BIPM/IFCC Workshop on
Global Traceability in Laboratory Medicine
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Metrological traceability for in-vitro diagnostic medical devices - Definitions and ISO/CEN standards

R. Dybkaer
Department of Standardization in Laboratory Medicine
Copenhagen Hospital Corporation
H:S Frederiksberg Hospital
Nordre Fasanvej 57
DK-2000 Frederiksberg, Denmark

Background
EU Directive 98/79/EC
CEN and ISO Technical Committees
Five EN ISO standards
Terminology

traceability

<metrology> property of the result of a measurement or the value of a measurement standard whereby it can be related to stated references, usually national or international measurement standards, through an unbroken chain of comparisons all having stated uncertainties

[≈ VIM:1993, 6.10]

EU Directive 98/79/EC on IVD MDs Annex I, Essential requirements A.3

'The traceability of values assigned to calibrators and/or control materials must be assured through available reference measurement procedures and/or available reference materials of a higher order.'

CEN and ISO work related to metrological traceability of IVD MDs

Presentation of **reference measurement procedures** (EN 12286:1998 + 12286/A1:2000; ISO/FDIS 15193)

Description of **reference materials** (EN 12287:1999, ISO/FDIS 15194)

Metrological **traceability** of values assigned to calibrators and control materials (prEN ISO/FDIS 17511)

Metrological **traceability** of values for catalytic concentration of **enzymes** assigned to calibrators and control materials (prEN ISO/FDIS 18153)

Laboratory medicine - Requirements for **reference measurement laboratories** (prEN ISO/FDIS 15195)

[R.D. 2002-06-09]

Rigg JC, Brown SS, Dybkær R & Olesen H

Compendium of Terminology and Nomenclature of Properties in Clinical Laboratory Sciences (Recommendations 1995)

International Union of Pure and Applied Chemistry
Clinical Chemistry Division
Commission on Quantities and Units in Clinical Chemistry
International Federation of Clinical Chemistry
Scientific Divison
Committee on Quantities and Units

Oxford: Blackwell Science 1995:xi + 290 pp.

IFCC/IUPAC PROPERTIES AND UNITS IN THE CLINICAL LABORATORY SCIENCES

Blood—
Osmotic pressure reaction;
arbitrary concentration(Free Haemoglobin/all Haemoglobin = 0,5; 37 °C; pH = 7,40; 24 hours; procedure)
Other term(s): Osmotic resistance
NPU02967
B—Osmotic pressure reaction; arb.c.(Free Hb/all Hb = 0,5; 37 °C; pH = 7,40; 24 h; proc.) = ?

Plasma—
Osteocalcin;
substance concentration
nanomole/liter
M = 5 845 g/mol
Other term(s): Bone-GLA-protein
NPU02968
P—Osteocalcin; subst.c. = ? nmol/l

Plasma—
Osteonectin;
substance concentration
mole/liter
NPU02969
P—Osteonectin; subst.c.= ? prefix ? mol/l

Urine—
Oxoglutarate;
substance concentration
micromole/liter
NPU02986
U—Oxoglutarate; subst.c. = ? µmol/l

Urine—
2-
Oxo-isocaproate;
substance concentration
mole/liter
M = 130,14 g/mol
NPU02977
U—2-Oxo-isocaproate; subst.c.= ? prefix ? mol/l

Urine—
17-
Oxosteroid;
substance concentration(list; procedure)
NPU09096
U—17-Oxosteroid; subst.c.(list; proc.)
NPU09097 U—Androsterone; subst.c. = ? nmol/l
NPU02013 U—Etiocholanolone; subst.c. = ? µmol/l
NPU01855 U—Prasterone; subst.c. = ? nmol/l

(R.D. 2001-04-06)

Guide to the Expression of Uncertainty in Measurement

Corrected and reprinted edition
Geneva: ISO 1995:viii + 101 pp.

