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GUIDE ON THE FORM FOR STANDARDS
FOR CHEMICAL PRODUCTS
AND FOR METHODS OF CHEMICAL ANALYSIS

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BRIEF HISTORY

The ISO Recommendation R 78, *Guide on the form for standards for chemical products and for methods of chemical analysis*, was drawn up by Technical Committee ISO/TC 47, *Chemistry*, the Secretariat of which is held by the Ente Nazionale Italiano di Unificazione (UNI).

Work on this question led to the adoption of a Draft ISO Recommendation.

In April 1956, this Draft ISO Recommendation (No. 85) was circulated to all the ISO Member Bodies for enquiry. It was approved by 17 Member Bodies; no Member Body opposed the approval of the Draft.

This Draft ISO Recommendation was then submitted by correspondence to the ISO Council, which decided, in December 1958, to accept it as an ISO RECOMMENDATION.

BRIEF HISTORY RELATING TO THE 2nd EDITION

In October 1960, it was decided to redraft the second part of ISO Recommendation R 78-1958; work on this question led to the adoption of a Draft ISO Recommendation.

In April 1968, this Draft ISO Recommendation (No. 1533) was circulated to all the ISO Member Bodies for enquiry. It was approved, subject to a few modifications of an editorial nature, by the following Member Bodies :

Australia	Iran	Spain
Austria	Israel	Switzerland
Belgium	Italy	Thailand
Brazil	Netherlands	Turkey
Cuba	New Zealand	U.A.R.
Czechoslovakia	Poland	United Kingdom
France	Portugal	U.S.A.
Germany	Romania	U.S.S.R.
Hungary	South Africa, Rep. of	

One Member Body opposed the approval of the Draft :

India

This Draft ISO Recommendation was then submitted by correspondence to the ISO Council which decided, in September 1969, to accept it as a new wording of the second part of ISO Recommendation R 78-1958, the first part of this ISO Recommendation remaining unchanged.

The present edition (2nd edition) cancels and replaces the first edition of ISO Recommendation R 78-1958.

**GUIDE ON THE FORM FOR STANDARDS
FOR CHEMICAL PRODUCTS
AND FOR METHODS OF CHEMICAL ANALYSIS**

INTRODUCTION

DRAWING UP STANDARDS ACCORDING TO STANDARD LAYOUTS

It is recommended that standards for chemical products and for methods of chemical analysis should be drawn up using the standard layouts of which details are given below.

It must always be remembered, in making use of these standard layouts, that they are to be used as *general layouts for guidance only*. They should be adapted to suit any special requirements. There may, in some cases, be no need for all the subdivisions provided : no account will then be taken of those not required.

Two standard layouts are provided :

- I. Standard layout for a standard for a chemical product, with notes on its application page 5
- II. Standard layout for a standard method of chemical analysis with notes on its application page 11

These layouts have a very wide field of application.

Their object is to help to solve problems of drafting and layout which arise in drawing up standards for chemical products and for methods of chemical analysis.

In a general way, a standard for a chemical product should form a consistent whole; in addition to specifying the characteristics required of the product, it should state how to determine these characteristics. Hence a standard method of chemical analysis has a rightful place in the text itself of a standard for a chemical product. However, to shorten the text, the method of chemical analysis may be issued as a separate standard; in particular, when there exists a general method of chemical analysis applicable to the product, the standard for the product may merely refer to it.

The adoption of a standard form of layout and drafting ensures

- that the various items of information to be included in the standard are set up always in the same order;
- that no important point is overlooked in the preparation of the standard;
- that the section sought may be found rapidly, whatever the origin or scope of the standard.

(This is important, in particular when dealing with a partial translation of a text or when comparing two texts.)

