



# **Specific Accreditation Guidance**

## **Calibration reference equipment table**

**June 2019**

**© Copyright National Association of Testing Authorities, Australia 2013**

This publication is protected by copyright under the Commonwealth of Australia Copyright Act 1968.

NATA's accredited facilities or facilities seeking accreditation may use or copy this publication or print or email this publication internally for accreditation purposes.

Individuals may store a copy of this publication for private non-commercial use or copy a reasonable portion of this publication in accordance with the fair dealing provisions in Part III Division 3 of the Copyright Act 1968.

You must include this copyright notice in its complete form if you make a copy of this publication.

Apart from these permitted uses, you must not modify, copy, reproduce, republish, frame, upload to a third party, store in a retrieval system, post, transmit or distribute this content in any way or any form or by any means without express written authority from NATA.

## Calibration reference equipment table

### Purpose

This document provides guidance for establishing calibration and checking intervals for reference equipment. The information presented should be read in conjunction with the guidance found in the informative annex of the *General Accreditation Criteria: Equipment assurance, in-house calibration and equipment verification*.

Facilities should also refer to the *General Accreditation Criteria: Metrological Traceability Policy*.

Item of equipment	Calibration interval (years)	Checking interval (months)	General comments and example reference standards
<b>Accelerometer</b>			
Reference	5		
		24	Intercomparison
<b>Acoustic attenuator</b>			
	5		
		12	Check 2 ratios
<b>Acoustic calibrator - including pistonphone and sound source</b>			
	1		AS/IEC 60942
		6	Intercompare
<b>Alignment telescope</b>			
	6		
<b>Analogue band pass filter - sound &amp; vibration</b>			
Octave and fractional	2		AS/NZS 4476, IEC 1260, IEC 61260
<b>Anemometer</b>			
	1		Anemometers with rotating parts should be checked regularly for wear, damage and free bearing operation.
<b>Angle gauge</b>			
Reference	4 then 8 subsequent		

Item of equipment	Calibration interval (years)	Checking interval (months)	General comments and example reference standards
Working	2 then 4 subsequent		
<b>Attenuator</b>			
	3		Frequency Response
		12	Check two ratios. Resistance and return loss.
<b>Autocollimator</b>			
	6		EURAMET cg-22
<b>Balance</b>			
	3		NMI Monograph 4
		12	Service. Where the facility can demonstrate that the balance is used in a suitable environment (e.g. dust free, chemical free) and results of user checks consistently demonstrate good performance and ability, the service may be waived.
		6	Repeatability check. <i>General Accreditation Criteria: User checks and maintenance of laboratory balances</i>
		1	One point check <i>General Accreditation Criteria: User checks and maintenance of laboratory balances</i>
		Each weighing	Zero point check
<b>Barometer</b>			
Fortin	Initial		
		60	One point check with transfer instrument. <i>General Accreditation Guidance: The in-situ calibration of barometers</i>
Aneroid	1		

Item of equipment	Calibration interval (years)	Checking interval (months)	General comments and example reference standards
<b>Bridge - manual balance</b>			
	5		
		12	Check against laboratory standards
<b>Caliper</b>			
	2		AS 1984
		On use	Zero point, correct closure of jaws
<b>Capacitor</b>			
	5		
		12	Intercompare
<b>Cold reference junction - ACJC</b>			
		12	Check against reference thermometer or comparison at ice point
<b>Colorimetric integrating sphere</b>			
	1		As long as the coating is in reasonable condition then the absolute reflectance is not critical and recoating is not necessary. Annual recalibration using a reference lamp is recommended. More frequent calibration may be necessary if the sphere is new or in a dusty or humid environment or subject to lamps emitting UV radiation.
		3	Check using working standard lamp
<b>Comparator - dimensional</b>			
	3		
<b>Current shunt</b>			
	5		See entry for shunt
<b>DC voltage reference</b>			
	1 to 2		Interval dependent on required uncertainty