Published in the names of

BIPM	**:**	**International Bureau of Weights and Measures**
IEC	**:**	**International Electrotechnical Commission**
IFCC	**:**	**International Federation of Clinical Chemistry**
ISO	**:**	**International Organization for Standardization**
IUPAC	**:**	**International Union of Pure and Applied Chemistry**
IUPAP	**:**	**International Union of Pure and Applied Physics**
OIML	**:**	**International Organization of Legal Metrology**

(R.D. 2002-06-09)

EN 12286:1998 + 12286/A1:2000; ISO 15193
In vitro diagnostic medical devices –
Measurement of quantities in samples of biological origin –
Presentation of reference measurement procedures

Title page, Contents list, Foreword, Warning and safety precautions
Introduction, Title, Scope, Normative references
Definitions, Symbols and abbreviations
Principle and method of measurement, Terminology
Check list, Reagents, Apparatus, Sampling and sample
Preparation of measuring system and analytical portion
Operation of measuring system, Data processing
Analytical reliability, Special cases
Validation by inter-laboratory studies
Reporting, Quality assurance

(R.D. 2002-06-09)

EN 12287:1999; ISO 15194
In vitro diagnostic medical devices -
Measurement of quantities in samples of biological origin -
Description of reference materials

Classification and naming, Description
Title page, Contents list, Foreword,
Warning and safety precautions, Introduction
Title of report, Scope
Definitions, Symbols and abbreviations, Terminology
Justification for choice of reference material
General characteristics, Specific characteristics
Validation
Intended function, Instructions for use
Label, Certificate, Package insert

(R.D 2002-06-09)

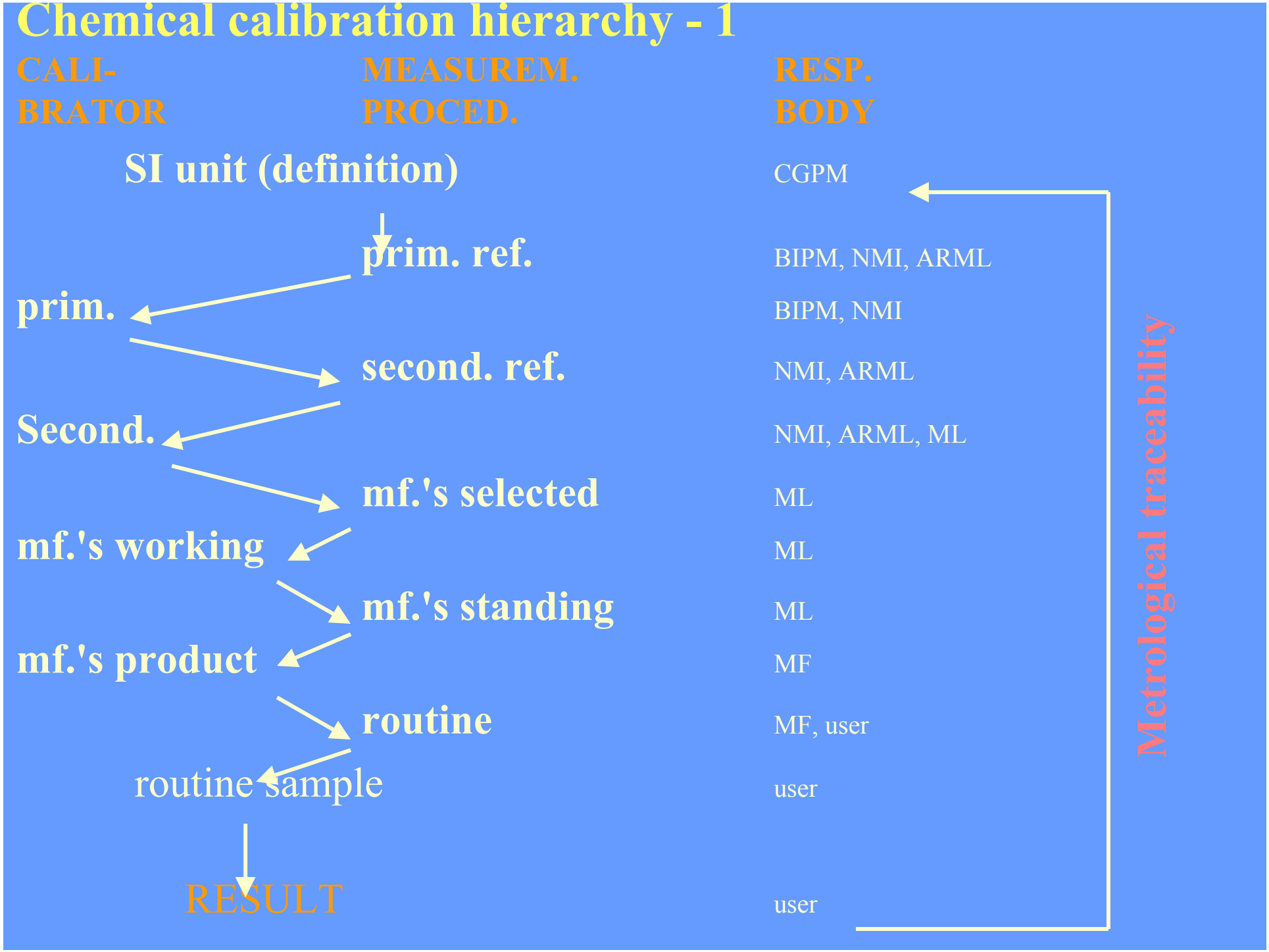
prEN ISO/FDIS 15195
Laboratory Medicine –
Requirements for reference measurement laboratories