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INTERNATIONAL STANDARD

ISO 78/1

~~4 STANDARD~~ LAYOUT FOR A STANDARD FOR A CHEMICAL PRODUCT

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STANDARD LAYOUT

1. TITLE
2. SCOPE
3. CHARACTERIZATION OF PRODUCT
 - 3.1 Identification
 - 3.1.1 Chemical formulae
 - 3.1.2 Exact molecular weight
Rounded-off molecular weight
 - 3.1.3 Percentage composition of components specified for identification
 - 3.2 Classification
 - 3.3 Codification
4. MANUFACTURE
5. REQUIREMENTS
 - 5.1 Geometrical characteristics
 - 5.2 Physical and physico-chemical characteristics
 - 5.3 Chemical characteristics
 - 5.4 Organoleptic characteristics
 - 5.5 Mechanical characteristics
 - 5.6 Other characteristics (if necessary)
For example, see note on hygienic, toxicological or physiological characteristics, page 9.
6. SAMPLES AND TEST SPECIMENS
7. METHODS OF TEST
 - 7.1 Geometrical tests
 - 7.2 Physical and physico-chemical tests
 - 7.3 Chemical tests
 - 7.4 Organoleptic tests
 - 7.5 Mechanical tests
8. PACKAGING AND MARKING
9. PRECAUTIONS FOR STORAGE, TRANSPORT AND USE
10. ANNEX

NOTES ON THE APPLICATION OF THE STANDARD LAYOUT FOR A STANDARD FOR A CHEMICAL PRODUCT

1. TITLE

The title of the document should reflect the contents of the text very concisely and without ambiguity.

2. SCOPE

This section should state as precisely as possible the types of product covered by the standard. The statement should be brief.

If any confusion is to be feared between these and related products not covered by the standard, it is recommended that the latter should be listed.

3. CHARACTERIZATION OF PRODUCT

This section should contain the following subdivisions :

3.1 Identification

3.1.1 Chemical formulae

3.1.2 Exact molecular weight
Rounded-off molecular weight

3.1.3 Percentage composition of components specified for identification

3.2 Classification

3.3 Codification

This section should contain only straightforward information, as precise as possible.

The layout of the classification and codification in the form of tables is recommended whenever it might help the reader.

4. MANUFACTURE

The object of this section is not to standardize manufacturing processes. It is merely intended to contain an indication of the manufacturing process of the product, especially where the process used would result in certain special features which it might be useful to know, but the determination of which is not possible by standard methods of test.

5. REQUIREMENTS

This section should

- state the characteristics which are required of the products covered by the standard;
- give the recommended limits for these characteristics;
- refer to the test laid down for their determination.

As regards the characteristics,* the purpose of this section is to express the limits of the characteristics of a product. The limits should be defined and expressed numerically, whenever possible, fixing either a minimum limit or a maximum limit, or a value with a tolerance on either side, within which the value of the characteristic is considered as acceptable.

The values and limits for the characteristics should be fixed so as to take into account, on the one hand, the practical possibilities of manufacture and, on the other, limitations of the methods of test.

When it is not possible to express a characteristic numerically, it is usual for a comparison to be made, as regards this characteristic, with a reference sample agreed by buyer and seller.

The standard layout provides for five types of principal characteristics. Not all these types may be applicable in every case; on the other hand, this list is not intended to be limiting, and other types may be provided in certain cases.

5.1 Geometrical characteristics

This clause may be of definite importance in specific cases; for example in the case of monocrystals used in optics.

It may include the particle size analysis of a product. This property should, as far as possible, be specified in accordance with the recommendations laid down by Technical Committee ISO/TC 24, *Sieves, sieving and other sizing methods*. It is necessary, in particular, to state exactly, in addition to the characteristics of the sieves (or the other dimensional classification methods used), the quantities of product passing through and/or retained by these sieves.

5.2 Physical and physico-chemical characteristics

These characteristics, such as density, index of refraction, electrical conductivity, pH value, freezing and boiling points, etc., are often specific for a given product and can generally be determined quickly and accurately.

It is essential to state exactly the units used and to use the symbols and conventions adopted internationally. (It is recalled that Technical Committee ISO/TC 47, *Chemistry*, and many other ISO Technical Committees have adopted 20 °C as the primary reference temperature.)

