
- (b) the number of packages in the lot or shipment;
- (c) the grade of the customer-formula fertilizer;
- (d) the guaranteed analysis prescribed in these Regulations and
- (e) the weight of the lot or shipment.

(5) Where a package of mixed fertilizer is sold and does not contain a label showing the name and grade of each compound or ingredient in the fertilizer, the vendor shall be guilty of an offence.

Label not to bear a statement that implies the presence of a slowly available plant nutrient

37. The label affixed to a package of fertilizer shall not bear a statement that implies the presence of a slowly available plant nutrient at least unless twenty five per cent of the guaranteed amount of the nutrient in the fertilizer is present in a water-insoluble or other slowly available form.

Labeling of fertilizer supplement

38.-(1) Every package containing a fertilizer supplement shall have a label affixed thereto on which shall be printed -

- (a) the name and address of the manufacturer of the fertilizer supplement or the name and address of the registrant;
- (b) in the case of a fertilizer supplement that is not registered under these Regulations, the name and address of the person who caused the fertilizer supplement to be packaged;
- (c) the name of the fertilizer supplement;
- (d) the weight of the fertilizer supplement;
- (e) the lot number of the fertilizer supplement;
- (f) the directions for use of the fertilizer supplement;
- (g) the guaranteed analysis prescribed in these Regulations;
 - (i) the minimum amount expressed in per cent of the active ingredient in the fertilizer supplement,
 - (ii) the species name or genus of the active microorganism; and

- (iii) the minimum number of active viable cells per gram of product of the active genus or species of microorganism in the product;
- (h) in the case of a fertilizer supplement in which the active ingredient may deteriorate, the date beyond which the fertilizer supplement is not intended for use;
- (i) in the case of a fertilizer supplement that is or contains prohibited material, conspicuous statements written legibly and indelibly in both official languages that indicate that -
 - (i) feeding the product to cattle, sheep, deer or other ruminants is illegal and subject to fines or other penalty under the Act and these Regulations;
 - (ii) the product is not to be used on pasture land or other grazing areas for ruminants;
 - (iii) the product is not to be ingested; and
 - (iv) a person shall wash his or her hands after the person uses the product; and
 - (v) the registration number of the fertilizer supplement if the supplement is required to be registered.

(2) The provisions of paragraphs (1)(d) and (f) shall not apply to a seed package containing a pre-inoculated or coated pre-inoculated seed if each package of pre-inoculated or coated pre-inoculated seed has a label on which is stated that ,

"This product is treated with (species name or genus of the active microorganism) inoculum."

(3) a package containing peat, peat moss, sphagnum moss, tree bark or other fibrous organic material shall bear the following information on the label -

- (a) the name and address of the person who packaged or caused the fertilizer supplement to be packaged; and
- (b) the name and volume of the fertilizer supplement.

(4) Notwithstanding the provisions of subregulations (1) to (3), of this regulation where a fertilizer supplement is sold in **bulk**, the information required by those sub regulations to be shown on a label shall be shown on the shipping bill or on a statement accompanying the shipment.

Fertilizer

GN. No. 350 (contd.)

Label not to mislead or deceive the purchaser

39.-(1) A label referred to in regulations 35 (5) and 39 (1) shall not have printed thereon-

- (a) any incorrect or misleading information or mark; or
- (b) a brand or name that would tend to deceive or mislead a purchaser with respect to the composition or utility of the product to which the label relates.

(2) The character, size, colour and placing of the printing on a label referred to in sub regulation (1) shall not emphasize or obscure any part of the name, analysis or other information required to be printed on the label.

Additional statement

40.-(1) Where any reference, direct or indirect, is made in respect of the place of manufacture of a label or container and not the place of manufacture of a fertilizer or fertilizer supplement, the reference shall be accompanied by an additional statement indicating that the place of manufacture refers only to the label or container.

(2) Where a prepackaged fertilizer or fertilizer supplement that is manufactured or produced and labeled in a country other than Tanzania has applied to it a label that shows the identity and principal place of business of the person in Tanzania for whom the prepackaged product was manufactured or produced for resale, the identity and principal place of business of that person shall be preceded by the words "imported by" or "imported for" , unless the geographic origin of the prepackaged product is stated on the label.

Name of a fertilizer or fertilizer supplement

41.-(1) The designated name of a fertilizer or fertilizer supplement having a composition set in Column I of Twelfth Schedule shall be the name set out in Column II of that Schedule.

(2) The grade of a fertilizer or supplement referred to in sub regulation (1) shall form part of the name of that fertilizer.

(3) Where the composition of a fertilizer or fertilizer supplement is not set out in Column one of Twelfth Schedule that fertilizer or fertilizer supplement shall be designated by a name acceptable to the Director.

Names for mixed fertilizers containing any major plant nutrient

42.-(1) The names for mixed fertilizers that contain any major plant nutrient shall include the grade designation in the manner required by regulation 42 (1) of these Regulation.

(2) In addition to the requirements of sub regulation (1), the names for fertilizers that contain a pesticide shall include as a suffix

the amount of the active ingredient of the pesticide in the fertilizer expressed as a percentage followed by the name of the pesticide.

(3) A grade designation shall be stated as a hyphenated numerical series and, in the case of mixed fertilizers other than customer-formula fertilizers, the numerals shall be in whole numbers only.

(4) When a grade designation is used on the label of any fertilizer, the numerals shall represent minimum guarantees expressed in per cent for total nitrogen, total phosphate and total potash, listed in that order.

(5) A label showing the name of a tobacco fertilizer shall include the words -

- (a) "flue-cured tobacco", where the fertilizer is intended for flue-cured tobacco production; or
- (b) "burley tobacco", where the fertilizer is intended for burley tobacco production.

(6) The name of a mixed fertilizer shall not include the names or designation of any type or types of soil.

(7) Specialty fertilizers represented for dairy feeding and not represented for further dilution shall not be required to have the grade designation stated as part of the name.

(8) For the purposes of these Regulations, units of measurement shown on a label shall be expressed in accordance with the International System of Units (SI units).

PART VI

CLASSES, NAMES AND STANDARDS OF FERTILIZER AND FERTILIZER SUPPLEMENTS

Classes, names and standards of fertilizer or fertilizer supplements

43. Classes, names and standards of fertilizer or fertilizer supplements for the purposes of these Regulations shall be as set out in the Twelveth and Thirteenth Schedules to these Regulations.

Mixed fertilizer and fertilizer supplements

44.-(1) The major plant nutrients present in every mixed fertilizer containing nitrogen, phosphorous and potassium in total shall not be less than 24% of the total content of the fertilizer, except if the mixed fertilizer is -

- (a) a customer-formula fertilizer;
- (b) a specialty fertilizer;
- (c) a fertilizer the ingredients of which contains-
 - (i) at least 50% that is of animal or vegetable

- origin and that supplies 25% of the nitrogen in the mixture in a water-insoluble form, and
- (ii) at least 18% that is of major plant nutrients combined; or
- (d) a product registered under the Act.
- (2) A fertilizer supplement shall be prepared to the extent that-
- (a) the amount of the product to be applied to the seed of any crop will not interfere with the commonly used rates of seeding for that crop, and
 - (b) the number of viable cells of microbial species other than the desired nodule inducing *Rhizobium* species are at a level that will not affect the viability or performance of such desired species.
- (3) Where a fertilizer supplement consists of pre-inoculated seeds to which inoculum is adhered and the seeds are of a crop having a similar seed size, each seed shall have adhered to it at least the number of viable cells of the nodule inducing species.
- (4) Every fertilizer supplement referred to in subregulation (3) shall be prepared to the extent that-
- (a) the product does not contain a substance that would inhibit nodulation and nitrogen fixation; and
 - (b) the number of viable cells of microbial species, other than the desired nodule inducing *rhizobium* species, are at a level not likely to affect the viability or performance of the desired species.
- (5) Where a fertilizer supplement consists of coated pre-inoculated seed, that is, a seed to which inoculum is adhered and that is coated with a material for the purpose of protecting the viability of bacteria contained in the inoculum, the person who packed the product shall provide the Director with results of scientific investigations respecting the effectiveness of the product for its intended purposes including the minimum number of viable cells of intended *rhizobium* species per seed.
- (6) A fertilizer or fertilizer supplement shall not contain -
- (a) any substance in quantities likely to be generally detrimental or seriously injurious to vegetation, domestic animals, public health or the environment when used according to directions; and

(b) any substance that would, when applied in amounts commonly used or as specified in the directions for use, leave in the tissues of a plant a residue of a poisonous or harmful substance.

(7) A fertilizer or fertilizer supplement shall have such chemical and physical composition as to be efficacious for every purpose for which it is represented or sold.

(8) Where the label on a fertilizer or representations made in respect of a fertilizer indicate that the fertilizer contains lesser plant nutrients -

(a) such plant nutrients shall be present in sufficient quantity in the fertilizer to be efficacious for the purpose or purposes indicated on such label or in such representations; and

(b) such plant nutrients at recommended rates of use shall not be present at toxic levels.

Standards of fertilizer or fertilizer supplement sold or imported

45. Every fertilizer or fertilizer supplement sold or imported under a name specified in the Twelfth and Thirteenth Schedule shall meet the requirements of the standard of that fertilizer or fertilizer supplement.

Mixed fertilizer containing two or more nutrients

46.-(1) Every mixed fertilizer containing two or more major plant nutrients shall have the guaranteed amount of nutrients as shown in the Thirteenth Schedule to these Regulations.

(2) Where a mixed fertilizer contains two or more major plant nutrients set out in the Thirteenth Schedule, no nutrient shall have a deficiency of the guaranteed amount.

(3) Where a mixed fertilizer contains lesser plant nutrients set out in the Thirteenth Schedule, no lesser plant nutrient or pesticide set out in column 1 of an item in the table shall have a variation from the guaranteed amount set out in Column II.

PART VII

STORAGE OF FERTILIZER AND FERTILIZER SUPPLEMENT

Storage of fertilizer or fertilizer supplement for quality control

47.-(1) Every fertilizer dealer shall be responsible for the quality of fertilizer or fertilizer supplement he sells or offers for sale.

(2) Fertilizer or fertilizer supplements shall be kept in a way to ensure compliance of its quality as per code of practice for

storage and transport of fertilizer or fertilizer supplement as set out in Fourteenth Schedule to these Regulations.

(3) A Fertilizer dealer may appoint an agent with knowledge, ability and facilities to deal with fertilizer or fertilizer supplements offered for sale.

(4) The fertilizer dealer shall notify the Director of the name and address of the person appointed as his agent pursuant to sub-regulation (3)

(5) Fertilizer dealer and his agent shall be responsible for the quality of the fertilizer or fertilizer supplement offered for sale.

(6) Where an Inspector has reasonable grounds to believe that fertilizer or fertilizer supplement is being sold without having reached standards or in violation of these Regulations, shall immediately issue a stop sale order in a form as shown in the Fifteenth Schedule to these Regulations.

PART VIII

IMPORTATION AND EXPORTATION OF FERTILIZER AND FERTILIZER SUPPLEMENTS

Importation of
fertilizer or
fertilizer
supplement

48.-(1) Every fertilizer dealer before importing fertilizer or fertilizer supplement, shall submit to the Director a notice of intention to import such fertilizer or fertilizer supplement in a form as shown in the Sixteenth Schedule to these Regulations.

(2) The notice under sub-regulation (1) shall specify-

- (a) name and address of importer;
- (b) name and address of exporter;
- (c) country of origin;
- (d) the quantity of fertilizer or fertilizer supplement;
- (e) expected date of arrival of consignment; and
- (f) Port of entry;

(3) Each notice of intention to import fertilizer or fertilizer supplement shall be accompanied by a non-refundable fee as set out in the second Schedule to these Regulations.

(4) Upon receipt of such notice, the Director shall issue an Import Permit in a form as shown in the Seventeenth Schedule to these Regulations upon being satisfied with the compliance of the notice of the intention to import.

(5) Upon receipt of clearing documents from the exporter, the importer of fertilizer or fertilizer supplements shall fill a form as shown in the Eighteenth Schedule to these Regulations.

(6) Any fertilizer or fertilizer supplement imported under this regulation shall not be sold unless its quality has been analysed and approved.

(7) Any imported fertilizer or fertilizer supplement shall be accompanied by certificate of quality issued by a Recognized Certification Authority of country of origin of the exporter of fertilizer or fertilizer supplement.

(8) Where an import consignment of risk materials of animal origin is to be imported, an additional Quality Assurance Certificate from relevant authority of exporting country shall accompany the application form and approved by the Director of Veterinary Services.

Exportation of
fertilizer or
fertilizer
supplement

49.-(1) Any Fertilizer dealer who intends to export fertilizer or fertilizer supplement, shall make an application to the Director for a permit to export fertilizer or fertilizer supplement in a form as shown in the Nineteenth Schedule to these Regulations.

(2) The application under subregulation (1) shall be accompanied with an import permit from the country to which fertilizer or fertilizer supplement is exported and shall specify the quantity of fertilizer or fertilizer supplement to be exported.

(3) Upon receipt of such application, the Director shall issue Fertilizer and fertilizer supplements export permit in a form as shown in the Twentieth Schedule to these Regulations upon being satisfied with the compliance of the notice of intention to export.

(4) The exporter shall ensure compliance with all conditions for export of fertilizer and fertilizer supplements as provided in these Regulations.

(5) Where consignment of risk materials of animal origin is to be exported, permit from veterinary authorities of importing country approved by the Director of veterinary services shall be accompanied with the application form.