Management system requirements
Organisation and management, Quality management system
Personnel, Measurement documentation and records, Contracting

Technical requirements
Premises and environmental conditions
Handling of samples, Equipment, Reference materials
Reference measurement procedures, Metrological traceability
Uncertainty of measurement, Quality assurance
Reporting results, Minimum requirements for reporting
Optional elements
Cross-references to ISO/IEC 17025

(R.D. 2002-06-09)

Chemical calibration hierarchy - 1



primary direct reference measurement procedure

primary reference measurement procedure
that measures the value
of an unknown quantity
without reference to a standard
of the same quantity

[≈ CCQM:1998]

primary ratio
reference measurement procedure

primary reference measurement procedure
that measures the value of a ratio
of an unknown quantity to a standard
of the same quantity;
its operation must be completely
described by a measurement equation

[≈ CCQM:1998]

[R.D. 2000-08-11]

primary reference material

reference material having the
highest metrological qualities and
whose value of the appropriate quantity is
determined by means of a
primary reference measurement procedure

[≈ CCQM: 1995]

analytical specificity of a measurement procedure

ability of a measurement procedure
to measure a measurand
with defined component
independently of other components
in a system

(R.D. 2002-06-09)

analytical selectivity of a measurement procedure

ability of a measurement procedure
to measure simultaneously
several measurands,
each with defined component,
independently of each other
and of further components
in a system

(R.D. 2002-06-09)