5.3 Chemical characteristics

It is necessary to mention in what form the *content of the various chemical elements* should be expressed, for example as metal, as oxide, as a given salt. It does not appear possible to give a general rule, and hence each case should be considered separately. If the content of a given element has been expressed in a conventional form, this should be stated.

In general, individual *impurities* should be specified, but if this is not possible for some particular impurities, it may be necessary to specify total impurities, in which case a method of determining total impurities should be given.

It is recommended that the *strength* or *composition* of chemical products should be expressed as percentage by mass.

The *percentage by mass* of an element (whether a constituent or an impurity) in a chemical product is the mass in grammes of this element contained in a reference mass of 100 g of the chemical product, the condition of the latter being specified, for example dry, state of hydration.

The percentage by mass should be given as "per cent" and indicated by the % sign.

The percentage value thus given should be followed by the mention of the condition of the *reference mass* of the product analysed.

In cases where the percentage by mass cannot be used, it is essential to explain clearly the method of expression used.

Generally, the *expression of the strength or composition* of the chemical product is based on the condition of the reference mass of the sample at the moment of beginning the analysis (i.e. the condition of the sample received by the operator carrying out the analysis).

* In this text, the fact has not been overlooked that some users, in placing their orders, often refer simply either to the concentration or to a process of manufacture, making it unnecessary to specify the values of the corresponding characteristics.

There are exceptions to this general principle, because of specific peculiarities of a given product which prevent, or make impracticable, the direct application of this general principle. For instance :

- (a) The water content of a hygroscopic chemical product is, preferably, given with reference to the product as sampled (direct application of the general principle). On the other hand, the chemical composition of this product (apart from constituents which are readily lost under atmospheric conditions only) is given with reference to the product freed from its moisture under specified conditions.
- (b) The content of impurities of a chemical product having a variable predominant chemical characteristic is sometimes given with reference to this characteristic. (Thus, the contents of impurities of different types of sulphuric acid are given with reference to the content of dissolved sulphuric acid, H_2SO_4 .) This method of expression enables the contents of impurities to be related easily to the *active element* or *radical* of the chemical product, which is primarily considered when studying a chemical reaction.

5.4 Organoleptic characteristics

When required, these characteristics should be given but, apart from special cases, are not expressed quantitatively.

5.5 Mechanical characteristics

This clause may be important in some special cases.

5.6 Other characteristics (if necessary)

NOTE. - Among other characteristics which may (if necessary) be introduced are hygienic, toxicological or physiological characteristics.

A subdivision on these characteristics may be introduced into this document, when present studies of this question are completed.

6. SAMPLES AND TEST SPECIMENS

The result of a physical or chemical determination can only characterize a product (or a batch of a product) if it is certain that the sample, on which this determination has been made, is truly representative of the product (or batch).

The operation of sampling must therefore be properly carried out and the standard should lay down the appropriate procedure (this may be a direct reference to a general standard dealing with the matter, if this standard applies to the case in point). The information given in this section should take into consideration the recommendations laid down by Technical Committee ISO/TC 69, *Application of statistical methods*.

The marking of samples and test specimens, or of packages containing them, should be as simple as possible, in order to avoid confusion.

It is recommended that a sampling report, a copy of which should accompany the sample sent to the laboratory, should contain all information about the origin and any other matters that might affect the results.

7. METHODS OF TEST

This section should give all the information necessary for making the tests for determining the characteristics listed in section 5 and for ensuring their reproducibility.

This section may

- contain the whole text of the method of test, or
- refer to a more general standard applicable in this instance, or
- refer to a separate publication, particularly where the description of the test procedure is very long.

Each type of test should include a complete description of the operations involved.

The test procedure and all details as to conditions of conducting the test, particularly the degree of accuracy of the physical quantities involved and the apparatus employed, should be sufficiently clear to enable any trained operator of a laboratory specialized in the field, who has the standard before him, to carry out the test. Apart from special cases expressly stated, the test should be as objective as possible. Wherever points affecting a subjective interpretation exist, they should be mentioned in the test report as being characteristics of the test.