Item of equipment	Calibration interval (years)	Checking interval (months)	General comments and example reference standards
		3 to 6	Intercompare
<b>Digital signal analyser - sound &amp; vibration</b>			
	5		
		12	
<b>Dimensional measuring machine</b>			
Precision scale	5 then subsequent 10		
Geometric test	5		
Micrometer head	3		
Coordinate Measuring Machine (CMM)	2		
		6	Intermediate volumetric check (e.g. ball bar)
<b>Dividing head and rotary table</b>			
	5 then 10 subsequent	24	
<b>Dry block calibrator</b>			
	1		EA – 10/13, EURAMET cg-13
<b>Electrical instrument</b>			
Digital Multimeter (DMM) and other types of meters which measure electrical parameters such as volts, resistance, current, capacitance, power, etc	1		Calibrate over all ranges and parameters of use including calibration across frequency (Hz) of use. <i>General Accreditation Guidance: Electronic measuring equipment as reference standards.</i> EURAMET cg-15
		6	Compare with meters of similar resolution
Analogue meter (see above)	1		
		6	Compare with meters of similar resolution

Item of equipment	Calibration interval (years)	Checking interval (months)	General comments and example reference standards
Data loggers / chart recorders (see above)	1		
		6	Check at two points over the range
<b>Environmentally controlled enclosure</b>			
Temperature-controlled chamber	1		Spatial uniformity, IEC 60068-1; 60068-2-38; 60068-2-39 over 3 points in the temperature working range, EURAMET cg-20
		36	Spatial uniformity in the working zone over 3 points in the temperature working range
Humidity-controlled chamber	1		Humidity distribution in working zone over the operational range. EURAMET cg-20
		12	Spatial uniformity of temperature
CO <sub>2</sub>	On use		Monitor level
Infrared, ultraviolet and visible	1		
		On use	Check operation of the lamps
Pressure / vacuum	1		Monitor level
<b>Extensometer calibrator</b>			
	5		AS 2328 and AS 1545
<b>Flowmeter</b>			
			EURAMET cg-19
Differential pressure meter, orifice meter, venturi meter and anubar	2	6	Flow or dimensional calibration plus inspection for wear and damage. Associated transducers (temperature, pressure, density) to be calibrated in accordance with that transducer requirement.
Electronic thermal, mass flow	1		Where high temperature or corrosive gases are monitored a shorter interval is recommended
Laminar flow meter	2	6	Inspect for damage or contamination

Item of equipment	Calibration interval (years)	Checking interval (months)	General comments and example reference standards
Orifice plate	Initial	6	Visual check for wear and damage
Sonic nozzle			
Reference 0.1%	3	6	Inspect and clean
Working 0.5%	6	6	Inspect and clean
Soap film	2		
Positive displacement meter	2		
Prover	2	6	Thermometer ice points and pressure readout checks for stability EURAMET cg-21
Rotary meter	2	6	Inspect for contamination or damage
Rotameter variable area meter	2	3	Visual inspection for damage to float edges or ball float for pitting
Turbine meter	2	6	Inspect for contamination or damage of turbine blades, and free bearing operation
Turbine meter (Pelton Wheel / Miniature)	1	6	Inspect for contamination or damage of turbine blades, and free bearing operation
Vortex shedding	2	6	Inspect for contamination of the bluff body
Wet test meter	2	Before use	Set water level before use
<b>Gauge block</b>			
Reference	4 then 8 subsequent		EURAMET cg-02
<b>Glass scale - used as a reference for dimensional comparison</b>			
	3 then 6 subsequent		
<b>Haze standard</b>			
Plastic	5		
Glass	10		