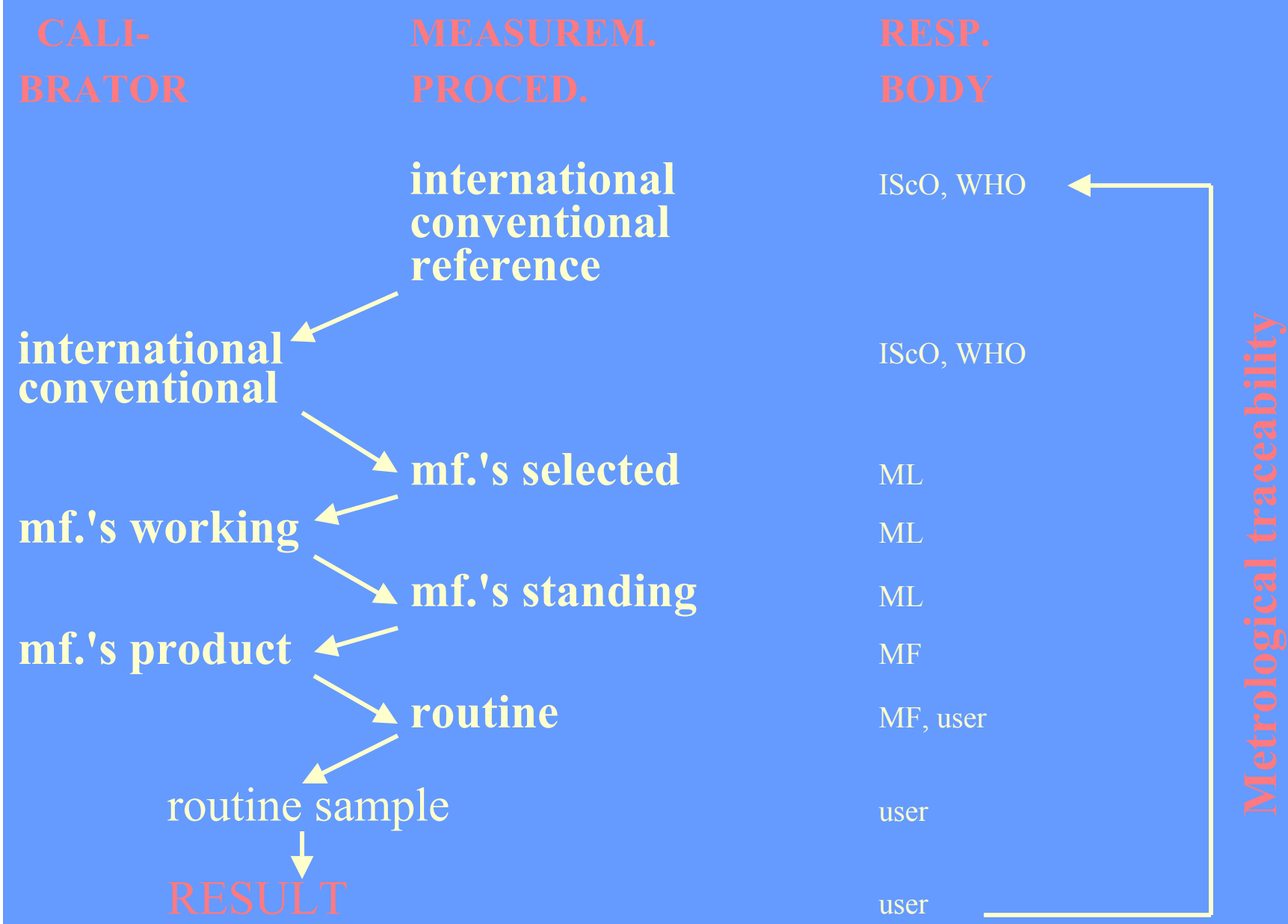
commutability of a material

closeness of the agreement between
the mathematical relationship of
the measurement results obtained by
two measurement procedures
for a stated quantity in a given material, and
the mathematical relationship obtained for
the quantity in human samples