The standard layout provides for five types of test :

- 7.1 Geometrical tests
- 7.2 Physical and physico-chemical tests
- 7.3 Chemical tests
- 7.4 Organoleptic tests
- 7.5 Mechanical tests

8. PACKAGING AND MARKING*

This section is of considerable importance in the case of chemical products, as they are often corrosive or dangerous for other reasons. In this connection, it is necessary to take into account the regulations, both national and international, existing or contemplated. Here, safety rules should be the main consideration.

The nature and dimensions of packages necessary to ensure sound keeping of the product may be laid down.

9. PRECAUTIONS FOR STORAGE, TRANSPORT AND USE*

This section is included to give information serving as a guide for the proper use of the products and their sound keeping, and, in particular, for indicating the precautions to be taken for the preservation of the specified characteristics and the time during which these characteristics can be retained.

10. ANNEX

The annex includes all the items of information which cannot reasonably be introduced into the main body of the standard, but which, even as an indication, it is useful to know.

Example : a reminder of the number assigned to the product in the international or the national customs tariff.

* The information given in this section should be considered merely as guidance showing the desired objective.

II. STANDARD LAYOUT FOR A STANDARD METHOD OF CHEMICAL ANALYSIS

Annexe 2D aux

Directives pour
les travaux techniques
de l'ISO.

⇒ ISO 78/2-1982

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INTRODUCTION

With a view to the simplification, rationalization and standardization of methods, reagents and equipment used in test laboratories, and so that each ISO Recommendation or other international document prepared in this field should be drafted in terms as comprehensible as possible, particularly to readers whose mother tongue is not the language in which the document is written, the following principles should be applied for the layout and wording of methods of chemical analysis:

GENERAL

1. PLAN OF DOCUMENT

In drafting the methods of analysis, the subjects should be dealt with in the order shown in the standard layout given on page 14, omitting however any section or clause which may be unnecessary in the particular case in question, and adding, if required, any further ones in the most appropriate place.

2. NUMBERING OF SECTIONS AND CLAUSES

The sections and clauses from beginning to end of each document, including documents containing several parts each dealing with a different method of test, should be numbered consecutively in accordance with a decimal system, using arabic numbers.

3. UNITS AND SYMBOLS

3.1 The units, signs and symbols laid down in ISO Recommendations* or, failing these, those already well known internationally, should be used whenever possible.

The millilitre (ml) is usually used as the special name for the cubic centimetre (cm³), in accordance with the decision of the XIIth General Conference of Weights and Measures (Paris, October 1964).

The symbols for units of measurement should be used whenever they are preceded by a number expressed in figures; but in other cases, these units should preferably be written out in full (by way of exception, it is more practical to use symbols as column headings in tables of numerical values).

3.2 **% Sign** ("per cent" in English and "pourcent" in French)

The % sign should be used in all cases where this sign is preceded by figures, unless otherwise indicated (for example, for typographical requirements).

4. TERMINOLOGY

4.1 When several synonyms may express the same concept in an official ISO language, preference should be given to that which is closest to the corresponding term in the other ISO language.

Example :

"end point" = "point final".

4.2 When there is no similarity of terms in the different languages to express the same concept and when there are in existence widely known symbols or abbreviations, these should be given in parentheses after the terms used in the different languages in order to assist readers of all languages.

* See in particular ISO Recommendation R 31.

5. CHOICE OF METHODS OF TEST

As far as possible and except where in certain industries this rule would be contrary to justified and well-established practice, which it is desirable to retain, the same test methods for a given characteristic in related chemical products should be adopted in all ISO documents and their wording should be as similar as possible.

6. CHEMICAL NOMENCLATURE

The directives prepared by the International Union of Pure and Applied Chemistry (IUPAC) on the nomenclature of chemical compounds and the way of spelling and printing their names should be applied. It is advisable to put the common name of the reagent in parentheses after the IUPAC name.

Whenever possible, it is recommended to avoid the use of trade names and registered trade names.