Item of equipment	Calibration interval (years)	Checking interval (months)	General comments and example reference standards
<b>Height setting micrometer and riser block</b>			
	3 then 6 subsequent		
<b>Hydrometer</b>			
Reference	5		
Working glass	1		
Working metal	6 months		
<b>Hygrometer</b>			
Electronic type (e.g. digital psychrometer)	1		
Digital psychrometer (aspirated wet and dry-bulb thermometer)	1		
		6	Check against a calibrated thermometer at ambient temperature. Check the wick for contamination and effective wetting and clean or replace if required.
Electrical impedance relative humidity sensor	1		Can be 2 yearly if used only under ambient conditions. May need more frequent calibration or checks if used in high humidity environments.
Chilled mirror dew or frost point hygrometer	2		Maintain/clean the mirror in accordance with manufacturer recommendations
<b>Inductor</b>			
	5		
		12	Intercompare
<b>Instrument and ratio transformer</b>			
	10		Instrument transformers may be extended to 20 years with annual intercomparisons
<b>Instrument transformer test set</b>			

Item of equipment	Calibration interval (years)	Checking interval (months)	General comments and example reference standards
	5	12	Compare with a transformer or other known error device. For CT sets every second calibration may be substituted by a test using the NMI/NATA adjustable error current transformer.
<b>Laser power / energy meter</b>			
	2		
		3	Visual check
<b>Length bar</b>			
Reference	4 then 8 subsequent		
Working	2 then 4 subsequent		
<b>Level - precision</b>			
	4		
		12	12 monthly single point check for electronic levels
<b>Linear scale - precision</b>			
	5 then 10 subsequent		
<b>Load cell</b>			
			EURAMET cg-04
	2		AS 2193
		On day of use	If amplification is variable perform shunt calibration check
<b>Luminance meter and Illuminance meter</b>			
Digital	1		
Analogue	2		
<b>Manometer</b>			

Item of equipment	Calibration interval (years)	Checking interval (months)	General comments and example reference standards
Reference and working, liquid (mercury based)	10		Periodically check the cleanliness of the fluid and the cleanliness, shape and freedom of movement of the Hg meniscus. Changes in the shape of the meniscus, as it moves, indicates dirty mercury or glass.
		36	Check the cleanliness of the fluid
Reference and working, liquid (liquid other than mercury)	3		Periodically check the cleanliness of the fluid and the cleanliness, shape and freedom of movement of the meniscus
		18	Check the cleanliness of the fluid
Electronic	1		
<b>Mass</b>			
Reference (integral stainless steel or nickel chromium alloy)	3 then 6 subsequent		Verifying Authorities request 3 then 5 subsequent
Working (stainless steel, nickel chromium alloy)	3		
Working (other alloy and iron Class III)	2		
<b>Mass comparator</b>			
		6	Repeatability checks at full, half and minimum scale
<b>Metal - temperature reference</b>			
Freezing fixed point	5		
<b>Micrometer</b>			
	5		
		1	Zero, one point (against gauge block) and condition of anvils
<b>Micrometer setting gauge</b>			
	3 then 6 subsequent		

Item of equipment	Calibration interval (years)	Checking interval (months)	General comments and example reference standards
<b>Microphone - measuring</b>			
	2		
		3	Check frequency response and sensitivity
<b>Microphone amplifier</b>			
		12	Check frequency response and meter accuracy
<b>Noise analyser</b>			
Integrated in firmware	Initial		Initial calibration is not necessary where the analyser has already been type approved. Where the instrument has not been type approved, or where firmware changes are made, initial calibration is necessary.
<b>Optical flat</b>			
	3 then 6 subsequent		
<b>Optical parallel</b>			
	3 then 6 subsequent		
<b>Optical projector</b>			
	5		
<b>Orifice plate</b>			
	Initial	6	Visual check for wear and damage
<b>Oscilloscope</b>			
		24	Time base and voltage scale accuracy
<b>Photodetector</b>			
Silicon cell	3		Linearity and spectral
Other	5		Calibrate more frequently when the filter transmittances change significantly