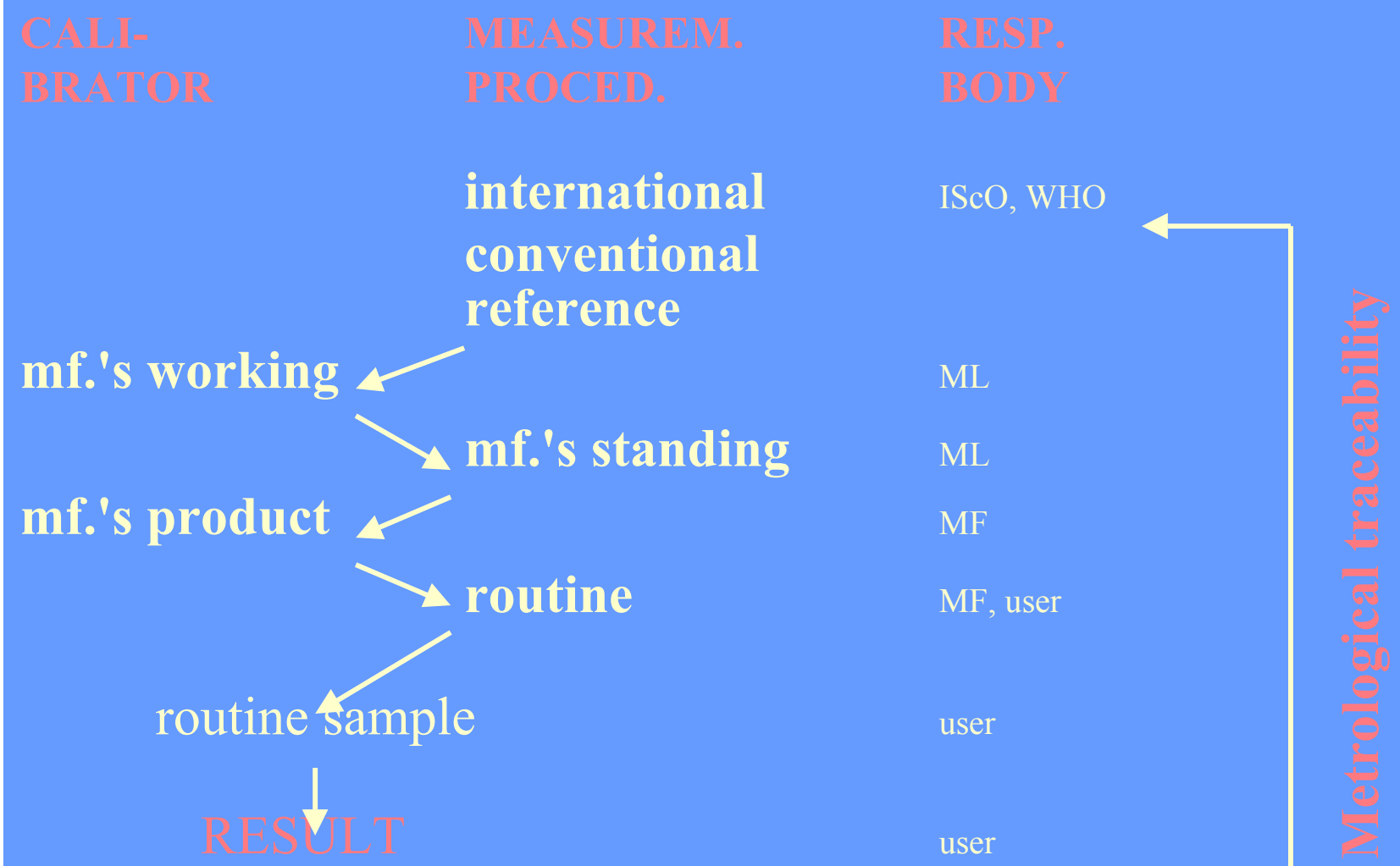
[prEN ISO/FDIS 17511-3.9 & 18153-3.4]

(R.D. 2002-06-09)