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STANDARD LAYOUT

1. TITLE
2. SCOPE
3. FIELD OF APPLICATION
4. DEFINITIONS
5. PRINCIPLE
6. REACTIONS
7. REAGENTS
8. APPARATUS
9. SAMPLING AND SAMPLES
10. PROCEDURE
11. EXPRESSION OF RESULTS
12. SPECIAL CASES
13. NOTES ON PROCEDURE
14. TEST REPORT
15. SCHEMATIC REPRESENTATION OF PROCEDURE
16. BIBLIOGRAPHICAL REFERENCES
17. ANNEXES

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NOTES ON THE APPLICATION OF THE STANDARD LAYOUT FOR A STANDARD METHOD OF CHEMICAL ANALYSIS

1. TITLE

The title of the document should express very concisely and without ambiguity the products to which the method of test applies, the constituent or the characteristic to be determined and the nature of the determination.

Example :

*Hydrochloric acid for industrial use – Determination of iron content –
2,2' -bipyridyl spectrophotometric method*

2. SCOPE

The scope section of the document should describe succinctly the method of test and the products to which it applies.

This section should contain in particular any additional, but useful, information which could not be included in the title.

3. FIELD OF APPLICATION

This section should contain all information to enable the user to judge quickly whether the standard is applicable to the products being considered, or whether limitations exist.

It should contain in particular an indication of the products to which the method of analysis applies and the limits between which the method can be used without alteration.

These limits should take into account the presence of the other constituent elements of the product or products in question and of their own limiting contents.

A clear distinction should be drawn between the individual fields of application of the methods laid down whenever the document includes several methods. In effect, it is sometimes necessary to provide several methods for the determination of a given component, depending, for example, on the composition of the product or on its differing contents of that component, or the accuracy required, each method having its own field of application.

If it is necessary to provide for modifications to the basic method, for instance to ensure the elimination of certain interfering factors, these modifications should be treated as special cases. These special cases should be indicated in the section "Field of application" and the corresponding modifications should be described in the "Special cases" section.

NOTE. – In simple cases, it may be preferable to amalgamate sections 2, "Scope" and 3, "Field of application" into a single section entitled "Scope and field of application".

4. DEFINITIONS

If it is necessary, in order to make the text more readily understandable, to give definitions of certain terms, these definitions should be given in this section.

5. PRINCIPLE

This section should indicate the essential steps of the method used (preferably using substantive phrases), the basic principles and the properties of which use is made and, if appropriate, the reasons justifying the choice of certain procedures.

6. REACTIONS

This section should indicate the essential reactions, when they are considered necessary for the comprehension of the text or the calculations. These reactions should, if possible, be expressed in ionic form.

The reactions are given then only for guidance and do not claim to settle any controversial questions. They justify the calculations made from the data obtained in the determinations and may lead to a better understanding of the method, especially where several successive changes of valency occur in the element being determined.

Any additional information required should be given either in a note to this section or in the section "Notes on procedure".

7. REAGENTS

This section should give the list of all the reagents or other products used during the test, together with their essential characteristics (concentration, density*, etc.) including, where necessary, their degree of purity in relation to their specific use.

If necessary, the precautions to be taken for storing the reagents, and the time for which they may be stored, should also be specified.

When a standard volumetric solution or standard solution, of a special kind, is called for, its preparation and, if necessary, its standardization should be described in this section. In other cases, these particulars are not necessary, but if general methods for the preparation and checking of certain reagents used are the subject of an ISO Recommendation, a reference to the latter should be made.

When the absence of an interfering element in the reagents has to be verified, it is necessary to give the details of the tests to be used for this purpose.

It is desirable to draw up this section in the following systematic order :

- pure products (excluding solutions);
- solutions or suspensions of approximate concentration stated (excluding standard volumetric solutions and standard solutions);
- standard volumetric solutions and standard solutions;
- indicators.