Item of equipment	Calibration interval (years)	Checking interval (months)	General comments and example reference standards
		12	Check spectral response with colour filters
		6	Check linearity of response
<b>Photometric integrating sphere</b>			
	1		As long as the coating is in reasonable condition then the absolute reflectance is not critical and recoating is not necessary. Annual recalibration using a reference lamp is recommended. More frequent calibration may be required if the sphere is new or in a dusty or humid environment or subject to lamps emitting UV radiation.
		3	Check using working standard lamp
<b>Photometric test plate for luminance</b>			
All		36	Visual inspection
Ceramic or enamel	10		
Other	5		
<b>Pitch diameter reference disc</b>			
	4 then 8 subsequent		
<b>Polygon - precision</b>			
	5 then 10 subsequent		
<b>Verification plate for plate reader</b>			
	10		See photometric test plates
<b>Polilight or light source used with specific wavelength filters</b>			
		On use	Checked against reference material
<b>Process instrument calibrator</b>			
	1		Initial calibration should include an ACJC check at typical field use ambient temperatures

Item of equipment	Calibration interval (years)	Checking interval (months)	General comments and example reference standards
<b>Pressure balance</b>			
			EURAMET cg-03
Dead weight tester with accuracy < 0.01%	3		
		12	Spin time and fall rate
Dead weight tester with accuracy > 0.01%	5		
		12	Spin time and fall rate
<b>Pressure equipment</b>			
Mechanical gauge	1		Metrology Society of Australia (MSA), Test Method 2 - 2008, Calibration of Pressure Gauges
Digital pressure gauge	1		Metrology Society of Australia (MSA), Test Method 1 - 2008, Calibration of Pressure Calibrators, Indicators and Transducers
Pressure transducers	1		Metrology Society of Australia (MSA), Test Method 1 - 2008, Calibration of Pressure Calibrators, Indicators and Transducers
Pressure transmitter	1		Metrology Society of Australia (MSA), Test Method 1 - 2008, Calibration of Pressure Calibrators, Indicators and Transducers
Calibrator	1		Metrology Society of Australia (MSA), Test Method 1 - 2008, Calibration of Pressure Calibrators, Indicators and Transducers
<b>Pyrgeometer</b>			
	3		
<b>Pyrheliometer</b>			
Reference	3		
Working		6	Check against reference
<b>Pyrometer - disappearing filament</b>			
	3		

Item of equipment	Calibration interval (years)	Checking interval (months)	General comments and example reference standards
<b>Quartz control plate</b>			
	Initial		Visual check before use
<b>Radiation thermometer - including visible and infrared pyrometers</b>			
	2		Initial test of target size dependence should be performed. Initial calibration should include sufficient points to confirm linearity.
		12	Check at one point in range or at ice point
Black body source	2		Either calibration of the measured radiance temperature in a specified waveband, or calibration of the monitor sensor together with blackbody cavity uniformity assessment.
<b>Radioactive reference material</b>			
Neutron, X-rays, gamma	5	12	
<b>Radiometers - thermal</b>			
	2 or after 100 tests		
		3	Against know radiant heat source
<b>Reference ballast</b>			
Lighting test	5		
<b>Refractometer</b>			
		On use	Check against distilled water
<b>Reference glass filter</b>			
Spectrophotometry, colourimetry, luminous transmittance, neutral density	10		
<b>Reference haze standard</b>			
Plastic	5		
Glass	10		

Item of equipment	Calibration interval (years)	Checking interval (months)	General comments and example reference standards
<b>Refractive index standard</b>			
Liquid	5		
		Before use	Check for contamination
Solid	Initial		
		Before use	Visual examination
<b>Reference tile</b>			
Plastic and PTFE	3		
Ceramic	10		
Gloss (glass, ceramic)	10		
<b>Resistor</b>			
	5		
		12	Intercompare
<b>RF power meter</b>			
	3		
		6	Intercompare
			Check VSWR
<b>RF thermister mount and thermal converter</b>			
	3		
		6	Intercompare
<b>Roller and ball</b>			
	4 then 8 subsequent		
<b>Roughness standard</b>			
Metal	4		
		12	Microscopic inspection
Glass	Initial		