PART IX
INFORMATION AND RECORDS

Fertilizer
dealers to keep
information
and records

50. Every Fertilizer dealer shall keep information and records of each fertilizer and fertilizer supplement in regards to -

- (a) type of fertilizer or fertilizer supplements;
- (b) origin;

- (c) port of entry;
- (d) quantity imported or exported and sold;
- (e) purpose for use;
- (f) batch number;
- (g) date of manufacture;
- (h) date of importation or exportation;
- (i) any other information which may be necessary for purposes of control of fertilizer and fertilizer supplement.

Periodical reporting

51. (1) Subject to the provisions of regulation 51, the information and record under regulation 50 shall:
- (a) be reported semi-annually to the Director;
 - (b) be maintained for at least 20 years; and
 - (c) be made available to the Analyst or Inspector whenever requested.
- (2) The information obtained under sub-regulation (1) of this regulation shall be kept in the database by the Director.

Disposal of unwanted quantities of fertilizer or fertilizer supplement

- 52.-(1) Every fertilizer dealer shall supply information to the Director on safe and ways of disposing unwanted quantities of fertilizers or fertilizer supplements.
- (2) Information on the ways of disposing unwanted quantities of fertilizer or fertilizer supplement shall not deviate from relevant laws regulations on environmental protection.
- (3) Fertilizer dealer shall be responsible for the costs of disposing condemned fertilizer or fertilizer supplements.

PART X
SAFETY AND HEALTH

Handling and transportation of fertilizer and fertilizer supplements

53. (1) Any person handling fertilizer or fertilizer supplement shall possess and use appropriate personal protective or equipment which shall include face-masks, goggles, respirators, rubber gloves, plastic or rubber aprons, rubber boots, overalls and caps.
- (2) Fertilizer or fertilizer supplement shall be packed in clean and dry container designed to provide protection against

storage areas of fertilizers product deterioration, compaction, weight change or other spoilage.

(3) The container shall be capable of withstanding all anticipated level of handling, storage, stacking, loading and unloading conditions and shall at least have the following qualities-

- (a) not capable of being adversely affected by changes in ambient conditions such as, pressure, temperature and humidity;
- (b) the outer surface of the container is constructed of, or coated with, materials capable of resisting corrosion or other deterioration;
- (c) the inner surface of the container or closure is coated or lined with substances or materials which resist corrosion and are not comprised of materials capable of reacting with other materials such as fertilizers from other compounds, or weaken the overall structure of the container or closure;
- (d) approved container or closure of a specific material and design for a particular fertilizer product or formulation shall be re-approved if it has to be used for other product or formulation.

(3) no fertilizer and fertilizer supplements shall be transported or stored or handled in such a way that it can easily come into contact with un-intended objects such as feed or food stuff.

(4) Fertilizer and fertilizer supplements storage areas shall be constructed and maintained in such a way that the risk of exposure and environmental contamination and poisoning is avoided.

(5) Fertilizer and fertilizer supplements storage areas shall be inspected regularly and special attention shall be given to damage, spills and container deterioration, and clean-up and decontamination shall be done promptly.

(6) Fertilizer and fertilizer supplements storage area shall be kept locked, well ventilated and provided with fire-fighting equipment.

PART XI
MISCELLANEOUS

Fees for
service

54.-(1) The fees set out in the Second Schedule to these Regulations shall be payable in respect of all services as provided therein.

(2) The fee for any service shall be paid at the time when the application for a particular service is made.

Exemption

55.-(1) Animal and vegetable manures that are sold in their natural condition are exempted from these Regulations.

(2) Fertilizer or fertilizer supplements that are imported or manufactured for experimental purposes are exempted from these Regulations.

FIRST SCHEDULE

(Made under regulation 3(1))

APPLICATION FOR REGISTRATION OF FERTILIZER AND FERTILIZER SUPPLEMENTS

FORM FR - 1

TANZANIA FERTILIZER REGULATORY AUTHORITY

FOR OFFICIAL USE

The Director, Tanzania Fertilizer Regulatory Authority, P.O. Box 9192, DAR ES SALAAM.

Application No: Date Received: Fees Receipt No: Date Approved/Rejected: Rejection letter Ref.No.

(To be filled in Triplicate)

1. Applicant's Details:

- (a) Name: (b) Address: (c) Address in Tanzania if different from above: (d) Type of Fertilizer dealer (Manufacturer, Importer,): (e) Name and address of Importer of Fertilizer and/or Fertilizer supplements: (f) Name and address of firm consultant (s):

2. Details of the Product:

- (a) Common name(s) of the Fertilizer and/or Fertilizer supplements: (b) Trade name(s) of the Fertilizer and/or Fertilizer supplements: (c) Type of Fertilizer and/or Fertilizer supplements

(d) Physical properties:

- (i) Physical description (e.g. colour, particle size, etc) (ii) Solubility (iii) Spraying/dusting properties (iv) Moisture content (v) Flammability, etc

- (vi) Fertilizer grade.....
- (vii) Acidity/Alkalinity
- (viii) Levels of heavy metals contained in fertilizer and/ or fertilizer supplements
- (ix) Levels of radioactive materials contained in fertilizer or fertilizer supplements

3. Give a summary of the Product's side effects:

- (a) Allergenicity of the fertilizer and/ or fertilizer supplements
- (b) Possible hazards to environment and people applying and handling the fertilizer and/ or fertilizer supplements
- (c) Heavy metal tolerance data treated with the fertilizer and/ or fertilizer supplements.....
- (d) Radioactive materials tolerance data treated with the fertilizer and/ or fertilizer supplements
- (e) Residue tolerance data in substances treated with the fertilizer and/ or fertilizer supplements where possible International accepted levels should be given:
.....
- (f) Any other residues harmful to environment (soil, water ,plants and animal products)

4. Safety:

- (a) Recommended precautions in handling the fertilizer and/ or fertilizer supplements
- (b) Recommended first aid in case of poisoning, skin reaction etc:
.....
- (c) Recommended treatment after poisoning:
- (d) Recommended methods of destroying substandard fertilizer and/ or fertilizer supplements

5. Analytical Methods:

Supply official methods of analysis for parameters contained in fertilizer and/ or fertilizer supplements

6. Containers:

- (a) Type of containers used for transport and storage of fertilizer and/ or fertilizer supplements:
- (b) Type and size of packaging materials for distribution of fertilizer and/ or fertilizer supplements:

7. Technical Data;

- (a) Recommended field of applications (mention target crop.):
- (b) Suggested methods of applications:
- (c) References of recommended use by authorized body (ies) in Tanzania:
.....
- (d) Reference or recommended use by authorized bodies outside Tanzania:
.....
- (e) Reference where the product has been applied showing the application rates (metric units):
- (f) Residual effects of the fertilizer and/ or fertilizer supplements in the environment (soil,

- water, plant and animal products):
8. *The Label:*
- (a) Append three specimen of fertilizer and/ or fertilizer supplements, exact label of the product as it appears on the container
 - (b) Enclose specimens of any extra information pamphlets regarding fertilizer and/ or fertilizer supplements
9. Chemical and Physical stability of the fertilizer and/ or fertilizer supplements in the recommended unopened containers under given storage conditions (mention shelf life and expiry date)
10. *Details of the manufacturer:*
- (a) Name
 - (b) Physical address.....
 - (c) Storage conditions of Fertilizer and/ or fertilizer supplements.....

11. *Name and Qualifications of the technical staff in charge*

.....
.....

12. *Certificate:*

I/We certify that the information given above is correct to the best of my/our knowledge using the information and scientific data available to me/us.

.....
.....
Signature of Authorized Officer(s)
Title:
.....
Date:
For.....

I/We hereby enclose a cheque/ bank deposit receipt for Tshs/USD
..... being payment of the application fee
for.....

Name of the Applicant:.....
Signature:.....
Date:.....

Fertilizer

GN. No. 350 (contd.)

SECOND SCHEDULE

(Made under regulation 3(2))

FORM FR 2

FOR OFFICIAL USE

The Director
Tanzania Fertilizer Regulatory Authority
P.O. Box 9192,
DAR ES SALAAM.

Application No:
Date Received:
Fees Receipt No:
Date Approved/Rejected:

FEEES

S/N	TYPE OF SERVICES	Fee (USD)
1.	Application for registration of fertilizer or fertilizer supplement	50
2.	Laboratory and field test per season for new fertilizer or fertilizer supplement	10,000
3.	Application and registration of sterilizing plant	1,000
4.	Application for registration of fertilizer dealer	50
5.	Application for a license	20
6.	Analysis of total Nitrogen	50
7.	Analysis of total Phosphate	50
8.	Analysis of potash Content	30
9.	Analysis of lesser plant nutrient	50
10.	Analysis of moisture content	20
11.	Analysis of heavy metal	120
12.	Analysis of particle size	20

THIRD SCHEDULE

(Made under regulation 4(1))

ANALYTICAL METHODS OF FERTILIZER AND FERTILIZER SUPPLEMENTS

Solid fertilizers — Preparation of samples for chemical and physical analysis**1 Scope**

This International Standard specifies methods for the preparation of test samples and test portions from laboratory samples of solid fertilizer for subsequent chemical or physical analysis. It does not cover the preparation of samples for certain physical tests which require test portions of more than 2 kg.

This International Standard is applicable to all solid fertilizers.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this international Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 3310-1 : 1982, *Test sieves — Technical requirements and testing — Part 1: Test sieves of metal wire cloth.*

ISO 5306 : 1983, *Fertilizers — Presentation of sampling reports.*

ISO 7410 : 1983, *Fertilizers and soil conditioners — Final samples — Practical arrangements.*

ISO/TR 7553 : 1987, *Fertilizers — Sampling — Minimum mass of increment to be taken to be representative of the total sampling unit.*

ISO 7742 : 1988, *Solid fertilizers — Reduction of samples.*

ISO 8157 : 1984, *Fertilizers and soil conditioners — Vocabulary.*

3 Definitions

For the purposes of this International Standard, the definitions given in ISO 8157 and the following definitions apply.

3.1 reduction: The process of producing a representative smaller mass of fertilizer from a larger mass, with the remainder being discarded.

3.2 division: The process of producing a number of representative smaller portions, approximately equal in mass to each other, from a larger mass with little or no remainder.

4 Principle

Reduction and division of the laboratory sample, as necessary, to produce test samples. Preparation of test portions from the test samples by division, with or without previous grinding, or by combination, as appropriate.

5 Apparatus

5.1 Rotary sample divider or riffle divider, satisfying the requirements of ISO 7742.

5.2 Sample grinder

Any machine used for grinding samples as required by this International Standard shall be checked for satisfactory performance.

Particular points to be checked are:

- a) the fineness of grinding achieved;
- b) the temperature rise of the material being ground.

The grinder shall be capable of taking the whole sample at one pass and should preferably be totally enclosed. It shall have a screen, or other mechanism without a screen, which will allow the ground material to pass through the machine into a collecting vessel and away from the cutters or grinding discs, to avoid over-grinding. In the case of a grinder with screens, the fineness of grind can be adjusted by the fitting of different mesh screens. Grinding shall continue until as much as possible of the fertilizer has passed through the machine.

NOTE — If the grinder is of the open type, the moisture content of the fertilizer may change significantly during grinding.

5.3 Mortar and pestle, of suitable material and size.

5.4 Test sieves, complying with the requirements of ISO 3310-1, of nominal aperture sizes 1,0 mm, 0,5 mm and 0,18 mm.

NOTE — In cases where national regulations or the nature of the material require sieves of different aperture sizes, these may be used but the fact should be noted in the sample preparation report.

5.5 Sample containers, made of plastics material and/or glass, or any other material of adequate resistance and fitted with airtight closures (see ISO 7410).

6 Procedure (see figure 1)

WARNING — All operations connected with this procedure should be carried out as quickly as possible to minimize the absorption or loss of water.

6.1 Preparation of test samples in their original condition

Mix the whole of the laboratory sample and follow the procedure described in ISO 7742, to reduce (if necessary) and divide the total mass to obtain the appropriate number of representative test samples, each of about 0,5 kg in mass.

Reject, by random selection, any test samples in excess of those required and place the remaining N test samples in some of the airtight containers (5.5).

NOTE — The maximum number of test samples which can be produced by this method will depend on the mass of the original laboratory sample. The minimum number of 0,5 kg test samples which is required will depend on the nature of the analyses to be carried out and the number of replicates required. In some instances, when only chemical analyses are to be carried out, only a small laboratory sample will be available and the whole of this sample will be used as the test sample.

6.2 Further preparation for test samples which must remain in their original condition

Test samples in this category include all those for physical testing, those for certain chemical analyses and those which, by their nature, must not be ground.

6.2.1 Preparation of test portions for physical testing

If the mass of the test portion required is greater than 0,5 kg, select at random two or more of the N test samples (6.1). Mix these together and, if the mass required is not an exact multiple of 0,5 kg, reduce it to the required size by following the procedure described in ISO 7742.

If the mass of test portion required is less than 0,5 kg, select at random one of the N test samples (6.1) and continue the reduction and division following the procedure described in ISO 7742, until test portions of the required mass for the test are obtained. During the division process, replicate test portions will be obtained and those are suitable for replicate tests without further treatment. Discard any unwanted material.

NOTE — Representativity of the sample may be lost during this further sub-division and reference should be made to ISO/TR 7553.

6.2.2 Preparation of test portions for moisture analysis

Test portions for moisture analysis shall not be ground because grinding is likely to alter the moisture content of the fertilizer. If necessary, the size of the larger particles may be reduced by crushing.