Each reagent is identified by a number, by showing this number in parentheses, in the procedure section after the name of the reagent, it is possible, by referring back to the "Reagents" section, to avoid repeating all the characteristics of the reagent in question and thus to keep the text short.

7.1 List of reagents

The list of reagents should include all the reagents necessary for the test proper, without, however, including products used only in the preparation of these reagents.

7.2 Pure products

In the list of reagents, pure products should be described unambiguously, giving all the particulars necessary for their identification (for example, the chemical formula, concentration, etc.) and, for solid products in particular, the presence of water of crystallization, if any.

7.3 Aqueous solutions

In the list of reagents, solutions for which the solvent is not specified are by convention aqueous solutions; the use of the term "aqueous" in this list, in defining these solutions, is therefore in general superfluous.

* Density (symbol ρ). Quotient of the mass by the volume. (See ISO Recommendation R 31.)

7.4 Solution with defined concentration

The following equivalent terms in the official ISO languages (English, French and Russian) should be used.

Equivalent terms	Definitions	Expression of concentration of solutions
<p>7.4.1 <i>Standard volumetric solution</i></p> <p>Solution titrée</p> <p>Титрованный раствор</p>	<p>Solution the concentration of which is defined accurately</p>	<p>The strength of these solutions should be expressed in terms of normality or molarity, the latter being used only when this is necessary to avoid any ambiguity. The strength is represented by a whole number (N, 2N, M, etc.) or by a decimal number (0.1 N, 0.06 N, 2.5 N, 0.5 M, etc.). In certain cases, the strength of the solution may be given in grammes per litre and the abbreviation g/l should then be used.</p>
<p>7.4.2 <i>Standard reference solution</i></p> <p>Solution étalon de référence</p> <p>Образцовый раствор</p>	<p>Solution used as a reference solution for standardizing other solutions. These are prepared either from a primary standard or standardized by some other means.</p>	<p>The strength of these solutions should be expressed in the same way as that of standard volumetric solution (7.4.1).</p>
<p>7.4.3 <i>Standard solution</i></p> <p>Solution étalon</p> <p>Эталонный раствор</p>	<p>Solution of accurately known concentration of an element, an ion, a compound or a group derived from the product used for its preparation.</p>	<p>The strength of these solutions should generally be expressed in grammes per litre or in sub-multiples of this unit.</p>
<p>7.4.4 <i>Standard matching solution*</i></p> <p>Solution témoin</p> <p>Контрольный раствор</p>	<p>Solution of which the relevant characteristic is exactly known or defined (for example, colour, turbidity, etc.) and is used to assess the test solution in relation to that characteristic. It may be prepared from solutions 7.4.1, 7.4.2, 7.4.3 or other solutions with the required characteristic.</p>	<p>The strength of these solutions should be expressed in accordance with the indications of clauses 7.4.1, 7.4.2, 7.4.3 as applicable.</p>

* This English term is used solely as a generic term for these solutions and each solution should be defined more precisely by the appropriate adjective; for example, "Standard colorimetric solution", "Standard turbidimetric solution", etc.

7.4.5 *Other solutions*

7.4.5.1 Where the concentration of a solution is to be given on a mass by mass or volume by volume basis, it should be expressed as a percentage in the following way :

$$\dots \% (m/m) \quad \text{or} \quad \dots \% (V/V).$$

7.4.5.2 In cases where the concentration is expressed in terms of the dimensionally heterogeneous units of mass and volume, the concentration should be expressed in grammes per litre or, where appropriate, in sub-multiples thereof.

7.4.5.3 In cases where a solution is prepared by dilution of another specified solution, the following conventions should be observed :

- The expression “diluted $V_1 \rightarrow V_2$ ” means that the volume V_1 of the specified solution is diluted in such a way as to give a total volume V_2 of final mixture.
- The expression “diluted $V_1 + V_2$ ” means that the volume V_1 of the specified solution is added to the volume V_2 of the solvent.

NOTE. – Expressions such as “ $V_1 : V_2$ ” or “ V_1/V_2 ” which have different meanings in different countries should not be used.

