

In vitro diagnostic medical devices — Measurement of quantities in biological samples — Metrological traceability of values for catalytic concentration of enzymes assigned to calibrators and control materials

The European Standard EN ISO 18153:2003 has the status of a
British Standard

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National foreword

This British Standard is the official English language version of EN ISO 18153:2003. It is identical with ISO 18153:2003.

The UK participation in its preparation was entrusted to Technical Committee CH/212, In vitro diagnostics, which has the responsibility to:

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- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

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Summary of pages

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English version

**In vitro diagnostic medical devices - Measurement of quantities
in biological samples - Metrological traceability of values for
catalytic concentration of enzymes assigned to calibrators and
control materials (ISO 18153:2003)**

Dispositifs médicaux de diagnostic in vitro - Mesurage des
grandeurs dans des échantillons d'origine biologique -
Traçabilité métrologique des valeurs de concentration
catalytique des enzymes attribuées aux agents
d'étalonnage et aux matériaux de contrôle (ISO
18153:2003)

In-vitro-Diagnostika - Messung von Größen in Proben
biologischen Ursprungs - Metrologische Rückführbarkeit
von Werten der katalytischen Konzentration von Enzymen,
die Kalibratoren und Kontrollmaterialien zugeordnet sind
(ISO 18153: 2003)

This European Standard was approved by CEN on 11 March 2003.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Management Centre has the same status as the official versions.

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Management Centre: rue de Stassart, 36 B-1050 Brussels

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Foreword

This document (EN ISO 18153:2003) has been prepared by Technical Committee CEN/TC 140 "In vitro diagnostic medical devices", the secretariat of which is held by DIN, in collaboration with Technical Committee ISO/TC 212 "Clinical laboratory testing and in vitro diagnostic test systems".

This European Standard EN ISO 18153:2003 including the Amendment shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by February 2004, and conflicting national standards shall be withdrawn at the latest by February 2004.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative annex ZA, which is an integral part of this document.

The International Federation of Clinical Chemistry and Laboratory Medicine (IFCC), the European Confederation of Laboratory Medicine (ECLM), and the European Diagnostic Manufacturers Association (EDMA) have contributed to its preparation.

This standard includes a Bibliography.

Annexes A and B are informative.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

The Directive 98/79/EC on in vitro diagnostic medical devices requires that the metrologically traceability of values assigned to calibrators and control materials be assured through available reference measurement materials and reference measurement procedures of higher order. Following this concept, the European Standard prEN ISO 17511 on "traceability" has been elaborated which describes a hierarchical order of measurement procedures and calibration materials. The general rules expressed in that standard also apply to quantities involving catalytic activity. Whenever possible, metrological traceability should be demonstrated to the SI unit which forms the top of the calibration hierarchy.

For the measurement of the catalytic activity concentration of enzymes (hereafter called 'catalytic concentration'), a hierarchy of calibrators and measurement procedures is described in the present standard. For enzyme measurements, the definition of the derived coherent SI unit "mole per second cubic metre", given the special name "katal per cubic metre" by the General Conference on Weights and Measures, is the top of the hierarchy followed by a primary reference measurement procedure to which lower level measurement procedures, calibrators, and control materials should be traced whenever possible.

Enzymes in blood or other biological fluids can be measured for diagnostic purposes in terms of their catalytic concentrations. The analytical principle of the measurement of the catalytic rate of conversion of substrate has considerable advantages of speed, low limit of detection, analytical specificity, and low cost. Results of catalytic concentration measurements are only comparable if the enzyme activities are measured under the same conditions. Therefore, an enzyme measurand cannot be described only by kind-of-quantity (e.g. catalytic concentration), name of enzyme and of system, but requires also the specified measurement procedure and especially the indicator component of the measured reaction. At the top of the calibration hierarchy, the measurement procedure should be internationally agreed, e.g. 'creatine kinase measured by the conversion rate of NADH in the IFCC reference measurement procedure'.

Thus, the primary reference measurement procedure is an integral part of the definition of the measurand and has to be followed in all detail, e.g. as concerns:

- kind of substrate (where the specificity of the enzyme allows this to be varied) and its concentration,
- activators and their concentrations,
- direction of catalysed reaction,
- indicator component,
- buffer system and pH,
- temperature,
- pre-incubation time,
- material used for starting the reaction,
- lag time,
- reaction time.