Item of equipment	Calibration interval (years)	Checking interval (months)	General comments and example reference standards
		12	Microscopic inspection
<b>Roundness standard</b>			
	5 then 10 subsequent		
<b>Screw check plug for ring gauge</b>			
	3 then 6 subsequent		EURAMET cg-10
<b>Screw pitch reference standards</b>			
	3 then 6 subsequent		EURAMET cg-10
<b>Screw thread measurement cylinder and vee piece</b>			
	Initial		EURAMET cg-10
		12	Visual inspection
<b>Secondary standard dosimeter - ionising radiation</b>			
	3	Before use	
<b>Setting cylinder</b>			
	3 then 6 subsequent		EURAMET cg-06
<b>Setting ring</b>			
	3 then 6 subsequent		
<b>Shunt</b>			
	5		
		12	Intercompare
<b>Signal generator</b>			
	1		When used in isolation to provide reference signals
<b>Sine bar, centre and table</b>			
	3 then 6 subsequent		

Item of equipment	Calibration interval (years)	Checking interval (months)	General comments and example reference standards
<b>Sound level meter and noise dosimeter</b>			
	2		.
		On use	Check against acoustic calibrator or pistonphone
<b>Sound power source</b>			
	5		
<b>Spectrophotometer</b>			
		6	Wavelength accuracy, bandpass, absorbance, stray light error, linearity of response, repeatability and matching of cells
		On use	A blank and at least 2 points on the calibration curve to be checked
<b>Spectroradiometer</b>			
All		On use	If not calibrating prior to use, a check on a working standard lamp is recommended. Additional checks may be required if the input geometry has been changed.
Array	Initial		Wavelength accuracy, bandpass, stray light error, spectral responsivity, linearity of response, repeatability
		6	Wavelength accuracy, spectral responsivity, linearity of response, repeatability
Scanning		6	Wavelength accuracy, bandpass, stray light error, linearity of response, repeatability
<b>Spectrum and harmonic analyser</b>			
	1		Parameters to be calibrated dependant on use
<b>Squareness tester</b>			
	3 then 5 subsequent		
<b>Square</b>			

Item of equipment	Calibration interval (years)	Checking interval (months)	General comments and example reference standards
Try square	2 then 5 subsequent		
Block square	4 then 8 subsequent		
Straightedge - steel cast iron	3 then 6 subsequent		
Granite	4 then 8 subsequent		
<b>Standard lamp - incandescent</b>			
Luminous flux, Luminous intensity, Illuminance	5		Or calibrate after each 20 hours burning period, whichever comes first
Spectral radiance, irradiance, relative measurements	10		Or calibrate after 50 hours burning period, whichever comes first
Spectral radiance, irradiance, absolute measurements	5		Or calibrate after 20 hours burning period, whichever comes first
Distribution temperature	10		Or calibrate after 50 hours burning period, whichever comes first
<b>Standard lamp - LED</b>			
Luminous flux, luminous intensity, illuminance	1		Calibration interval may be increased based on stability after several repeat calibrations
<b>Surface plate</b>			
Cast iron	3 then 6 subsequent		
Granite	4 then 8 subsequent		
<b>Thermocouple</b>			
			EURAMET cg-08
'Base metal' type, sheathed	2		For use up to 400°C. It is not recommended to recalibrate thermocouples used above 400°C
'Base metal' type, wire	2		For use up to 300°C. Replace if used above 300°C

Item of equipment	Calibration interval (years)	Checking interval (months)	General comments and example reference standards
Stored reels	10		Reel of wire – 4 samples of wire from end points and middle of reel
'Rare metal' type	3		3 years or after 100 hours above 500°C whichever is sooner
<b>Thermometer</b>			
Reference, liquid-in-glass	10		
		Before use	Before use check at ice point <i>General Accreditation Guidance: Liquid-in-glass thermometers - selection, use and calibration checks</i>
Liquid-in-glass	5		
		6	Check at ice point <i>General Accreditation Guidance: Liquid-in-glass thermometers - selection, use and calibration checks</i> or against reference thermometer at 1 point in range
Resistance			NMI Monograph 11
-40°C to 250°C	5		
		6	Check resistance at ice point
<-40°C and >250°C	2		
		6	Check resistance at ice point
Measuring instrument AC bridge type	5		
Measuring instrument DC bridge type	2		
		6	Check at ice point
Reference, digital indicating systems, with or without a temperature/humidity sensor, hand held or bench type, single and multichannel	Initial		Calibrate against a reference temperature measuring system. For thermocouple type devices, check efficacy of automatic cold junction compensation with the temperature sensor at ice point.
	1		Calibrate against a reference measuring system