In the same way, traditional or conventional denominations of the solutions or reagents other than those given above should not be used (for example, “hydrogen peroxide, 12 volumes”).

8. APPARATUS

This section should give the characteristics of the apparatus used during the test, apart from ordinary laboratory apparatus. Where appropriate, reference should be made to apparatus standardized by Technical Committee ISO/TC 48, *Laboratory glassware and related apparatus*, or described by other ISO Technical Committees.

It is advisable to illustrate special types of apparatus and their assembly by means of a diagram drawn in accordance with the relevant recommendations of Technical Committee ISO/TC 10, *Drawings (general principles)*, insofar as these are applicable.

Any checking of the functioning of the assembled apparatus should be described in the section “Procedure” in a clause headed “Check test” (see clause 10.4).

The special requirements of any apparatus that is not in common use should be given in this section, especially if they play a significant part in the procedure or if they might constitute a factor in the safety, reproducibility and accuracy of the method.

9. SAMPLING AND SAMPLES

9.1 **Definitions**

The following equivalent terms in the official ISO languages (English, French and Russian) should be used.

<p><i>Laboratory sample</i></p> <p>Echantillon pour laboratoire</p> <p>Лабораторный образец</p>	<p>Sample as prepared for sending to the laboratory</p>
<p><i>Test sample</i></p> <p>Echantillon pour essai</p> <p>Образец для испытаний</p>	<p>Sample in the state of preparation in which it is subjected to the test</p>
<p><i>Test portion</i></p> <p>Prise d'essai</p> <p>Проба для анализа</p>	<p>The quantity of product actually drawn from the test sample (or, if both are the same, from the laboratory sample) and on which the test is actually carried out</p>

9.2 Sampling

In principle, sampling for the preparation of the laboratory sample is independent of the chemical analysis as such, and it is generally sufficient to refer to the relevant standard dealing specifically with this question, or to the corresponding section of the product standard. Where no texts exist, this clause may include a sampling plan and sampling procedure taking into account the recommendations on terminology and statistical treatment in this field laid down by Technical Committee ISO/TC 69, *Application of statistical methods*.

If necessary, this clause should also give any useful information on the mass or volume of the laboratory sample, the characteristics of the containers for its storage (type, capacity, air-tightness, etc.) and storage conditions to be used.

9.3 Preparation of the test sample

This clause should give all the necessary information for the preparation of the sample from which the test portions will be drawn. This sample is prepared from the "laboratory sample" specified in clause 9.2

In each case, all the steps in the preparation should be stated (for example, grinding, drying, etc.) together with appropriate information on the characteristics of the sample thus prepared (particle size distribution, approximate mass or volume, etc.) and, if necessary, those of any containers to be used for storage (type, capacity, air-tightness) and the storage conditions themselves.

10. PROCEDURE

This section may be divided into as many clauses as there are separate operations or sequences of operations to be carried out.

Each of these operations should be described accurately, in the chronological order of their execution, using the infinitive form in French and the imperative form in English.

If the number of steps in the procedure is large, it is recommended that the clauses covering each should be sub-divided into further clauses each corresponding to a given analytical operation, including all indispensable preliminary operations.

If the method to be described is already given in another document, the phrase "use the method described in document ..." or "use one of the methods described in document ..." should be used, if necessary, with an indication of any modification.

The section "Procedure" should include the following clauses, unless there are special reasons against this :

10.1 Safety precautions

If there are risks, for example of explosion, fire or toxicity, for which special precautions are necessary, a cautionary statement should be included in this clause in capitals or in italics.

When necessary, more detailed advice on safety procedures and first-aid measures can be left to an annex.

10.2 Test portion

This clause should give all the information necessary for the drawing of the test portion from the test sample (or from the laboratory sample, if both are the same) prepared as indicated above in clause 9.3. Where appropriate, it should state the method of weighing or measuring this test portion (for example, using a weighing pipette). It should state the mass or volume of the test portion, the precision with which this has to be measured and, if necessary, any other relevant characteristics.