Chemical calibration hierarchy - 2



Chemical calibration hierarchy - 3



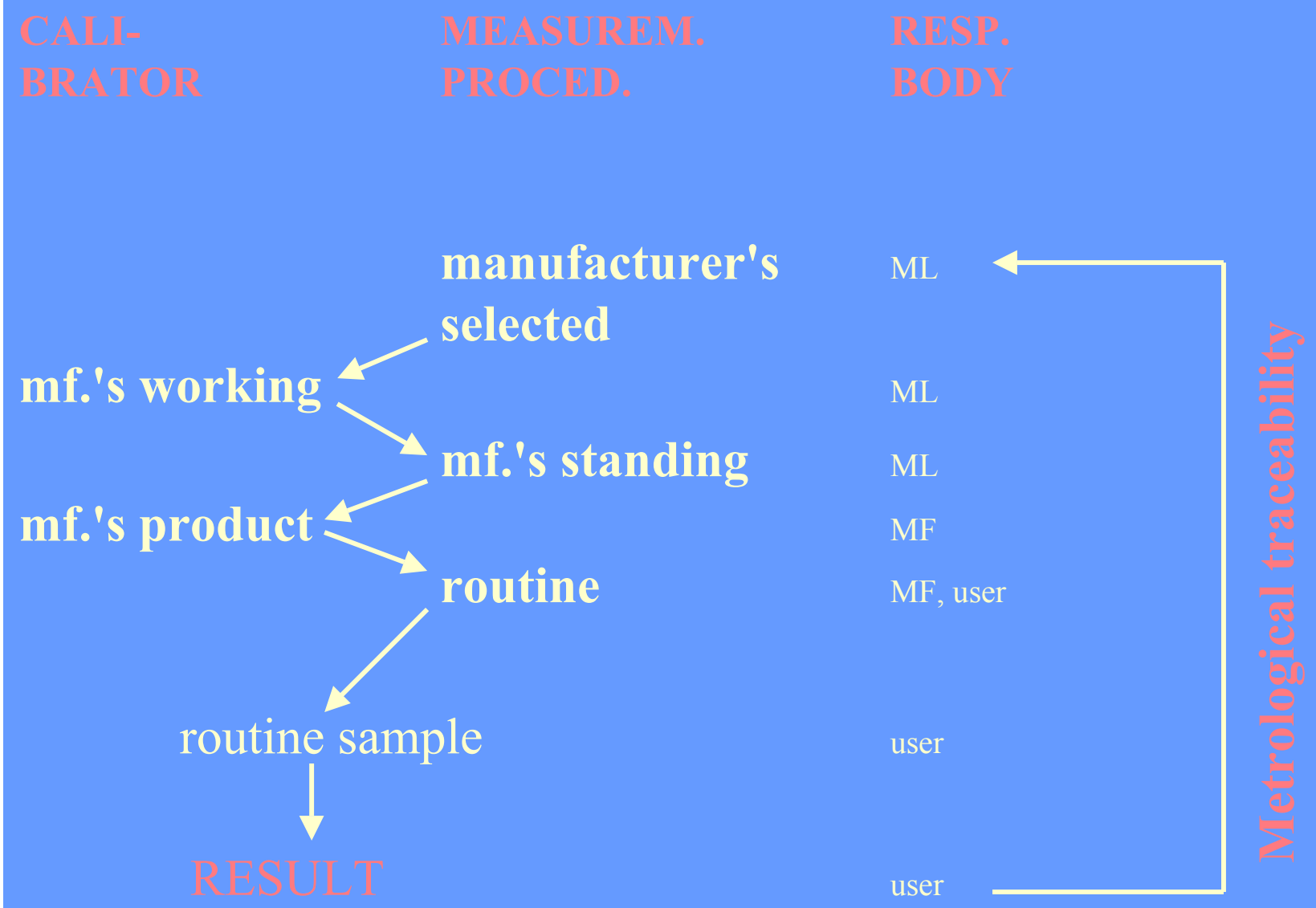
Chemical calibration hierarchy - 4

International biological standard IS

preparation of a substance of biological or synthetic origin by means of which the World Health Organization generally defines an international unit after an international study has been completed

[WHO 1990]

Chemical calibration hierarchy - 5



PROTOCOL FOR USE OF TERMS AND DEFINITIONS ISO/TC 212