Select, at random, one of the N test samples (6.1) and carry out reduction and division, following the procedure described in ISO 7742, until test portions of the required size are obtained.

6.2.3 Preparation of test portions for other chemical analyses

Some chemical analyses have to be performed on test portions taken from samples which have not been ground. Reference should be made to this in the relevant analytical method. Some fertilizers decompose during grinding and it is essential that these are not ground before starting analysis. The following fertilizers may be subject to such considerations: calcium nitrate, calcium magnesium nitrate, sodium nitrate, calcium cyanamide, ammonium sulfate, ammonium nitrate with more than 30 % of N, urea, basic slag, natural phosphate partially solubilized, dicalcium phosphate, sintered alumina and calcium phosphate and soft natural phosphate and slow-release fertilizers.

Select, at random, one of the N test samples (6.1) and carry out reduction and division following the procedure described in ISO 7742 until test portions of the required size are obtained.

6.3 Further preparation for test samples for chemical analysis

See 6.2.2 and 6.2.3 for those special cases where the test sample must remain in its original condition.

WARNING — Care should be taken during the following grinding operation that the temperature of the fertilizer does not rise above 45 °C, to avoid loss of ammonia, etc.

6.3.1 General

Select, at random, one of the N test samples (6.1) and follow preferably the procedure described in 6.3.2 or, if a suitable sample grinder is not available, that specified in 6.3.3, or, if special treatment is necessary, that specified in 6.3.4, 6.3.5 or 6.3.6 as appropriate.

6.3.2 Use of sample grinder

Grind the test sample in the grinder (5.2) until all the sample has passed through, or for the specified time, depending on the type of grinder. To check that the grinding has been adequate, thoroughly mix and sieve a small representative portion of the ground sample through the test sieve of aperture size 0,5 mm (5.4) and discard it. If the whole of this portion does not pass through the sieve, return the sample to the grinder and repeat the grinding until satisfactory grinding is achieved.

NOTE — For mixtures containing one or more very hard components, it may be difficult to grind and homogenize all the components. The procedure given in this subclause should not be used if the overgrinding of some of the softer components is to be avoided. In these, and only these, cases it will be necessary to prepare two or more parts of the same sample.

6.3.3 Use of mortar and pestle

Sieve the total laboratory sample on the test sieve of aperture size 0,5 mm (5.4). Grind the residuc on the sieve, using the mortar and pestle (5.3), until all the material passes, without residue, through the sieve.

Grnding to the fineness required shall in all cases be avoided where this will affect the solubility in various reagents. Carefully homogenize all the sample.

NOTE — In this case the moisture content of the fertilizer may change significantly during grinding.

6.3.4 Products which are difficult to grind mechanically

Products with abnormal moisture content or products such as superphosphate may become doughy if ground mechanically. In these cases crush the fertilizer in the mortar (5.3) so that all the material passes through the test sieve of aperture size 1,0 mm (5.4).

6.3.5 Organic matter

Some organic materials may be of such a nature that the procedures described above cannot be used. Examples of these are: fresh guano, leather, wool and animal residues. In these cases the analyst should use the best practicable means to reduce the material size and to obtain a representative sample and should record the method used in the test report.

NOTE — Many of these materials may be ground after intense cooling, for example in liquid nitrogen.

6.3.6 Fertilizers comprising several different materials

These fertilizers include materials with marked differences in texture or mechanical properties (hardness, density, etc.). They may be difficult to grind completely, e.g. mixtures of organic and inorganic materials, or they may segregate during handling, e.g. potassium magnesium sulfate. Special procedures are necessary in those cases.

A grinding machine capable of grinding the whole of the sample in one pass to the required fineness is strongly recommended. Follow the procedure specified in 6.3.2 using the test sieve of aperture size 0,18 mm (5.4).

6.3.7 Foreign matter

If the test sample contains foreign matter which cannot be ground, remove and weigh this, and allow for it in the results of the analysis. This material should be retained and, if possible, its nature recorded in the test report.

6.3.8 Storage

Place all the prepared sample from 6.3.2, 6.3.3, 6.3.4, 6.3.5 or 6.3.6 in one of the clean containers (5.5) and seal it hermetically until required for analysis.

6.3.9 Taking test portions

Before taking each test portion for analysis, mix the whole test sample well, e.g. by rolling it on a piece of hard paper or by mixing small portions using a spatula. Form the material into a flattened cone and take the required test portion at random in small increments with the spatula.

7 Labelling

Label all those containers (5.5) into which final portions of the laboratory sample have been placed, following the procedures described in ISO 7410.

8 Sample preparation report

A copy of the sample preparation report should remain with each final portion at all times. Reference should be made to the sample preparation report in any sampling report produced (see ISO 5306).

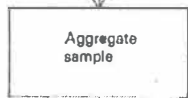
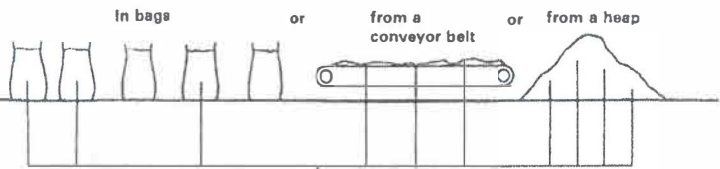
The sample preparation report should include the following particulars:

- a) reference to the method used for preparation, i.e. the number of this International Standard and the appropriate clause(s) used;
- b) all information necessary for the complete identification of the sample;
- c) any unusual features noted during this procedure;
- d) any operation not specified in this International Standard, or in the International Standards to which reference is made, or any operation regarded as optional.

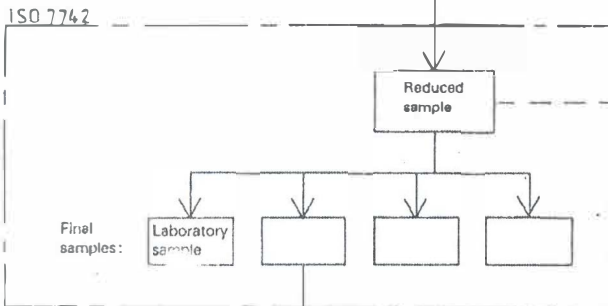
Fertilizer to be sampled

Stages in sampling process

1) Take increments



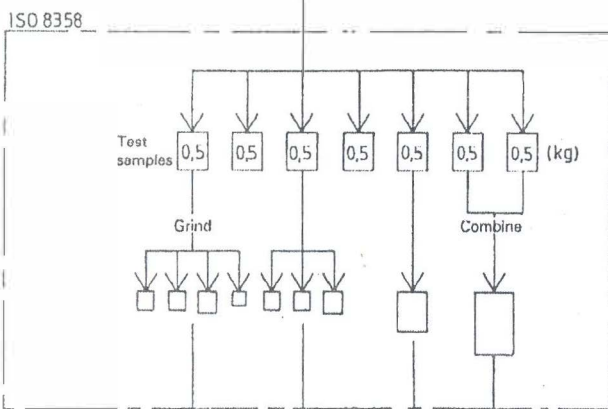
2) Reduce (if necessary)



3) Divide (if necessary)

4) Prepare test samples (if necessary)

5) Prepare test portions



Testing:

Chemical tests on ground test sample

Chemical tests on test sample in "original state"

Physical tests

Physical test requiring test portion larger than 0,5 kg

Physical test requiring very large test portion

Fertilizers – Determination of total nitrogen content – Titrimetric method after distillation

1 Scope and field of application

This International Standard specifies a titrimetric method, after distillation, for the determination of the total nitrogen content of fertilizers in all forms, including those which have to be digested.

The method is not recommended for fertilizers containing more than 7 % of organic matter.

2 Principle

Reduction of nitrate to ammonia by chromium powder in acid medium. Conversion of organic and urea nitrogen into ammonium sulfate by digestion with concentrated sulfuric acid in the presence of a catalyst. Distillation of the ammonia from an alkaline solution, absorption in an excess of standard volumetric sulfuric acid solution and back-titration with standard volumetric sodium hydroxide solution in the presence of methyl red or screened methyl red as indicator.

3 Reagents

During the analysis, use only reagents of recognized analytical grade having, in particular, low nitrogen contents (see 5.3), and only distilled water or water of equivalent purity.

3.1 Chromium metal, powder, of particle size less than or equal to 250 μm .

3.2 Aluminium oxide, fused. Purmice is suitable.

3.3 Anti-foaming agent, for example paraffin wax of melting point not lower than 100 °C, or a silicone.

3.4 Ammonium nitrate, dried at 100 °C to constant mass.

3.5 Digestion catalyst mixture, finely ground, comprising
– potassium sulfate (K_2SO_4): 1 000 g;
– copper(II) sulfate pentahydrate ($\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$): 50 g.

3.6 Sulfuric acid, concentrated, ρ approximately 1,84 g/ml.

3.7 Hydrochloric acid, concentrated, ρ approximately 1,18 g/ml.

3.8 Sodium hydroxide, approximately 400 g/l solution.

3.9 Sodium hydroxide, standard volumetric solution, $c(\text{NaOH}) = 0,10 \text{ mol/l}$.¹⁾

3.10 Sulfuric acid, standard volumetric solution, $c(\text{H}_2\text{SO}_4) = 0,25 \text{ mol/l}$.²⁾

3.11 Sulfuric acid, standard volumetric solution, $c(\text{H}_2\text{SO}_4) = 0,10 \text{ mol/l}$.³⁾

3.12 Sulfuric acid, standard volumetric solution, $c(\text{H}_2\text{SO}_4) = 0,05 \text{ mol/l}$.¹⁾

3.13 Indicator, solution.

Use either the screened methyl red solution (3.13.1) or the methyl red solution (3.13.2).

3.13.1 Screened methyl red, ethanolic indicator solution.

Mix 50 ml of a 2 g/l ethanolic solution of methyl red with 50 ml of a 1 g/l ethanolic solution of methylene blue.

3.13.2 Methyl red, ethanolic indicator solution.

Dissolve 0,1 g of methyl red in 50 ml of 95 % (V/V) ethanol.

3.14 pH indicator paper, wide range.

4 Apparatus

Usual laboratory equipment, and

4.1 Digestion apparatus, comprising an 800 ml Kjeldahl flask and a pear-shaped hollow glass stopper.

4.2 Distillation apparatus.

The components of the distillation apparatus may be connected by means of rubber bungs and tubing or by the use of spherical ground glass joints.

Spherical ground glass joints should be held by spring clamps to ensure that they are leak tight. Rubber bungs and tubing shall be replaced when they begin to perish or show signs of wear.

A suitable apparatus is illustrated in the figure and comprises the following components.

4.2.1 Flask.

Either the Kjeldahl flask (4.1) or 1 000 ml round-bottomed flask may be used.

4.2.2 Single-bulb splash head and separate open-top dropping funnel, of capacity 100 ml, followed by a delivery tube at the outlet.

4.2.3 Allihn condenser, seven bulb (or other suitable condenser), with an expansion bulb, of approximate capacity 100 ml, followed by a delivery tube at the outlet.

4.2.4 Receiver: conical flask or beaker, of capacity 500 ml.

4.3 Anti-bumping granules or an anti-bumping device consisting of a 100 mm × 5 mm glass rod connected to a 25 mm length of polyethylene tubing.

4.4 Two burettes, of capacity 50 ml, complying with the requirements of ISO 385/1, class A.

4.5 Glass beads, of diameter 2 to 3 mm.

5 Procedure

5.1 Test portion

Weigh, to the nearest 0,001 g, between 0,5 and 2,0 g of the test sample, containing not more than 60 mg of nitrate nitrogen and 235 mg of total nitrogen.

NOTE — The preparation of test samples of fertilizers will form the subject of a future International Standard.

5.2 Determination

5.2.1 Reduction (this step is not required if nitrate nitrogen is known to be absent)

Transfer the test portion (5.1) to the flask (4.1) and add sufficient water to make up the total volume to 35 ml. Allow the flask to stand for 10 min with occasional gentle swirling to ensure dissolution of all nitrate salts.

Add 1,2 g of the chromium powder (3.1) and 7 ml of the hydrochloric acid solution (3.7). Allow the flask to stand for at least 5 min, but not more than 10 min, at ambient temperature.

Place the flask on a heating device in a fume cupboard with the heat input regulated to pass a 7 to 7,5 min boil test¹⁾ and heat the flask for 4,5 min. Remove from the heat and allow to cool.

5.2.2 Hydrolysis (this step can be used instead of the digestion (5.2.3) if it is known that the only forms of organic nitrogen present are urea and cyanamide forms)

Stand the flask in a fume cupboard and add 1,5 g of the fused aluminium oxide (3.2). Carefully add 25 ml of the sulfuric acid (3.6) to the flask. Insert the pear shaped hollow glass stopper into the neck of the flask and place on a heating device and initially heat until gently boiling. Then adjust the heat input to pass a 7 to 7,5 min boil test.¹⁾

Continue to heat the flask and contents until dense white fumes of sulfuric acid have been evolving for at least 15 min. Allow the flask to cool to room temperature and carefully add 250 ml of water. Allow the flask to cool.

5.2.3 Digestion (this step is necessary only if organic forms of nitrogen other than urea or cyanamide forms are present (see 5.2.2) or in the case of fertilizers of unknown composition)

Place the flask in a fume cupboard and add 22 g of the digestion catalyst mixture (3.5) and 1,5 g of the fused aluminium oxide (3.2). Carefully add 30 ml of the sulfuric acid (3.6) to the flask and add 0,5 g of the anti-foaming agent (3.3) to reduce foaming. Insert the pear-shaped hollow glass stopper into the neck of the flask and place on a heating device with the heat input adjusted to pass a 7 to 7,5 min boil test.¹⁾

If considerable foaming occurs, reduce the heat input until this phase is over. Continue to heat the flask and contents until dense white fumes are cleared from the bulb of the flask. Gently swirl the flask and continue digestion for a further 60 min or until the solution is clear, whichever is the longer. Allow the flask to cool to room temperature and carefully add 250 ml of water. Allow the flask to cool.

