

# ISO 17511:2020-04 (E)

## In vitro diagnostic medical devices - Requirements for establishing metrological traceability of values assigned to calibrators, trueness control materials and human samples

---

Contents	Page
Foreword.....	vi
Introduction.....	viii
<b>1 Scope.....</b>	<b>1</b>
<b>2 Normative references.....</b>	<b>2</b>
<b>3 Terms and definitions, symbols and abbreviated terms.....</b>	<b>2</b>
<b>4 General requirements to be fulfilled by a manufacturer for establishing, validating and documenting metrological traceability of human sample values determined with a specified IVD MD.....</b>	<b>19</b>
4.1 Requirements for documenting metrological traceability of measured quantity values.....	19
4.2 Definition of the measurand.....	19
4.3 Specifications for maximum allowable expanded measurement uncertainty, $U_{max}(y)$ .....	20
4.3.1 General requirements.....	20
4.3.2 Scope of the specification.....	20
4.4 Defining the calibration hierarchy.....	20
4.4.1 General requirements.....	20
4.4.2 Measured quantity.....	21
4.4.3 Highest level of metrological traceability.....	21
4.4.4 Traceability to SI.....	21
4.4.5 Non-SI traceable IVD MDs.....	21
4.4.6 Number of levels in the specified hierarchy.....	21
4.5 Selection and requirements for RMs and calibrators.....	21
4.5.1 General requirements.....	21
4.5.2 Characteristics to be documented.....	21
4.5.3 Higher order RMs that conform with ISO 15194.....	22
4.5.4 RMs not conforming to ISO 15194.....	22
4.5.5 Commutability of RMs.....	22
4.5.6 Exception to commutability assessment requirements.....	23
4.5.7 Application of a non-commutable CRM.....	23
4.5.8 Alternative RMs.....	23
4.5.9 Augmentation of alternative RMs.....	23
4.5.10 Non-commutable end-user IVD MD calibrators.....	24
4.6 Selection and requirements for MPs.....	24
4.6.1 Rationale for selection of MPs and documentation responsibility.....	24
4.6.2 Metrological status of MPs.....	24
4.6.3 Reference measurement laboratories.....	24
4.6.4 Impact of influence quantities.....	25
4.6.5 Changes in the measured quantity within a calibration hierarchy.....	25
4.7 Estimating uncertainty of assigned values for end-user IVD MD calibrators.....	25
4.7.1 General requirements.....	25
4.7.2 Documentation for method of estimating $u_{cal}$ .....	26
4.7.3 Statistical considerations and scope of $u_{cal}$ estimates.....	26
4.7.4 Expression of $u_{cal}$ .....	26
4.7.5 Product modifications.....	27
4.7.6 Information to be provided to the end-user.....	28
4.8 Validation of metrological traceability of values assigned to an IVD MD calibrator.....	28
4.8.1 General validation requirements.....	28
4.8.2 Validation strategies.....	28

4.8.3	Test design considerations and acceptance criteria .....	29
4.8.4	Calibration hierarchies with an available RMP .....	29
4.8.5	Calibration hierarchies with no available RMP .....	29
4.8.6	Calibration hierarchies with no RMPs and no CRMs .....	29
4.8.7	Validation of design changes to an end-user IVD MD calibrator .....	30
4.9	Additional calibration hierarchy documentation responsibilities .....	30
4.9.1	Obligation to end-users .....	30
4.9.2	Maintaining documentation .....	30
4.9.3	Third party manufacturers of IVD MD calibrators .....	30
4.9.4	Modifications introduced by independent entities .....	30
4.9.5	Calibration hierarchies supporting IVD MDs developed by a single entity for its own use .....	31
4.9.6	RMs other than end-user IVD MD calibrators .....	31
4.9.7	EQA and PT materials with claims of metrologically traceable target values .....	31
<b>5</b>	<b>Model calibration hierarchies for metrological traceability .....</b>	<b>31</b>
5.1	Elements of the description of a calibration hierarchy .....	31
5.2	Cases with RMPs and primary RMs .....	32
5.2.1	General considerations .....	32
5.2.2	Definition of the measurand .....	33
5.2.3	Selecting RMPs .....	34
5.2.4	Primary RMPs .....	34
5.2.5	Primary calibrators .....	35
5.2.6	Assigning a value to a secondary RM or calibrator .....	35
5.2.7	Commutability of secondary RMs .....	35
5.2.8	Manufacturer's Selected MP .....	35
5.2.9	Working calibrators .....	35
5.2.10	Manufacturer's standing MP .....	36
5.2.11	Manufacturer's end-user calibrator .....	36
5.2.12	$u_{cal}$ of the assigned value of the end-user calibrator .....	36
5.2.13	End-user IVD MD .....	36
5.3	Cases with a primary RMP that defines the measurand .....	36
5.3.1	General Considerations .....	36
5.3.2	Definition of the measurand .....	38
5.3.3	Higher order RMP that defines the measurand .....	38
5.3.4	The primary RMP and definition of the measurand .....	38
5.3.5	Documentation of the primary RMP .....	38
5.3.6	Assignment of values to secondary RMs .....	39
5.3.7	Manufacturer's selected MP .....	39
5.3.8	Manufacturer's working calibrator .....	39
5.3.9	Manufacturer's standing MP .....	40
5.3.10	Manufacturer's end-user calibrator .....	40
5.3.11	End-user IVD MD .....	40
5.4	Cases for measurands defined by a RMP calibrated with a particular primary calibrator .....	40
5.4.1	General considerations .....	40
5.4.2	Definition of the measurand .....	41
5.4.3	Value assignment of the primary RM .....	42
5.4.4	Value assignment of the primary calibrator .....	42
5.4.5	Selection and intended use of the RMP in the calibration hierarchy .....	42
5.4.6	Manufacturer's selected MP .....	42
5.4.7	Manufacturer's working calibrator .....	42
5.4.8	Manufacturer's standing MP .....	43
5.4.9	End-user IVD MD calibrator .....	43
5.4.10	End-user IVD MD .....	43
5.5	Cases with an international conventional calibrator that defines the measurand .....	43
5.5.1	General considerations .....	43
5.5.2	The international conventional calibrator — Material description .....	45
5.5.3	Value assignment of an international conventional calibrator .....	45
5.5.4	Commutability of an international conventional calibrator .....	45
5.5.5	Calibration and selection of the manufacturer's selected MP .....	46
5.5.6	Characteristics and value assignment of the manufacturer's working calibrator .....	46
5.5.7	Manufacturer's standing MP .....	46
5.5.8	End-user IVD MD calibrator .....	46
5.5.9	End-user IVD MD .....	46

5.6	Cases with metrological traceability supported by an international harmonisation protocol.....	46
5.6.1	General Considerations.....	46
5.6.2	International harmonisation protocol.....	47
5.6.3	Assignment of values to harmonisation RMs.....	48
5.6.4	Application of harmonisation RMs.....	48
5.6.5	End-user IVD MD.....	48
5.7	Cases for measurands with metrological traceability only to manufacturer's internal arbitrarily defined RM(s).....	48
5.7.1	General considerations.....	48
5.7.2	Selection of RMs.....	49
5.7.3	Manufacturer's Selected MP.....	50
5.7.4	Manufacturer's Standing MP.....	50
5.7.5	End-user IVD MD calibrators.....	50
5.7.6	End-user IVD MD.....	50
5.7.7	Documentation of the calibration hierarchy.....	50
<b>6</b>	<b>Labelling information to be provided to end-users by the manufacturer.....</b>	<b>51</b>
	<b>Bibliography.....</b>	<b>52</b>