

# INTERNATIONAL STANDARD

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## **Solid fertilizers — Sampling plan for the evaluation of a large delivery**

*Matières fertilisantes solides — Plan d'échantillonnage pour l'évaluation  
d'une grosse livraison*



Reference number  
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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 8634 was prepared by Technical Committee ISO/TC 134, *Fertilizers and soil conditioners*.

Annex A forms an integral part of this International Standard. Annex B is for information only.

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## Introduction

This International Standard on the sampling and evaluation of a large delivery of solid fertilizer has been prepared on the basis of a statistical study which forms the subject of ISO/TR 5307.

Each country has its own regulations applicable to the fertilizer trade and an official department is responsible for checking the application of these regulations. If they are violated, sanctions may be taken against those responsible for placing the fertilizer in that country. In the case of an imported delivery, it is the representative of the manufacturing company in the country, or the importer, who is considered by the relevant authorities to be responsible for the contents declared on labels or other documentation accompanying the fertilizer.

This International Standard concerns the case of an importer who re-sells, under his own responsibility, a large amount of fertilizer received from abroad. After unloading, this delivery is resold in smaller lots to traders (dealers or agricultural cooperatives) who will themselves directly supply farmers. In the case in question, it is the importer whose name is associated with the fertilizer; therefore it is he who will be considered by the retailers and users to be responsible for the declared contents.

# Solid fertilizers — Sampling plan for the evaluation of a large delivery

## 1 Scope

This International Standard specifies a method for sampling a delivery of more than 250 t of fertilizer and, after analysis of the sample or samples, presents rules for assessing whether the delivery can be accepted by a buyer, allowing for given reselling risks under given local legal conditions (or if he wishes to guarantee to the final buyer a given mean assay with a given risk).

The weighing of the bags or lots, the date limit for sampling, etc., which are of necessity involved in the definitive evaluation of the delivery, are not dealt with in this International Standard.

This sampling plan is applicable to a large delivery of fertilizer supplied to a third party for resale under his own responsibility, in small lots, each of which would be subject to legislation.

By "large amount" is understood, for example, a full boat-load (5 000 t, 10 000 t or more) corresponding to a relatively long period of manufacture, but the plan may be used for any delivery of 250 t or more.

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

ISO/TR 7553:1987, *Fertilizers — Sampling — Mini-*

*mum mass of increment to be taken to be representative of the total sampling unit.*

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

ISO 8358:1991, *Solid fertilizers — Preparation of samples for chemical and physical analysis*.

## 3 Definitions

For the purposes of this International Standard, the following definitions apply. These definitions are taken from ISO 8157/Add.1. ISO 8157 contains additional definitions relating to the sampling of fertilizers.

**3.1 lot; sample portion:** The total quantity of material, assumed to have the same characteristics, to be sampled using a particular sampling plan.

**3.2 delivery:** A quantity of material transferred at one time.

**3.3 sampling unit:** A defined quantity of material having a boundary which may be physical, for example a container, or hypothetical, for example a particular time or time interval in the case of a flow of material.

**3.4 increment:** A representative quantity of material taken from a sampling unit.

**3.5 aggregate sample:** A combination of all increments from the lot.

**NOTE 1** In this International Standard, all the increments are grouped in equal numbers to form aggregate samples.

**3.6 reduced sample:** A representative part of the aggregate sample obtained by a process of reduction in such a manner that the mass approximates to that of the final (laboratory) samples.

**3.7 final sample:** A representative part of the reduced sample or, where no intermediate reduction is required, of the aggregate sample.

## 4 Symbols

The following symbols appear in this International Standard and have the meanings assigned to them below.

|                |                                                                                                                                                                                              |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| $N$            | Number of sampling units to be selected during the sampling of the delivery. (Increments.)                                                                                                   |
| $N'$           | Number of analyses to be carried out on the $N$ increments during the inspection of the delivery.                                                                                            |
| $N_R$          | Number of sampling units contained in the smallest lot presented for resale.                                                                                                                 |
| $k$            | Number of increments to be combined into each aggregate sample for analysis.                                                                                                                 |
| $n$            | Number of sampling units which will be mandatorily selected during the official sampling of a lot of $N_R$ sampling units.                                                                   |
| $s$            | Estimate of $\sigma/\sqrt{k}$ with the aid of $N'$ analyses, where $\sigma$ is the standard deviation between the sampling units in the delivery.                                            |
| $\chi_i$       | Analytical result obtained on the sample of rank $i$ .                                                                                                                                       |
| $\bar{\chi}_i$ | Estimate of the mean value of the delivery with the aid of the $N'$ analyses.                                                                                                                |
| $L$            | Official inspection limit value which depends on the declared value ( $D$ ). It may be equal to $D$ or less than $D$ by a prescribed tolerance which may depend on the size of the lot sold. |
| $r_a$          | Probability that the mean value of $n$ sampling units is lower than the official limit value ( $L$ ), just acceptable by the importer.                                                       |
| $r_r$          | Probability that the mean value of $n$ sampling units is lower than the official limit value ( $L$ ), just unacceptable by the importer.                                                     |
| $\alpha$       | Probability of rejection of a delivery of just acceptable quality (seller's or producer's risk).                                                                                             |
| $\beta$        | Probability of acceptance of a delivery of just unacceptable quality (importer's or consumer's risk).                                                                                        |
| $u_{1-r_a}$    | Value of the standardized normal variable such that $Pr [u > u_{1-r_a}]$ equals $r_a$ .                                                                                                      |

|                |                                                                                                                                                            |
|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| $u_{1-r_r}$    | Value of the standardized normal variable such that $Pr [u > u_{1-r_r}]$ equals $r_r$ .                                                                    |
| $u_{1-\alpha}$ | Value of the standardized normal variable such that $Pr [u > u_{1-\alpha}]$ equals $\alpha$ .                                                              |
| $u_{1-\beta}$  | Value of the standardized normal variable such that $Pr [u > u_{1-\beta}]$ equals $\beta$ .                                                                |
| $K$            | Calculation coefficient which is dependent on $n$ , the risk levels $\alpha$ and $\beta$ and the probability levels $r_a$ and $r_r$ .                      |
| $a$            | Constant factor dependent on $N'$ which represents the uncertainty associated with the estimate of the standard deviation.                                 |
| $\delta$       | Non-centrality parameter.                                                                                                                                  |
| $t_0$          | Value of the non-central Student ratio corresponding to the level of probability for a non-centrality parameter equal to $\sqrt{N} u_{1-r_a} / \sqrt{n}$ . |
| $B_0$          | Limit value of the estimate calculated from $t_0$ .                                                                                                        |
| $A, B$         | Calculation intermediates used during the estimation of the lot after analysis.                                                                            |
| $F$            | Calculation intermediate used to facilitate the calculation of $k$ and $N$ .                                                                               |

## 5 General plan of application

The application of this International Standard involves a certain number of successive operations, which are described in clause 6 to clause 8.

### 5.1 Determinations prior to sampling

Determination of the number of sampling units  $N$  to be sampled and determination of the number of analyses  $N'$  to be carried out (see clause 6).

### 5.2 Sampling

- Designation and separation of the sampling units resulting in increments:
  - fertilizer in bags (see 7.1.2);
  - fertilizer in bulk (see 7.2.2).
- Increments from the sampling units:
  - fertilizer in bags (see 7.1.3);
  - fertilizer in bulk (see 7.2.3).
- Preparation of  $N'$  aggregate samples by grouping  $N$  increments  $k$  by  $k$  (see 7.1.4).