5.2.4 Distillation

If distillation from the round-bottomed flask is preferred, transfer the test portion (5.1) or the hydrolysed (5.2.2) or digested (5.2.3) solution to it quantitatively. Otherwise, place the test portion, or retain the solution, in the Kjeldahl flask.

Place the anti-bumping granules or anti-bumping device (4.3), in the latter case with the polyethylene in contact with the bottom of the flask, in the flask, and add a few of the glass beads (4.5). Assemble the apparatus as shown in the figure.

Measure into the receiver (4.2.4), according to the expected mass of nitrogen in the test portion, the appropriate volume shown in the table of one of the sulfuric acid solutions (3.10, 3.11 or 3.12).

Table

Expected mass of nitrogen in the test portion	Concentration of sulfuric acid solution	Volume of sulfuric acid solution
mg	mol/l	ml
0 to 30	0,05	25,0
30 to 50		40,0
50 to 65	(solution 3.12)	50,0
65 to 80	0,10	35,0
80 to 100		40,0
100 to 125	(solution 3.11)	50,0
125 to 170	0,25	25,0
170 to 200		30,0
200 to 235	(solution 3.10)	35,0

Add 4 or 5 drops of the indicator solution (3.13) and place the receiver so that the end of the delivery tube is below the surface of the acid, adding water to the receiver if necessary.

Pour at least 120 ml of the sodium hydroxide solution (3.8), or 20 ml if there was neither hydrolysis (5.2.2) nor digestion (5.2.3), into the dropping funnel and carefully run all but about 2 ml of this solution into the distillation flask. Close the stopcock, leaving the remaining 2 ml in the dropping funnel. Bring the contents of the flask to the boil, increasing the rate of heating progressively until, finally, the contents of the flask are boiling briskly. The contents of the flask shall remain alkaline during the distillation period.

When at least 150 ml of distillate have been collected, partially withdraw the receiver so that the delivery tube rests on the rim of the receiver. Test the subsequent distillate with the pH indicator paper (3.14) to ensure that all the ammonia is completely distilled. Remove the source of heat.

Detach the splash head from the condenser and wash the insides of the condenser and expansion bulb with water, collecting the rinsings in the receiver. Also rinse the outside of the delivery tube and collect the rinsings in the receiver.

5.2.5 Titration

Back-titrate the excess of acid with the standard volumetric sodium hydroxide solution (3.9) to the neutral colour of the indicator.

5.3 Blank test

Carry out a blank test, at the same time as the determination, using the same procedure, using the same reagents, but omitting the test portion, and using the 0,05 mol/l standard volumetric sulfuric acid solution (3.12).

The result of the blank test should not exceed 1,0 ml of standard volumetric solution. If the result is greater than 1,0 ml, check the reagents, especially the chromium powder (3.1).

5.4 Check test

Carry out a periodic check on the efficiency of the apparatus and the accuracy of the method using an aliquot portion of a solution of freshly prepared ammonium nitrate (3.4) containing 100 mg of nitrogen. The check shall be made using the same conditions as for the determination and the blank test and using the same indicator.

6 Expression of results

6.1 Calculation

The total nitrogen content, expressed as nitrogen (N) as a percentage by mass, is given by the formula

- a) if the 0,05 mol/l sulfuric acid solution (3.12) was used:

$$\frac{[(V_1 - V_2) - (V_3 - V_4)] \times 0,140}{m}$$

- b) if the 0,10 mol/l sulfuric acid solution (3.11) was used:

$$\frac{[(2 V_1 - V_2) - (V_3 - V_4)] \times 0,140}{m}$$

- c) if the 0,25 mol/l sulfuric acid solution (3.10) was used:

$$\frac{[(5 V_1 - V_2) - (V_3 - V_4)] \times 0,140}{m}$$

where

V_1 is the volume, in millilitres, of the sulfuric acid solution (3.10, 3.11 or 3.12, as appropriate) used for the determination;

V_2 is the volume, in millilitres, of the sodium hydroxide solution (3.9) used for the determination;

V_3 is the volume, in millilitres, of the sulfuric acid solution (3.12) used for the blank test;

V_4 is the volume, in millilitres, of the sodium hydroxide solution (3.9) used for the blank test;

m is the mass, in grams, of the test portion (5.1).

NOTE — If the concentrations of the standard volumetric solutions are not exactly as specified in the list of reagents, appropriate corrections should be made.

6.2 Precision

Precision data have been analysed statistically from an inter-laboratory study in which 19 laboratories participated with 3 levels. No statistical relationship between repeatability (r) or reproducibility (R) and the mean value of the total nitrogen content of the samples was found.

6.2.1 Repeatability, r

The difference between two individual test results, obtained simultaneously or in rapid succession by the same analyst, using the same apparatus, on identical test material, under the same operating conditions, should not exceed 0,36 % (m/m), expressed as nitrogen (N) content, at a confidence level of 95 %.

6.2.2 Reproducibility, R

The difference between two individual and independent test results, obtained by different analysts in different laboratories, on identical test material, should not exceed 1,3 % (m/m), expressed as nitrogen (N) content, at a confidence level of 95 %.

7 Test report

The test report should include the following information:

- a) the reference of the method used, i.e. ISO 5315;
- b) the result and the method of expression used;
- c) any unusual features noted during the determination;
- d) any operation not included in this International Standard or regarded as optional.

Fertilizers — Determination of ammoniacal nitrogen content — Titrimetric method after distillation

1 Scope and field of application

This International Standard specifies a titrimetric method, after distillation, for the determination of the ammoniacal nitrogen content of fertilizers.

The method is applicable only in the absence of urea or its derivatives, of cyanamide and of organic nitrogenous compounds.

2 References

ISO/R 385, *Burettes*.

ISO 641, *Laboratory glassware — Interchangeable spherical ground joints*.

ISO 648, *Laboratory glassware — One-mark pipettes*.

ISO 1042, *Laboratory glassware — One-mark volumetric flasks*.

3 Principle

Distillation of the ammonia from an alkaline solution, absorption in an excess of standard volumetric sulphuric acid solution and back-titration with standard volumetric sodium hydroxide solution in the presence of methyl red or screened methyl red as indicator.

4 Reagents

During the analysis, use only reagents of recognized analytical grade and only distilled water or water of equivalent purity.

4.1 Ammonium sulphate, dried at 105 °C to constant mass.

4.2 Hydrochloric acid solution.

Dilute concentrated hydrochloric acid, $\rho \approx 1,18$ g/ml, 1 + 1 with water.

4.3 Sodium hydroxide, approximately 400 g/l solution.

4.4 Sodium hydroxide, standard volumetric solution, $c(\text{NaOH}) = 0,20$ mol/l.¹⁾

4.5 Sulphuric acid, standard volumetric solution, $c(\text{H}_2\text{SO}_4) = 0,10$ mol/l.¹⁾

4.6 Indicator solution.

4.6.1 Screened methyl red indicator, ethanolic solution.

Mix 50 ml of a 2 g/l ethanolic solution of methyl red with 50 ml of 1 g/l ethanolic solution of methylene blue, or

4.6.2 Methyl red indicator, ethanolic solution.

Dissolve 0,1 g of methyl red in 50 ml of 95 % (V/V) ethanol.

4.7 pH Indicator paper, wide range.

5 Apparatus

5.1 Distillation apparatus.

The components of the apparatus may be connected by means of rubber bungs and tubing or by the use of ground glass joints.

Ground glass joints should be held by spring clamps to ensure that they are leak tight. Rubber bungs and tubing shall be replaced when they begin to perish or show signs of wear.

A suitable apparatus is illustrated in the figure and comprises:

5.1.1 Round bottomed flask, of nominal capacity 1 litre.

5.1.2 Single-bulb splash head and separate open-top cylindrical dropping funnel, of capacity 100 ml.

5.1.3 Allihn condenser, seven bulb, with an expansion bulb, of approximate capacity 100 ml, followed by a delivery tube at the outlet.

5.1.4 Receiver (conical flask or conical beaker), of capacity 500 ml.

5.2 Two burettes, of capacity 50 ml, complying with the requirements of ISO/R 385, class A.

5.3 One-mark volumetric flask, of capacity 500 ml, complying with the requirements of ISO 1042, class A.

5.4 One-mark pipette, of capacities 10 - 25 - 50 and 100 ml, complying with the requirements of ISO 648, class A.

5.5 Mechanical flask shaker, with a rotary or reciprocating action.

5.6 Anti-bumping granules or an anti-bumping device consisting of a 100 mm × φ 5 mm glass rod connected to a 25 mm length of polyethylene tubing.

6 Procedure

6.1 Test portion

Weigh, to the nearest 0,001 g, about 10 g of the analytical sample and transfer to the one-mark volumetric flask (5.3).

NOTE -- Procedures for the preparation of analytical samples will form the subject of a future International Standard.

6.2 Preparation of test solution

6.2.1 Products soluble in water

Add about 400 ml of water at 20 °C and shake the flask continuously for 30 min using the mechanical flask shaker (5.5).

6.2.2 Products containing water-insoluble material likely to retain ammonia

Add 50 ml of water and 20 ml of the hydrochloric acid solution (4.2) to the test portion (6.1). Mix the contents of the flask and allow to stand undisturbed until any liberation of carbon dioxide has ceased. Add about 400 ml of water at 20 °C and shake the flask continuously for 30 min using the mechanical flask shaker.

NOTE -- Complete dissolution of the test portion is not necessary. The procedure described extracts all the ammoniacal nitrogen.

6.3 Determination

Dilute the contents of the flask to the mark with water, mix well and filter through a dry medium rate and retention low ash grade of filter paper into a dry beaker. Discard the first 50 ml of filtrate and then transfer an aliquot portion of the filtrate, by means of a pipette (5.4), into the flask (5.1.1). The aliquot portion shall contain preferably between 75 and 100 mg of ammoniacal nitrogen but, in any case, shall be in the range 25 to 100 mg.

Dilute the contents of the flask to about 200 ml with water and add a few anti-bumping granules or the anti-bumping device (5.6) to prevent bumping during the distillation. Add a few drops of the indicator solution (4.6). Assemble the apparatus as shown in the figure

Measure 50,0 ml of the standard volumetric sulphuric acid solution (4.5) with a burette (5.2) into the receiver (5.1.4) and add 4 or 5 drops of the indicator solution (4.6). Place the receiver so that the end of the delivery tube (see 5.1.3) is below the surface of the acid, adding water to the flask if necessary.

Pour 15 ml of the sodium hydroxide solution (4.3) into the dropping funnel. If 20 ml of the hydrochloric acid solution (4.2) has been added to dissolve the test portion (see 6.2), use 25 ml of the sodium hydroxide solution (4.3).

Cool the contents of the distillation flask to room temperature and add the sodium hydroxide solution (4.3). When nearly all the sodium hydroxide solution has been added, close the stop-cock, leaving about 2 ml in the dropping funnel.

Bring the contents of the flask to the boil, increasing the rate of heating progressively until the contents of the flask are boiling briskly. The contents of the flask shall remain alkaline during the distillation period. When at least 150 ml of distillate has collected, partially withdraw the receiver so that the delivery tube rests on its rim. Test the subsequent distillate with the pH indicator paper (4.7) to ensure that all the ammonia has completely distilled. Remove the source of heat.

Detach the splash head from the condenser and wash the condenser and expansion bulb through with water, collecting the washings in the receiver. The outside of the delivery tube shall also be rinsed into the flask.

Back-titrate the excess of acid with the standard volumetric sodium hydroxide solution (4.4) to the neutral colour of the indicator.

6.4 Blank test

Carry out a blank test at the same time as the determination, using the same reagents but omitting the test solution.

The result of the blank test should not exceed 0,25 ml of 0,10 mol/l sulphuric acid solution.

6.5 Check test

Carry out a periodic check on the efficiency of the apparatus and the accuracy of the method using an aliquot portion of a freshly prepared solution of the ammonium sulphate (4.1) containing 100 mg of nitrogen. The check shall be made using the same conditions as for the sample and blank determinations and with the same indicator.

7 Expression of results

7.1 Calculation

The ammoniacal nitrogen content, expressed as nitrogen (N) as a percentage by mass, is given by the formula

$$\frac{[(V_1 - V_2) - (V_3 - V_4)] \times 0,002801 \times 100}{m}$$

$$= \frac{V_4 - V_2}{m} \times 0,2801$$

where

V_1 is the volume, in millilitres, of the standard volumetric sulphuric acid solution (4.5) used for the determination (50,0 ml);

V_2 is the volume, in millilitres, of the standard volumetric sodium hydroxide solution (4.4) used for the determination;

V_3 is the volume, in millilitres, of the standard volumetric sulphuric acid solution (4.5) used for the blank test (50,0 ml);

V_4 is the volume, in millilitres, of the standard volumetric sodium hydroxide solution (4.4) used for the blank test;

m is the mass, in grams, of sample in the aliquot portion taken for the determination.

NOTE — If the concentrations of the standard volumetric solutions used are not exactly as specified in the list of reagents, appropriate corrections should be made.

