



GUIDE 31

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Contents of certificates of reference materials

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been set up 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 guides are intended essentially for internal use in ISO committees or in some cases for the guidance of member bodies when dealing with matters which would not normally be the subject of an International Standard.

ISO Guide 31 was drawn up by the Committee on reference materials (REMCO) and was submitted directly to ISO Council who accepted it in August 1981.



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Contents of certificates of reference materials

0 Introduction

This document is an outcome of the collaboration of ISO Committee on reference materials (REMCO) with the following international organizations : EEC, IAEA, OIML, IUPAC and WHO. The first draft was prepared by Mr. T. W. Steele of the "National Institute for Metallurgy (SABS)".

Although the amount of information that is given on certificates of reference materials varies considerably, this variation is only partly accounted for by the varying nature of the material. Thus, certificates of even basically the same type of material issued by different producers vary from a bare statement of the value of the certified property to a lengthy document containing very detailed information, some of it not always relevant to the reference sample. Some producers do not issue certificates at all but expect the user to search for the information in publications which may not be readily available.

This diversity in the character of certificates has come about because the essential function of a certificate has not always been appreciated. The true nature of a certificate can best be appreciated if the certificate is compared with two other sources of information on a reference material. These are the label and the report : the former is normally affixed to the sample container, and the latter accompanies the certificate or can be obtained on request.

Usually, because the size of the label is determined by the size of the container to which it is to be affixed, the label can contain only the briefest of information about the reference material and, normally, simply identifies the reference material. The report on the reference material usually contains all the relevant information including the details of the certification procedure. However, because it is so detailed, there is clearly a need for a second document that would condense all the information about the sample. This document is the certificate which can be described as the synopsis of the report. A certificate that is expanded in an attempt to make it serve also as a report defeats its purpose, and is no longer the concise and readily referenced document that it should be.

Traditionally, the certificate has consisted of one or two pages as though the need for a brief synoptic document has always been intuitively felt to be appropriate. Apart from the desire for brevity, there was little need for a detailed certificate because the certified information was taken on trust. Except until comparatively recently, certified reference materials were produced by only a few specialist organizations whose reputations were such that their names were a sufficient guarantee of the integrity of the reference material. With the increase in the number of producers this assumption is no longer acceptable because no matter how high the reputation of the producers in their scientific and technological fields, it does not follow that this reputation is necessarily transferable to the fledgling reference material. Parallel with the increase in the number of new producers there has been a demand for a reference material of higher quality, a consequence both of the increased precision of measuring equipment and the need for more accurate data in the scientific and technological disciplines. In illustration of this trend, producers freely admit that their old reference materials may not meet the more stringent requirements of today. Whereas formerly it did not seem to be of much importance to know the bounds of uncertainty of a certified value other than in some intuitive fashion, users are now becoming increasingly more critical of certificates that do not give this information. The user needs not only this information but also the details of the whole certification procedure. In other words, not only must the certified value be accurate but it must now be seen to be accurate. In recognition of this need, the latest certificates of producers of long-established reputation are becoming more detailed and sometimes take on the character of a report. On the other hand, as has been mentioned, many of the younger producers issue detailed reports without certificates. The certificate is thus in danger of losing its useful synoptic character, or in some areas of becoming extinct. This eclipse of the certificate *per se* is unfortunate, and appears to arise from the fact that the distinction between a certificate and a report on the reference material has not been clearly recognized.

In summary, a certificate should communicate information about a reference material from the producer to the user; in essence, this information is a statement of the certified property values, their meaning, and their confidence limits.¹⁾ The remainder of the information is peripheral to this central statement and has two purposes : to describe the general nature and use of the material, and to assure the user of its integrity. In a well-prepared certificate, the information should be presented in a form that enables the user to draw his own conclusions about the integrity of the certified material.

This Guide is intended to help producers to prepare clear and concise certificates, which, while maintaining the essential character of a certificate, should help to provide, in summary form, all the information needed by the user of the reference material.

1) The term "uncertainty" in place of "confidence limits" is sometimes preferred (see ISO Guide 30).

1 Scope and field of application

A series of headings is given in clause 2 to indicate the information that should be provided on a certificate. An explanation is given under each heading, together with examples where more clarification seemed to be necessary. In the compilation of these headings, the aim was to cover the required information on as wide a range of reference materials as possible, taking into account such diverse examples as a triple-point cell, a microscope magnification standard, a powdered rock, and a biological material. Some of the headings may not be needed for a particular material but these are likely to be the exception rather than the rule. The headings are given in what seems to be a logical order for the presentation of the information, which in summary is as follows : the general particulars of the certifying organization and the reference material [name, sample, number, date of certificate, etc. (see 2.1 to 2.10)]; a description of the material and its intended use (see 2.11 to 2.16); the certified values, their confidence limits, and an explanation of these values and the techniques used for their measurement (see 2.17 to 2.21); the references and the names of participating analysts and certifying officers (see 2.22 to 2.25).

It should be emphasized that this Guide is concerned with the informational contents of the certificate and not its style or format. Thus, the order of headings and the wording of the headings may be changed to suit the reference material or the preferences of the producer.

2 Certificate headings

2.1 Name and address of the certifying organization

This name (usually given in prominent type at the head of the certificate) should be that of the body or organization that accepts responsibility for the information on the certificate. Cooperating laboratories or an organization that may only have prepared the sample are preferably given elsewhere (see 2.21).

2.2 Title of the document

There should be a distinct title. Common titles are

Certified reference material certificate of analysis

Certificate of a reference material

2.3 Status of the certificate

Some certificates are of a provisional nature, and this qualification when appropriate, should be clearly stated.

2.4 Name of material

As far as possible, the name should distinguish the type of reference material. Thus, "triple-point cell, diphenyl ether" is preferable to just "triple-point cell". The name of the rock or ore followed by its locality or a compositional characteristic gives more individuality to geological materials; for example, "Syenite (Phalaborwa)" or "Nepheline syenite". For metallurgical samples, it is appropriate to give the concentration of an important element, for example "Carbon steel 0,14 %".

2.5 Sample number (and batch number)

Each reference material should be numbered, the number preferably being accompanied by the initials of the certifying organization, for example "BCS No. 260". The practice adopted by the National Bureau of Standards of following the number with a letter (a to z) to identify a renewal of the original material is recommendable.

2.6 Date of certification

In addition to the original date of certification, the dates of all revisions should be given.

2.7 Availability of other forms or sizes of the reference material

This information need be given only in relation to the material named on the certificate. Thus, there can be one or more packaged units supplied or, as frequently happens with metallurgical samples, a metal or alloy may be available in the form of chips and rods.