7.2 Precision

The statistical information given below was obtained from analysis of 22 sets of results (two operations in each case, each operator carrying out two determinations) from laboratories in seven different countries.

7.2.1 Repeatability

The difference between successive test results, obtained by the same operator with the same apparatus under constant operating conditions on identical test material should not, in the long run, in the normal and correct operation of the test method, exceed the value of 0,03 % (m/m) at a confidence level of 95 %.

7.2.2 Reproducibility

The difference between two single and independent results, obtained by different operators working in different laboratories on identical test material should not, in the long run, in the normal and correct operation of the test method, exceed the value of 0,08 % (m/m) at a confidence level of 95 %.

8 Test report

The test report shall include the following particulars :

- a) the reference of the method used, i.e. ISO 5314;
- b) the results and the method of expression used;
- c) any unusual features noted during the determination;
- d) any operation not included in this International Standard or regarded as optional.

Fertilizers — Extraction of phosphates soluble in mineral acids

0 Introduction

The two methods specified in this International Standard have been recognized as equivalent for the extraction of mineral acid-soluble phosphates.

1 Scope and field of application

This International Standard specifies a method for the extraction of mineral acid-soluble phosphates by attack with a mixture of hydrochloric and nitric acids and a method by attack with a mixture of sulfuric and nitric acids.

These methods are applicable to all phosphate fertilizers and to mineral phosphates containing low amounts of organic matter.

2 Method A: Hydrochloric acid/nitric acid attack

2.1 Principle

Dissolution of the phosphates present in fertilizers or in mineral phosphates in a mixture of hydrochloric and nitric acids.

2.2 Reagents

All reagents shall be of recognized analytical grade, and the water used shall be distilled water or demineralized water of equivalent purity.

Acid mixture.

Add 3 volumes of nitric acid ($\rho_{20} = 1,40$ g/ml) to 1 volume of hydrochloric acid ($\rho_{20} = 1,18$ g/ml). Mix well, dilute with four volumes of water and mix again.

Use a freshly prepared acid mixture.

2.3 Apparatus

Ordinary laboratory apparatus, and in particular:

2.3.1 Grinder.

2.3.2 One-mark volumetric flask, of capacity 500 ml, complying with the requirements of ISO 1042, class A.

2.4 Test sample

Grind the laboratory sample until it passes through a sieve of aperture size 0,5 mm.

2.5 Procedure

2.5.1 Test portion

Weigh, to the nearest 1 mg, 2,5 g of the test sample and transfer it to a 400 ml beaker.

2.5.2 Extraction

Add 50 ml of the acid mixture (2.2). Cover the beaker with a clock-glass. Bring the mixture to boiling and simmer for 30 min. Add 100 ml of water, bring to boiling and simmer for a further 15 min. Cool to room temperature.

Transfer to the one-mark volumetric flask (2.3.2) and dilute to the mark with water. Mix carefully and filter the solution through a dry, folded medium-grade filter paper, free from phosphates. Discard the first two approximately 30 ml portions.

NOTE — The filtrate should be clear.

3 Method B: Sulfuric acid/nitric acid attack

3.1 Principle

Dissolution of the phosphates present in fertilizers or in mineral phosphates in a mixture of sulfuric and nitric acids.

3.2 Reagents

All reagents shall be of recognized analytical grade, and the water used shall be distilled water or demineralized water of equivalent purity.

3.2.1 Sulfuric acid ($\rho_{20} = 1,84$ g/ml).

3.2.2 Nitric acid ($\rho_{20} = 1,40$ g/ml).

3.3 Apparatus

Ordinary laboratory apparatus, and in particular:

3.3.1 Kjeldahl flask, of capacity at least 500 ml, or a flask, of capacity 250 ml, fitted with a reflux condenser.

3.3.2 One-mark volumetric flask, of capacity 500 ml, complying with the requirements of ISO 1042, class A.

3.4 Procedure

3.4.1 Test portion

Weigh, to the nearest 1 mg, 2,5 g of the test sample and transfer it to the Kjeldahl flask (3.3.1).

3.4.2 Extraction

Add 15 ml of water and mix so as to bring the test portion into suspension. Add 20 ml of nitric acid (3.2.2) and, carefully, 30 ml of the sulfuric acid (3.2.1).

As soon as initial violent reaction has ceased, bring the contents of the flask slowly to the boil and boil for 30 min. Allow to cool and then add, carefully and with mixing, about 100 ml of water. Bring to the boil again and boil for 15 min.

Cool and transfer the liquid quantitatively to the one-mark volumetric flask (3.3.2). Make up to the mark with water, mix and filter through a dry, folded filter paper, free from phosphates, rejecting the first portion of filtrate.

4 Test report

The test report for the subsequent determination of the phosphates content shall include the following information relevant to the preparation of the test solution:

- a) all the information necessary for the complete identification of the sample;
- b) a reference to this International Standard and the method used;
- c) any operations not specified in this International Standard, or regarded as optional, as well as any incident likely to affect the results of the determination of water-soluble phosphates content.

Fertilizers – Extraction of water-soluble phosphates

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies a method for the extraction of water-soluble phosphorus(V) oxide from fertilizers.

It is applicable to all fertilizers for which the determination of water-soluble phosphorus(V) oxide content is required.

2 REFERENCE

ISO . . . , *Fertilizers – Sampling*.¹⁾

3 PRINCIPLE

Dissolution in water of the phosphorus(V) oxide in a test portion by shaking, using a rotary shaker under specified conditions.

4 REAGENT

Distilled water, or deionized water of equivalent purity.

5 APPARATUS

Ordinary laboratory apparatus and in particular

5.1 Wide-necked one-mark volumetric flask (for example Stohmann flask), of capacity 500 ml.

5.2 Rotary shaker, capable of being controlled at a rotational frequency of 35 to 40 min⁻¹.

6 SAMPLING

See ISO . . .

7 PROCEDURE

7.1 Test portion

Weigh, to the nearest 0.001 g, about 5 g of the laboratory sample and place in the volumetric flask (5.1).

7.2 Extraction

Add 400 ml of the water (clause 4) at between 20 and 25 °C.

Shake gently by hand to disperse particulate matter and to prevent the test portion sticking to the sides of the flask. Place the flask on the shaker (5.2), controlled at 35 to 40 min⁻¹, and shake for 30 min.

Dilute to the mark with the water, mix carefully by hand shaking, and filter through a dry folded filter paper of medium speed, free from phosphate, collecting the filtrate in a dry receiver clean and free from phosphate. Reject the first 50 ml of filtrate.

Fertilizers — Determination of phosphorus content — Quinoline phosphomolybdate gravimetric method

1 Scope and field of application

This International Standard specifies a gravimetric method using quinoline phosphomolybdate for the determination of phosphorus (expressed as diphosphorus pentoxide) in a solution prepared from natural mineral phosphates or fertilizers.

2 References

ISO 5316, *Fertilizers — Extraction of water-soluble phosphates.*

ISO 7497, *Fertilizers — Extraction of phosphates soluble in mineral acids.*

3 Principle

Precipitation, after hydrolysis if necessary, of orthophosphate ions in the form of quinoline phosphomolybdate, in an acid medium and in the presence of acetone, at approximately 75 °C. Filtration, washing, drying and weighing of the precipitate obtained.

4 Reagents

During the analysis, use only reagents of recognized analytical grade and only distilled water or water of equivalent purity.

4.1 Acetone, pure.

4.2 Sodium molybdate dihydrate.

4.3 Quinoline, pure, distilled.

4.4 Citric acid monohydrate.

4.5 Nitric acid. $\rho_{20} = 1.38$ g/ml, 63 % (m/m) solution.

NOTE — If acid of another concentration is used, adjust the volume added accordingly.

4.6 Potassium dihydrogenorthophosphate, previously dried at 105 °C.

4.7 Precipitation reagent, prepared as follows:

4.7.1 Solution A

Dissolve 70 g of the sodium molybdate dihydrate (4.2) in 100 ml of water in a 400 ml beaker.

4.7.2 Solution B

Dissolve 60 g of the citric acid monohydrate (4.4) in 100 ml of water in a 1 000 ml beaker. Add 85 ml of the nitric acid solution (4.5).

4.7.3 Solution C

Add solution A to solution B and mix.

4.7.4 Solution D

Mix 35 ml of the nitric acid solution (4.5) and 100 ml water in a 400 ml beaker and add 5 ml of the quinoline (4.3).

4.7.5 Solution E

Add solution D to solution C and mix. Leave overnight. Filter through a sintered glass filter, of porosity P 10 or P 16 (pore size index from 4 to 16 μm) and, if necessary, filter the first part of the filtrate again until a clear filtrate is obtained.

Do not wash the residue with water. Add 280 ml of the pure acetone (4.1) to the filtrate and dilute to 1 000 ml with water.

The solution may be kept for 1 month in a stoppered bottle protected from sunlight and heat.

5 Apparatus

Usual laboratory equipment and in particular

5.1 Conical flask, wide necked, of capacity 500 ml.

5.2 Sintered glass filter crucible, of porosity P 10 or P 16 (pore size index from 4 to 16 μm).

6.3 Oven, capable of being maintained at $250 \pm 5^\circ\text{C}$.

6.4 Flameless heating apparatus.

6.5 Desiccator, containing silica gel.

6 Procedure

6.1 Allquot portion

From the solution of fertilizer obtained by extraction in accordance with ISO 5316 or ISO 7497, take an aliquot portion containing preferably 10 to 20 mg of diphosphorus pentoxide and not more than 20 ml of citrate solution.

Transfer to the conical flask (5.1). Add 25 ml of the nitric acid solution (4.5). Dilute to 100 ml with water.

6.2 Determination

6.2.1 Hydrolysis

If non-orthophosphates are present in the solution carry out a hydrolysis as follows.

Heat the contents of the conical flask gently until they begin to boil and boil until hydrolysis is complete (generally 1 h). Ensure that losses by splashing and excessive evaporation which would reduce the original volume by more than half are avoided, for example by using a reflux condenser system. When the hydrolysis is complete, make up to the original volume with water.

NOTE — If phosphorus is present in the form of orthophosphate only, the hydrolysis is not necessary.

6.2.2 Precipitation

Operating under a fume hood, add, without stirring, 100 ml of the precipitation reagent (4.7.5, solution E) from a measuring cylinder to the contents of the flask.

Cover with a watch-glass and heat the flask immediately using the apparatus (5.4) so that within 10 min boiling just starts (75 to 80°C) and maintain for about 30 s. Then remove the flask from the heating apparatus and allow to cool for at least 30 min. Swirl 3 or 4 times during cooling. Allow to settle.

6.2.3 Weighing of the crucible

Heat the filter crucible (5.2) in the oven (5.3) maintained at $250 \pm 5^\circ\text{C}$, to constant mass. Weigh the crucible to the nearest 0,000 1 g after cooling in a desiccator (5.5) containing silica gel in good condition.

6.2.4 Filtration and washing

Decant the supernatant liquid through the filter crucible (5.2), using suction. Wash the precipitate in the conical flask with 30 ml of water. Decant and filter the solution. Repeat this pro-

cedure five times. Quantitatively transfer the remainder of the precipitate into the crucible. Wash four times, adding the washing water only when filtration is practically complete. Continue to apply suction until all excess liquid has been extracted.

6.2.5 Drying and weighing

Wipe the outside of the crucible with a filter paper. Heat the crucible in the oven (5.3), maintained at $250 \pm 5^\circ\text{C}$, to constant mass (15 to 30 min). Cool the crucible in a desiccator (5.5) containing silica gel in good condition, transfer to a balance and then weigh immediately to the nearest 0,000 1 g.

6.3 Check of reagents

For each series of determinations, carry out a check of the reagents using only the reagents and solvents in the proportions used for the extraction (citrate solution, etc.).

6.4 Check test

It is recommended that a determination on an aliquot portion, containing 10 mg of diphosphorus pentoxide, of potassium dihydrogenorthophosphate (4.6) solution be carried out to check the validity of the method.

7 Expression of results

The diphosphorus pentoxide content, expressed as a percentage by mass, is equal to

$$\frac{141,95}{4\,425,84} \times m_1 \times \frac{V_1}{V_0} \times \frac{100}{m_0} = 3,207 \times \frac{V_1}{V_0} \times \frac{m_1}{m_0}$$

where

m_0 is the mass, in grams, of the test portion;

m_1 is the mass, in grams, of the precipitate;

V_0 is the volume, in millilitres, of the aliquot portion taken from the extraction solution;

V_1 is the volume, in millilitres, of the extraction solution;

141,95 is the relative molecular mass of diphosphorus pentoxide;

4 425,84 is twice the relative molecular mass of quinoline phosphomolybdate.

8 Precision

8.1 Repeatability

The absolute value of the difference between two individual results (mass of quinoline phosphomolybdate about 350 mg), using equal volumes of the same solution of extraction, under

the same conditions (same operator, same apparatus, same laboratory and short interval of time) shall be less than 2 mg.

8.2 Reproducibility

The absolute value of the difference between two individual results (mass of quinoline phosphomolybdate about 350 mg), using equal volumes of the same solutions of extraction, under different conditions (different operators, different apparatus, different laboratories and/or different times) shall be less than 6 mg.

9 Test report

The test report shall include the following information:

- a) the reference of the method used, i.e. ISO 6590;
- b) the results and the method of expression used;
- c) any unusual features noted during the determination;
- d) any operations not specified in this International Standard, or in the International Standards to which reference is made, or regarded as optional, together with any circumstances likely to have affected the results.

Solid fertilizers and soil conditioners – Test sieving

1 Scope and field of application

This International Standard specifies a method for the determination of the particle size distribution of solid fertilizers and soil conditioners by test sieving.

NOTE – The applicability of the method has been tested with sieves of nominal sizes of openings between 100 μm and 5,60 mm.

2 References

ISO 565, *Test sieves – Woven metal wire cloth, perforated plate and electroformed sheet – Nominal sizes of openings.*

ISO 2395, *Test sieves and test sieving – Vocabulary.*

ISO 2591, *Test sieving.*

ISO 3310-1, *Test sieves – Technical requirements and testing – Part 1: Test sieves of metal wire cloth.*

ISO 3944, *Fertilizers – Determination of bulk density (loose).*

ISO 3963, *Fertilizers – Sampling from a conveyor by stopping the belt.*

ISO 7410, *Fertilizers and soil conditioners – Final samples – Practical arrangements.*

3 Definitions

For the purpose of this International Standard, the definitions of ISO 2395 apply.

4 Principle

Dry sieving of a fertilizer sample with one or more test sieves using a mechanical sieving machine.

5 Apparatus

5.1 Balance, capable of weighing to the nearest 0,1 g.

5.2 Stainless steel woven wire test sieves, 200 mm diameter, complying with ISO 3310-1, with a lid and receiver for the sieves.

5.3 Mechanical shaker (sieving machine), capable of imparting both horizontal and vertical motion to material inside a nest of sieves.

5.4 Stopwatch.

5.5 Soft brush.

6 Sampling

See ISO 3963 and ISO 7410.

7 Preparation of the test portion

Reduce the sample (a method will form the subject of a future International Standard) to the quantity required for the sieving test. This quantity should be approximately that indicated in column 2 of table 1 for the sieve corresponding to the dominant size fraction of the sample, provided that the size distribution does not cause excess volume on any of the sieves in the set as indicated in column 3 of table 1.

Table 1 — Recommended charges for test sieving

Nominal aperture size	Bulk volume of material*	
	Recommended volume of charge	Maximum volume of residue permitted on the sieve at the completion of sieving
	cm ³	cm ³
9,00 mm	500	250
5,00 mm	400	200
4,00 mm	350	175
2,80 mm	240	120
2,00 mm	200	100
1,40 mm	160	80
1,00 mm	140	70
710 μm	120	60
630 μm	100	50
355 μm	80	40
250 μm	70	35
180 μm	50	30
For non-friable and non-adhesive materials only		
125 μm	50	25
90 μm	40	20

* The mass of material can be calculated by multiplying the volume by the bulk density, determined by the method described in ISO 3944, of the material to be sieved.

8 Procedure

8.1 Select a maximum of seven test sieves from the range of principal sizes listed in ISO 665 to cover the range of particle size expected. Assemble the sieves in ascending order of aperture size on top of the receiver.

NOTE — Normally the principal sizes (R 20/3) should be used, in special cases, however, it may be necessary to use supplementary sizes (R 20).

8.2 Weigh the test portion to the nearest 0,1 g, place it on the top sieve and fit the cover.

8.3 Place the assembled nest of sieves on the mechanical shaker and shake for 10 min.

8.4 Remove the sieves from the nest and weigh the quantity retained on each sieve and in the receiver to the nearest 0,1 g. Particles caught in the mesh of the sieve may be removed by brushing the reverse side of the sieve.

8.5 Carry out at least two tests on separate test portions prepared from the same laboratory sample.

9 Expression of results

9.1 Sum the masses of the fractions retained on the sieves and in the receiver.

11 Test report

The test report shall include the following information:

- the reference of the method used, i.e. ISO 8397;
- all information necessary for the complete identification of the sample;
- the nominal sizes of openings of the test sieves used;

NOTE — The sum of these masses should not differ by more than 1 % from the original mass of the test portion.

9.2 Calculate each fraction mass as a percentage of the sum of these masses.

10 Precision

The statistical information given here is only intended as a guideline to what can be expected. The values are based on the evaluation of collaborative studies which have been carried out using sieves of nominal sizes of openings between 100 μm and 5,60 mm.

10.1 Repeatability, r

The difference $|x_1 - x_2|$ between two single results (x_1 and x_2) found on identical test material by one operator using the same apparatus within the shortest feasible time interval will exceed the repeatability value r , expressed as a percentage, given by equation (1) and with a maximum value of 2,5 %, on average not more than once in 20 cases in the normal and correct operation of the method. Both results should be considered suspect if the repeatability value r is exceeded.

$$r = 0,5 \sqrt{\bar{x}} \quad \dots (1)$$

where \bar{x} is the mean value of the two results, expressed as a percentage by mass, of the fractions.

10.2 Reproducibility, R

Single results (x_1 and x_2) on identical test material reported by two laboratories will differ by more than the reproducibility value R , expressed as a percentage, given by equation (2) and with a maximum value of 12,5 %, on average not more than once in 20 cases in the normal and correct operation of the method. Both results should be considered suspect if the reproducibility value R is exceeded.

$$R = 2,5 \sqrt{\bar{x}} \quad \dots (2)$$

where \bar{x} is as defined in 10.1.

10.3 Examples (see table 2)

Table 2 — Examples of precision data

\bar{x}	r	R	For r		For R	
			x_{\min}^{**}	x_{\max}^{**}	x_{\min}^{**}	x_{\max}^{**}
1	0,5	2,5	0,8	1,3	0	2
4	1	5	3,5	4,5	1,5	6,5
9	1,5	7,5	6,3	6,6	5,3	12,8
16	2	10	15	17	11	21
25	2,5	12,5	23,8	26,3	18,8	31,3
36	2,5	12,5	34,8	37,3	29,8	42,3

* x_{\min} is the smaller of the two corresponding fractions x , expressed as a percentage by mass.

** x_{\max} is the larger of the two corresponding fractions x , expressed as a percentage by mass.

d) the mean values of the percentage by mass of material retained on each sieve;

e) any operations not specified in this International Standard, or in the International Standards to which reference is made, or regarded as optional, together with any circumstances likely to have affected the results.

NOTE — Methods of recording results of test sieving in tabular form are shown in ISO 2591.

SOLID FERTILIZERS -- DETERMINATION OF MOISTURE CONTENT

Scope

This standard describes the methods for the determination of moisture content in solid fertilizers.

A. Determination of Moisture -- Oven Dry Method

The method does not apply to fertilizers that yield volatile substances other than water at drying temperature.

Procedure

a) Weigh 2g of sample in a pre-weighed, clean and dry weighing bottle or petridish.

b) Heat in an oven for about 5 hours at 99 °C - 100 °C to constant weight. Cool in a desiccator and weigh. In case of ammonium sulphate and potassium salts heat to constant weight at 129 °C to 131 °C for five hours. For urea, heat at 70 °C + 5 °C for five hours

Calculation

$$\text{Moisture per cent by weight (\%)} = \frac{100(B - C)}{B - A}$$

Where, A = Weight in gram of the empty bottle.

B = Weight of the bottle plus the material in gram, before drying

C = Weight of the bottle plus the material in gram, after drying

B. Determination of Moisture -- Vacuum Desiccator Method

The method is applicable to Ammonium Chloride, Calcium Ammonium Nitrate (CAN), Di-Ammonium Phosphate (DAP) and all types of complex and mixtures of NPK fertilizers

Procedure

Weigh 5g of prepared sample in a weighed shallow porcelain dish and dry for 24 hours in a vacuum dessicator over sulphuric acid and re-weigh.

Calculation

$$\text{Moisture per cent by weight} = 100 \times \frac{W1}{W2}$$

Where, W1=Loss in weight in gram on drying and

W2=Weight in gram of the prepared sample taken for the test

C. Determination of Moisture -- Karl Fischer Method

This method is applicable to fertilizers like Urea, CAN and urea based complexes. The method is not suitable for phosphate rock based fertilizers and fertilizers containing monocalcium phosphate, calcium sulphate, alkali carbonates as well as aldehydes and ketone groups.

Apparatus

Karl Fischer titrator

Reagents

Karl Fischer reagent (KF) – Karl Fischer solution (pyridine free)(single solution)

Di-sodium tartarate dihydrate ($\text{Na}_2\text{C}_4\text{O}_6 \cdot 2\text{H}_2\text{O}$)

Methanol-KF grade/spectroscopy grade containing less than 0.05 % water

Procedure

Standardization of KF reagent

- i) Set up the instrument
- ii) Add methanol to the titration vessel until the electrodes are dipped and titrate with Karl-Fischer reagent to a pre-set end point persists for 30 seconds.
- iii) Add 100g of the disodium tartarate dehydrate to the titration vessel carefully and titrate with Karl Fischer reagent to a pre set end point (the pre-set end point should persist for 30 seconds). Note the volume of KF reagent used as V_1 mL.

Determination of moisture of sample

- a) Weigh 1 g of the prepared sample and transfer to the titration vessel carefully and stir until dispersed.
- b) Titrate with KF reagent to the same pre-set end point as above and note the volume of KF reagent used as V_2 mL.

Calculation

Factor (F)(mg H_2O /1 ml of KF reagent) = $\frac{0.1566 \times \text{mg of sodium tartarate dihydrate added}}{V_1}$

Moisture per cent by weight = $\frac{F \times V_2}{\text{Weight of sample (gram)} \times 10}$

FOURTH SCHEDULE

(Made under regulation 4(6))

FORM FR-4

The Director
Tanzania Fertilizer Regulatory Authority
P.O. Box 9192,
DAR ES SALAAM.

CERTIFICATE NO.

FERTILIZER OR FERTILIZER SUPPLEMENT REGISTRATION CERTIFICATE

1. By virtue of the power conferred on it by the Fertilizer Act, 2009 the TFRA hereby register..... as fertilizer/fertilizer supplement to of P.O. Box.....
2. This Certificate shall be valid from to and may be renewed as prescribed in these Regulations.

Name:.....

Title:.....

Date:.....

FIFTH SCHEDULE

FORM FR-5

(Made under regulation 6(1))

The Director
Tanzania Fertilizer Regulatory Authority
P.O. Box 9192
DAR ES SALAAM.

APPLICATION FOR REGISTRATION OF STERILISING PLANT

1. Name of Applicant.....
2. Address and location where plant is situated.....
3. What part of animal carcasses are being sterilized.....
4. Name and Trade Mark of Plant.....
5. Whether Dry Steam Sterilization Process is applied.....
6. Number of Wet Steam Digestors and Dry Steam Digesters comprising the plant.....
7. Capacity of each Digester separately.....
8. Maximum Steam Pressure per sq. cm each Digester can be subjected to:.....
9. Whether sterilized substance is to be dried in open air or by special installation:.....
10. If a Special Drying Installation is used, state whether a Rotating Pot is used, and whether heat is applied by steam or open fire:.....
11. Whether Environmental Impact Assessment Certificate has been issued to the Applicant, relevant authority and date of issue.....

I/We hereby enclose a cheque/ bank deposit receipt for Tshs/USD.....being payment of the application fee for.....

Name of the Applicant:.....
Signature:.....
Date:.....

Fertilizer

GN. No. 350 (contd.)

SIXTH SCHEDULE

(Made under regulation 6(2))

FORM FR-6

The Director
Tanzania Fertilizer Regulatory Authority
P.O. Box 9192
DAR ES SALAAM.

LICENCE FOR STERILIZING PLANT

LICENCE NO.

1. By virtue of the power conferred on it by the Fertilizer Act, 2009 the TFRA hereby grants licence to of P.O. Box..... to set up and run sterilizing plant.
2. This licence shall be valid from to and may be renewed as prescribed in these Regulations.

Name:.....
Signature:.....
Date.....

SEVENTH SCHEDULE

(Made under regulation 10(2))

FORM FR-7

TANZANIA FERTILIZER REGULATORY AUTHORITY

The Director
Tanzania Fertilizer Regulatory Authority
P.O. Box 9192
DAR ES SALAAM.

APPLICATION FOR REGISTRATION OF FERTILIZER DEALER

(To be filled in Triplicate)

1. Applicant's Details:

- (a) Name:
- (b) Physical Address:.....
- (c) Type of Fertilizer dealer (i.e Manufacturer, Importer,):

2. Name and Qualifications of the technical staff (if any)

.....
.....

3. I/We certify that the information given above is correct to the best of my/our knowledge using the information and scientific data available to me/us.

.....
 Signature of Authorized Officer(s)
 Title:

.....
 Date:

.....
 For.....

I/We hereby enclose a cheque/ bank deposit receipt for Tshs/USD..... being payment of the application fee for.....

Date: Signature:

EIGHTH SCHEDULE

(Made under regulation 11)

FORM FR-8

TANZANIA FERTILIZER REGULATORY AUTHORITY

The Director
Tanzania Fertilizer Regulatory Authority
P.O. Box 9192
DAR ES SALAAM

REGISTRATION CERTIFICATE AS FERTILIZER DEALER

LICENCE NO.

1. By virtue of the power conferred on me, under the Act, I hereby grants registration certificate as fertilizer dealer to.....of P.O. Box.....
2. This certificate shall be valid fromto and may be renewed as prescribed in these Regulations.

Signed and
sealed for and
on behalf of the
Authority

Date.....

Signed by the applicant.....

Director.....

NINTH SCHEDULE

Made under regulation 13(1))

FORM FR-9

TANZANIA FERTILIZER REGULATORY AUTHORITY

The Director
Tanzania Fertilizer Regulatory Authority
P.O. Box 9192
DAR ES SALAAM.

APPLICATION FOR LICENSING OF FERTILIZER DEALER

(To be filled in Triplicate)

1. Applicant's Details:

- (a) Name:
- (b) Physical Address:
- (c) Type of Fertilizer dealer (i.e Manufacturer, Importer.):

2. Name and Qualifications of the technical staff (if any)

.....

3. I/We certify that the information given above is correct to the best of my/our knowledge using the information and scientific data available to me/us.

.....
 Signature of Authorized Officer(s)
 Title:
 Date:
 For.....

I/We hereby enclose a cheque/ bank deposit receipt for Tshs/USD... being payment of the application fee for.....

Date: Signature:

TENTH SCHEDULE

(Made under regulation 13(2))

FORM FR-10

The Director
Tanzania Fertilizer Regulatory Authority
P.O. Box 9192
DAR ES SALAAM.

LICENSING CERTIFICATE AS FERTILIZER DEALER

LICENCE NO.

1. By virtue of the power conferred on me, under the Act, I hereby grants licence as fertilizer deal to..... of P.O. Box.....
2. This certificate shall be valid from to and may be renewed as prescribed in these Regulations.

Signed and
sealed for and
on behalf of the
Authority

Date.....

Signed by the applicant.....

Director.....

ELEVENTH SCHEDULE

(Made under regulation 16(2))

TANZANIA FERTILIZER REGULATORY AUTHORITY

APPLICATION FOR TEST AND ANALYSIS OF FERTILIZER AND FERTILIZER SUPPLEMENTS

TR 11

Name and address of fertilizer dealer.....

Physical location:.....

Weight of the consignment

Test to be carried out:

Location of the consignment.....

Remark (s)

Name of applicant:.....

Signature:.....

Date:.....

TWELVENTH SCHEDULE

(Made under regulation 43)

TANZANIA FERTILIZER REGULATORY AUTHORITY

The Director
Tanzania Fertilizer Regulatory Authority
P.O. Box 9192
DAR ES SALAAM.

CLASSES AND NAMES OF FERTILIZERS AND FERTILIZER SUPPLEMENTS

Item	Column 1 Composition	Column 2 Designated Names
	CLASS 1:	
	NITROGEN PRODUCTS	
1.1	Ammonium salt of nitric acid containing not less than 33% nitrogen, 1/2 of which is in the ammonium form and 1/2 in the nitrate form	Ammonium nitrate (Specify grade.)
1.2	Ammonium salt of sulphuric acid containing not less than 20% nitrogen	Ammonium sulphate (Specify grade.)
1.3	Double salt of ammonium sulphate and ammonium nitrate present in equal molecular proportions containing not less than 26% nitrogen, 1/4 of which is in the nitrate form and 3/4 in the ammonium form	Ammonium sulphate-nitrate (Specify grade.)
1.4	Ammonia gas compressed to liquid form containing not less than 82% nitrogen	Anhydrous ammonia (Specify grade.)
1.5	Calcium salt of nitric acid containing not less than 15% nitrogen	Calcium nitrate or nitrate of lime (Specify grade.)
1.6	Sodium salt of nitric acid containing not less than 16% nitrogen	Sodium nitrate or nitrate of soda (Specify grade.)
1.7	Sodium and potassium salts of nitric acid containing not less than 15% nitrogen and 10% potash	Sodium and potassium nitrate or nitrate of soda and potash (Specify grade.)

- | | | |
|------|---|--|
| 1.8 | Non-pressurized solutions represented for topical application to soils or plants, consisting of ammonia, urea and ammonium nitrate, or a mixture of these, containing not less than 20% nitrogen, of which the free ammonia gas content in the solution does not form a part of the guarantee or exceed 10,000 parts per million | Nitrogen solutions (non-pressurized)
(Specify grade.) |
| 1.9 | Pressurized solutions represented for soil incorporation consisting of ammonia, urea and ammonium nitrate, or a mixture thereof, containing not less than 20% nitrogen | Nitrogen solutions
(pressurized)
(Specify grade.) |
| 1.10 | A product consisting of ammonia and water containing not less than 20% nitrogen | Aqua ammonia or ammonia liquor
(Specify grade.) |
| 1.11 | Collected blood of slaughtered animals, dried and ground, containing not less than 12% nitrogen | Blood meal
(Specify grade.) |
| 1.12 | A product consisting principally of calcium cyanamide (CaNCN) and carbon containing not less than 20% nitrogen | Cyanamide
(Specify grade.) |
| 1.13 | Fish tissue, bone and waste heated under live steam, dried and ground | Fish meal or fish scrap
(Specify grade.) |
| 1.14 | The rendered, dried, ground and screened organic product derived from waste household food materials | Garbage tankage
(Specify grade.) |
| 1.15 | Processed, dried, ground hoofs and horns, ground to a fineness whereby at least 40% passes through a sieve having openings that are square and are each 0.149 mm (100 mesh TYLER screen) in width | Hoof and horn meal
(Specify grade.) |
| 1.16 | Dried and ground excreta of birds or other animals with or without litter, containing not less than 50% organic matter and designated as to kind and condition | Manure
(Specify grade.) |
| 1.17 | Slaughterhouse refuse and offal mixed with straw or other organic absorbent, containing not less than 60% organic matter | Paunch manure
(Specify grade.) |
| 1.18 | Compost produced using the organic matter fraction of the excreta of animals or birds, with or without litter. The compost may use as little as 60% manure and as much as 40% of a carbon source, if the ratio reflects the need for a carbon source when composting the manure, and if the carbon source includes only materials that may be used as litter, | Composted manure
(Specify grade.) |

- such as straw, hay, bark, sawdust, wood chips, shavings, leaves, grass, wood chunks (such as branches and leaves), tree clippings and plant residues but not including treated wood or materials that have been chemically or biologically contaminated
- 1.19 Products made from sewage, freed from grit and coarse solids, that are dried, ground and screened Processed sewage (Specify grade.)
- 1.20 The rendered, dried and ground product from animal tissue and residue Tankage (Specify grade.)
- 1.21 The commercial synthetic acid amide of carbonic acid containing not less than 45% nitrogen Urea (Specify grade.)
- 1.22 The reaction product of urea and formaldehyde containing not more than 34% nitrogen of which 60% is in a water-insoluble form and tests not less than 40% active by the nitrogen activity index for urea-formaldehyde compounds Urea-formaldehyde (Specify grade.)
- 1.23 The reaction product of urea and formaldehyde containing not less than 35% nitrogen of which at least 60% is in a water-insoluble form and tests not less than 40% active by the nitrogen activity index for urea-formaldehyde compounds Urea-form (Specify grade.)
- 1.24 The condensation product of isobutyraldehyde and urea containing at least 31% nitrogen of which at least 90% is, before grinding, in a water-insoluble form Isobutylidene diurea or I.B.D.U. (Specify grade.)
- 1.25 A commercial product principally of the formula $(\text{NH}_4)_2\text{S}_2\text{O}_3$ that contains not less than 12% nitrogen and 26% sulphur Ammonium thiosulphate (Specify grade.)
- 1.26 A water-soluble condensation product resulting from the reaction of two molecules of formaldehyde with three molecules of urea, with the elimination of two molecules of water. It has a minimum nitrogen content of 41% and is a source of slowly available nitrogen Dimethylenetriurea or DMTU (Specify grade.)
- 1.27 A product manufactured from feathers by treatment with steam under pressure. The addition of 0.5% sulphuric acid facilitates the hydrolysis at lower temperatures. The nitrogen content ranges from 11 to 14% Hydrolysed feather meal (Specify grade.)
- 1.28 A water-soluble condensation product resulting from the reaction of one molecule of formaldehyde Methylene diurea or MDU (Specify grade.)

with two molecules of urea, with the elimination of one molecule of water. It has a minimum nitrogen content of 42% and is a source of slowly available nitrogen

- | | | |
|------|--|--|
| 1.29 | The ground residues of soybeans from which oil has been extracted and which contain not less than 6% nitrogen | Soybean meal
(Specify grade.) |
| 1.30 | A coated slow-release fertilizer consisting of urea particles coated with sulphur. The product may be further coated with a sealant (2 to 3% of total weight). It may contain about 30 to 40% nitrogen and 10 to 30% sulphur | Sulphur coated urea
(Specify grade.) |
| 1.31 | A water-soluble compound of formula $C_2H_7N_3O$ that contains at least 41% nitrogen (CAS No. 7098-14-6; 1,3,5-triazin-2-one, tetrahydro-S-triazone) | Triazone
(Specify grade.) |
| 1.32 | A stable solution resulting from a controlled reaction in an aqueous medium of urea, formaldehyde, and ammonia that contains at least 25% nitrogen. The solution shall contain no more than 40% and not less than 5% nitrogen from unreacted urea and not less than 40% from triazone. All other nitrogen shall be derived from water-soluble, dissolved reaction products of the above reactants. Urea-triazone solution is a source of slowly available nitrogen | Urea-triazone solution
(Specify grade.) |

CLASS 2:

PHOSPHORUS PRODUCTS

- | | | |
|-----|--|---|
| 2.1 | A product obtained when superphosphate is treated with ammonia or with solutions that contain ammonia and other compounds of nitrogen | Ammoniated superphosphate
(Specify grade.) |
| 2.2 | A product obtained when phosphoric acid (H_3PO_4) is treated with ammonia, which product consists principally of mono-ammonium phosphate, di-ammonium phosphate or a mixture of those two salts | Ammonia phosphate
(Specify grade.) |
| 2.3 | A product obtained when a mixture of phosphoric acid (H_3PO_4) and sulphuric acid is treated with ammonia, which product consists principally of a mixture of ammonium phosphate and ammonium sulphate | Ammonium phosphate-sulphate
(Specify grade.) |
| 2.4 | A by-product in the manufacture of steel in blast furnaces containing not less than 14% available phosphoric acid and 16% total phosphoric acid ground to a fineness whereby at least 80% passes through a sieve having openings that are square and | Basic slag
(Specify grade.) |

- are each 0.149 mm (100 mesh TYLER screen) in width
- 2.5 Blood and bone, from animals, processed by wet or dry rendering with or without solvents, dried and ground; it shall contain not less than 6% nitrogen, 5% available phosphoric acid and 11% total phosphoric acid Blood and Bone meal (Specify grade.)
 - 2.6 A manufactured product consisting of di-calcic salt of phosphoric acid Dicalcium phosphate (Specify grade.)
 - 2.7 A product of a mine containing not less than 25% total phosphoric acid, ground to a fineness whereby at least 80% passes through a sieve having openings that are square and are each 0.149 mm (100 mesh TYLER screen) in width Natural rock phosphate (Specify grade.)
 - 2.8 A product obtained when natural rock phosphate is treated with sulphuric acid, phosphoric acid (H_3PO_4) or a mixture of both acids, which product contains not less than 18% available phosphoric acid Superphosphate (Specify grade.)
 - 2.9 Ground bone or bone meal that has been treated with sulphuric acid Acidulated bone (Specify grade.)
 - 2.10 Animal bones that are treated under live steam and are dried and ground to a fineness of whereby at least 40% passes through a sieve having openings that are square and are 0.149 mm (100 mesh TYLER screen) in width Bone meal (Specify grade.)
 - 2.11 A product consisting mainly of dicalcium phosphate obtained by neutralizing, with calcium hydroxide, the acid solution of either phosphate rock or processed bone Precipitated phosphate (Specify grade.)

CLASS 3:

POTASSIUM PRODUCTS

- 3.1 Potassium salt containing not less than 48% soluble potash principally as chlorides Muriate of potash (Specify grade.)
- 3.2 Potassium salt of nitric acid containing not less than 12% nitrogen and 44% soluble potash Nitrate of potash or potassium nitrate (Specify grade.)
- 3.3 Natural potassium salts containing not less than 20% soluble potash principally as chlorides Potash manure salts (Specify grade.)
- 3.4 Potassium salt containing not less than 48% soluble potash principally as sulphates and not more than 2.5% chlorine Sulphate of potash (Specify grade.)
- 3.5 Potassium salt containing not less than 20% soluble potash principally as sulphates and not less than 25% sulphate of magnesium and not more than Sulphate of potash-magnesia (Specify grade.)

2.5% chlorine

- | | | |
|-----|---|--|
| 3.6 | A commercial product containing not less than 24% soluble potash (K_2O), not less than 53% sulphate of magnesia and not more than 2.5% chlorine | Double sulphate of potash and magnesia or langbeinite (Specify grade.) |
|-----|---|--|

CLASS 4:

CALCIUM AND MAGNESIUM PRODUCTS

- | | | |
|-----|--|---|
| 4.1 | A mineral product that consists principally of calcium sulphate with combined water ($CaSO_4 \cdot 2H_2O$) and that is incapable of neutralizing soil acidity. It shall contain not less than 70% $CaSO_4 \cdot 2H_2O$ | Gypsum, landplaster or crude calcium sulphate (Specify grade) |
| 4.2 | A product that consists principally of $MgSO_4$, with or without combined water. For example, epsom salts ($MgSO_4 \cdot 7H_2O$), kieserite ($MgSO_4 \cdot H_2O$) and calcined kieserite ($MgSO_4$) | Magnesium sulphate (Specify grade) |

CLASS 5:

FERTILIZER SUPPLEMENTS

- | | | |
|-----|--|---------------------|
| 5.1 | A solid mature product resulting from composting, which is a managed process of bio-oxidation of a solid heterogeneous organic substrate, including a thermophilic phase. This product may be designated as to kind | Compost |
| 5.2 | A volcanic glass that has been finely ground and heated to cause expansion | Perlite |
| 5.3 | A product ($3MgO \cdot Fe_2Al_2O_3 \cdot 3SiO_2$) that is produced when vermiculite ore (a magnesium mica) is heated and expands to many times its original volume. Exfoliate vermiculite weighs from 0.12 to 0.38 kg/l. | Vermiculite |
| 5.4 | Homogeneous and friable mixtures of partly decomposed organic matter with or without earth | Humus or leaf mould |
| 5.5 | Partly decayed vegetable matter of natural occurrence accumulated in water | Peat |

THIRTIETH SCHEDULE

(Made under regulation 46)

TANZANIA FERTILIZER REGULATORY AUTHORITY

MIXED FERTILIZER WITH MAJOR NUTRIENTS

COLUMN I	COLUMN II	
Name of fertilizer	Major nutrient grade	
N: P: K (20:10:10)	N	20%
		P ₂ O ₅ 10%
		K ₂ O 10%
N: P: K (10:18:24)	N	10%
		P ₂ O ₅ 18%
		K ₂ O 24%
N: P: K (25:5:5)		N 25%
		P ₂ O ₅ 5%
		K ₂ O 5%
N: P: K (6:20:18)		N 6%
		P ₂ O ₅ 20%
		K ₂ O 18%
N: P: K (4:17:15)		N 4%
		P ₂ O ₅ 17%
		K ₂ O 15%
Diammonium phosphate (DAP)		N 18-21%
		P ₂ O ₅ 46-54%
Potassium nitrate	N	13%
		K ₂ O 44%
Potassium phosphates		K ₂ O 29-45%
		P ₂ O ₅ 18-22%
Potassium orthophosphates	K ₂ O	30-50%
		P ₂ O ₅ 30-60%
Potassium polyphosphates	K ₂ O	22-48%
		P ₂ O ₅ 40-60%
Potassium metaphosphates	K ₂ O	55-57%
		P ₂ O ₅ 38%
Potassium calcium pyrophosphates	K ₂ O	25-26%
		P ₂ O ₅ 39-54%
Monoammonium phosphate-sulphate	N	13-16%
		P ₂ O ₅ 20-39%
Monoammonium phosphate	N	11%
		P ₂ O ₅ 48-55%
Ammonium phosphate (21:53:0)	N	21%
		P ₂ O ₅ 23%
Ammonium phosphate (21:61:0)	N	21%
		P ₂ O ₅ 27%

Fertilizer

GN. No. 350 (contd.)

Ammonium phosphate (11:48:0)	N	11%	
		P ₂ O ₅	21%
Ammonium phosphate (16:48:0)	N	16%	
		P ₂ O ₅	21%
Ammonium phosphate (18:46:0)	N	18%	
		P ₂ O ₅	20%
Ammonium phosphate (16:20:0)	N	16%	
		P ₂ O ₅	8.7%
Ammonium phosphate-nitrate	N	30%	
		P ₂ O ₅	4%
Ammonium polyphosphate solution	N	10-11%	
		P ₂ O ₅	34-37%
Ammoniated ordinary superphosphate	N	4%	
		P ₂ O ₅	6.1-16%
Ammoniated concentrated super-phosphate	N	4-6%	
		P ₂ O ₅	19-21%
Urea-ammonium phosphate	N	21-38%	
		P ₂ O ₅	13-42%
Urea-phosphate	N	17%	
		P ₂ O ₅	43-44%
Rock phosphates			

MIXED FERTILIZER WITH LESSER (MICRO) PLANT NUTRIENTS

COLUMN I COLUMN III	COLUMN II			
Name of fertilizer nutrient grade	Major nutrient grade		Lesser (Micro)	
Ammonium sulphate	N	21%	S	24%
Ammonium chloride	N	25-26%	Cl	66%
Ammonium nitrate-sulphate	N	30%	S	5-6%
Ammonium nitrate with lime	N	20.5%	S	0.6%
			CaO	10%
			MgO	7%
Ammonium thiosulphate solution	N	12%	S	26%
Calcium nitrate	N	15%	CaO	34%
Potassium nitrate	N	13%	CaO	0.5%
	K ₂ O	44%	MgO	0.5%
			S	0.2%
			Cl	1.2%
Urea-sulphate	N	30-40%	S	6-11%
Urea-sulphur	N	30-40%	S	10-20%
Potassium sulphate	K ₂ O	50-52%	S	17%
Potassium magnesium sulphate	K ₂ O	22%	S	22%
			Mg	11%
Ammoniated ordinary superphosphate	N	2-5%	S	10-72%
		P ₂ O ₅	CaO	17-21%
Ammoniated concentrated superphosphate	N	4-6%	S	0-1%
		P ₂ O ₅	CaO	12-14%

FOURTEETH SCHEDULE

(Made under regulation 47(2))

CODE OF PRACTICE FOR HANDLING AND STORAGE OF FERTILIZER
AND FERTILIZER SUPPLEMENT

- 1.0 Warehouse for Storage of Fertilizer and Fertilizer Supplement
- 1.1 The warehouse for storage of fertilizer and fertilizer supplement shall be located in a clean and tidy site with arrangements provided for destruction and disposal of waste.
- 1.2 The warehouse shall be located away from areas liable to flooding and away from drinking water sources.
- 1.3 The site shall be free from rodent activity and will have a good drainage system
- 1.4 The construction of the warehouse shall be climatically suitable and damp-proof with structurally sound walls and roof that effectively keeps out rain, provides ventilation to allow fumes and heat to escape in case of fire and at the same time provide protection against direct sunlight. The doors shall also be sound, well fitting and secure. The windows and ventilators shall be in good repair and screened to prevent access by birds or rodents.
- 1.5 The internal walls of warehouse shall be structurally sound, non flammable type and with all piping and electrical wiring scaled.
- 1.6 Floors shall be made of concrete with a load bearing capacity sufficient to withstand the weight of the stock, racking and any mechanical handling equipment to be used. Floors shall be impervious to liquids, free from cracks and facilitate cleaning.
- 1.7 The building shall be designed to enable escape in case of emergency from any enclosed area and emergency exits shall be clearly marked.
- 1.8 The building shall permit reasonable movement of materials and enough space to allow hygienic working conditions and clear access to fire-fighting equipment

- 2.0 Storage of Fertilizer and Fertilizer Supplement
- 2.1 Care and attention shall be given to the characteristics of the fertilizer and fertilizer supplement to be stored in the warehouse that is, consideration shall be made as to whether the fertilizer is hygroscopic, cohesive, gives out volatile substances, explosive or none of these properties.
- 2.2 It shall therefore, be ensured that fertilizer and fertilizer supplement are stored on a clean floor and well- ventilated structures and in readily accessible space.
- 2.3 During rainy seasons or when the relative humidity is very high, the ventilators and doors of the warehouse where fertilizer and fertilizer supplement are stored shall be closed. Where possible, the stacks of hygroscopic fertilizers shall also be covered with polyethylene sheets.
- 2.4 All stocks in the warehouse shall be frequently inspected for leakages, caking of powders, pulverisation of granules, change in colour due to oxidation, dampness of packages and corrosion or deterioration of bags or bins.
- 2.5 Different fertilizers or fertilizer supplements shall be kept in separate stacks. Stock cards indicating the name of the fertilizer or fertilizer supplement, date of receipt, number of bags in the stack and other relevant information shall be tagged to each stack at a convenient height.
- 2.6 Storage for bulk fertilizer and fertilizer supplement shall employ facilities that ensure good ventilation.
- 2.7 For storage of large quantities of hygroscopic fertilizer and fertilizer supplement, storage structures with dehumidification facilities shall be ideal.
- 2.8 Bins or hoppers used for bulk storage shall be made of materials that resist the corrosive effect from fertilizers or fertilizer supplement.
- 2.8 Care shall be taken to ensure fertilizer and fertilizer supplement are not blown around the storage bin or hopper openings due to the effect of ventilation. Care shall also be taken to ensure that bins or hoppers are not over filled resulting in spillages.
- 3.0 Handling of Fertilizer and Fertilizer Supplement

Fertilizer

GN. No. 350 (contd.)

- 3.1 Bags received for storage shall be sorted out the damaged bags from the sound bags.
- 3.2 Storage warehouses, trucks or any vessels intended to handle fertilizer or fertilizer supplement shall be carefully cleaned before receiving fertilizers.
- 3.3 Oil, acids and other combustible materials shall be kept away from the fertilizers and fertilizer supplements. In places where fertilizers and fertilizer supplements are stored or handled, smoking and the use of fire or naked flames shall be avoided.
- 3.4 Due caution should be taken in using vehicles powered by petrol or diesel oil, particularly with regard to spillage of the fuel.
- 3.5 Bags handling fertilizers and fertilizer supplements shall neither be handled using cranes nor dropped from excessive heights.
- 3.6 Personnel working in the warehouse for storage of fertilizer and fertilizer supplements shall be given protective gears.
- 3.7 The personnel shall also be enlightened on the safety precautions in the warehouse and the necessary emergency action to be taken in case of fire.
- 3.8 The personnel shall be trained in proper handling of fertilizer and fertilizer supplement and safety procedures. The personnel shall also have a clear understanding of the operation's emergency response plan in the event of an accident.

FIFTEENTH SCHEDULE

(Made under regulation 47(6))

FORM FR 15

TANZANIA FERTILIZER REGULATORY AUTHORITY

The Director
Tanzania Fertilizer Regulatory Authority

P.O. Box 9192
DAR ES SALAAM.

STOP SALE ORDER

Date.....
Name of fertilizer dealer.....
Physical address

.....
.....

Fertilizer

GN. No. 350 (contd.)

By virtue of the power conferred on me, under the ACT, you are hereby prohibited to sale, or offer for sale fertilizer/ fertilizer supplement for failure to comply with standard prescribed under the regulations

This stop order applies to the fertilizer/ fertilizer supplement with the following particulars

Type of fertilizer/ fertilizer supplement.....

Batch number.....

Quantity (number of bags)

Fertilizer dealer..... Inspector.....

Sign: Sign:.....

SIXTEENTH SCHEDULE

(Made under regulation 48(1))

TANZANIA FERTILIZER REGULATORY AUTHORITY

FOR OFFICIAL USE

The Director
Tanzania Fertilizer Regulatory Authority
P.O. Box 9192
DAR ES SALAAM

Application No:
Date Received:
Fees Receipt No:
Date Approved/Rejected:

A NOTICE OF INTENTION TO IMPORT FERTILIZER OR FERTILIZER SUPPLEMENT

I/We
Of P. O. Box
wish to import fertilizer /fertilizer supplement
.....
.....
from.....

Fertilizer

GN. No. 350 (contd.)

quantity.....
Name and address of exporter
Port of entry
The importation will be made during the period
Date :

Importer/Agent
Signature
Date:

Name of Officer:.....
Signature:.....
Date:.....
For (Official Stamp).....

SEVENTEENTH SCHEDULE

(Made under regulation 48(4))

FORM FR 17

TANZANIA FERTILIZER REGULATORY AUTHORITY

The Director
Tanzania Fertilizer Regulatory Authority
P.O. Box 9192
DAR ES SALAAM.

PERMIT TO IMPORT FERTILIZER OR FERTILIZER SUPPLIMENT

No.

M/S of
(mailing address)

Is hereby authorized to import the following fertilizer or fertilizer supplements:

Common Name:

Trade Name:

In quantity/quantities of

Date:

Name

Signature:

Fertilizer

GN. No. 350 (contd.)

EIGHTEENTH SCHEDULE

(Made under regulation 48(5))

FORM FR 18

TANZANIA FERTILIZER REGULATORY AUTHORITY

FOR OFFICIAL USE

The Director
Tanzania Fertilizer Regulatory Authority
P.O. Box 9192
DAR ES SALAAM

Application No:
Date Received:
Fees Receipt No:
Date Approved/Rejected:

APPLICATION FOR CLEARANCE OF IMPORTED FERTILIZER OR FERTILIZER SUPPLEMENT

Name of importer
Physical address
Fertilizer /fertilizer supplement
.....
Country of origin
quantity.....
Name and address of exporter
Clearing agent
Port of entry
Expected date of arrival
FOB
Date.....

Signature.....
Importer/Agent Signature

Signature of Authorized Officer.....
Name
Title:
Date
For (official stamp)

NINEENTHEENTH SCHEDULE

(Made under regulation 49(1))

FORM FR 19

TANZANIA FERTILIZER REGULATORY AUTHORITY

The Director
Tanzania Fertilizer Regulatory Authority
P.O. Box 9192
DAR ES SALAAM.

APPLICATION FOR A PERMIT TO EXPORT FERTILIZER OR FERTILIZER SUPPLEMENT

I/We

of mailing address

wish to export the fertilizer/ fertilizer supplement

quantity.....

to

The exportation will be made during the period of

Signature
Importer/Agent Signature

Signature of Authorized Officer(s).....
Name
Title:
Date :
For (official stamp)

TWENTIENTH SCHEDULE

(Made under regulation 49(3))

FR 20

FORM

TANZANIA FERTILIZER REGULATORY AUTHORITY

The Director
Tanzania Fertilizer Regulatory Authority
P.O. Box 9192
DAR ES SALAAM.

PERMIT TO EXPORT FERTILIZER OR FERTILIZER SUPPLEMENT

M/S
of (mailing address)
Is hereby authorized to export the following fertilizer or fertilizer supplements:
Common Name:
Trade Name:
Quantity
To

Date:
Name
Signature of authorizing officer:

Dar es Salaam
22nd September, 2011

JUMANNE MAGHEMBE,
*Minister for Agriculture, Food
Security and Co-operatives*