Item of equipment	Calibration interval (years)	Checking interval (months)	General comments and example reference standards
		6	Check at ice point
<b>Time interval and frequency standard</b>			
Caesium and rubidium			Calibration program dependent on type and accuracy required. This may be as frequently as daily if needed.
Counter	1		
GPS receivers			Refer to <i>Specific Accreditation Criteria: ISO/IEC 17025 Application Document, Calibration - Annex, Electrical metrology</i>
Other oscillator			Calibration program dependent on type and accuracy required
<b>Torque</b>			
			ISO 6789-2 EURAMET cg-14
Standard (beam and mass)	4 then 8 subsequent		
Transducer	1		
		6	In house cross check of overlapping ranges
<b>Transfer AC-DC standard</b>			
	1 to 5		If only one is available. Interval dependent on established history and required uncertainty.
		6 to 12	Intercompare with appropriate level digital instruments, compare adjacent ranges and self-check
	4 to 8		If two are available. Interval dependent on established history and required uncertainty.
		12	Intercompare
<b>Tricolorimeter</b>			
		12	Check against calibrated colour filters or surfaces

Item of equipment	Calibration interval (years)	Checking interval (months)	General comments and example reference standards
<b>Velocity transducer</b>			
	3		
		24	Check frequency response and sensitivity
<b>Vibration calibrator</b>			
	2		
<b>Volt ratio box</b>			
	5		
		12	Intercompare
<b>Voltage dividers</b>			
	5		
<b>Ultraviolet lamp</b>			
		During use	Monitor irradiance level
<b>Viscometer</b>			
U-tube viscometer - Reference	Initial	120	Against reference oils ASTM D2162
U-tube viscometer - Working	Initial		Using quality oils against reference tubes or using reference oils
		24	ASTM D2162/D445; IP 71
Brookfield	Initial, then every 2		Against reference oils. As well as the spindle number, the temperature of the test and the revolution per minute need to be reported.
		1	Against quality (i.e. manufacturers') oils.
Ferranti	Initial	3	Against reference oils
Zahn	Initial	12	Against reference oils
<b>Watt-hour and VAR-hour reference</b>			
Electronic	1 to 2		Interval dependant on required uncertainties and instrument history.

Item of equipment	Calibration interval (years)	Checking interval (months)	General comments and example reference standards
		3	Intercompare

## References

This section lists publications referenced in this document. The year of publication is not included as it is expected that only current versions of the references shall be used.

### Australian Standards

AS 1349	<i>Bourdon tube pressure and vacuum gauges</i>
AS 1545	<i>Methods for the calibration and grading of extensometers</i>
AS 1984	<i>Vernier callipers (metric series)</i>
AS 2001.1	<i>Methods of test for textiles - Conditioning procedures</i>
AS 2193	Calibration and classification of force-measuring systems
AS 2328	<i>Micrometer heads - Metric series</i>
AS 2360.1.5	<i>Measurement of fluid flow in closed conduits - Pressure differential methods - Measurement using orifice plates, nozzles or Venturi meters - Pulsating flow, in particular sinusoidal or square wave intermittent periodic-type fluctuations</i>
AS 4476	<i>Acoustics—Octave-band and fractional-octave-band filters</i>
AS IEC 60942	<i>Electroacoustics - Sound calibrators</i>
AS IEC 61672.1	<i>Electroacoustics - Sound level meters - Specifications</i>
AS IEC 61672.2	<i>Electroacoustics - Sound level meters - Pattern evaluation tests</i>

### Other Standards

ASTM D445	<i>Standard Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (and Calculation of Dynamic Viscosity)</i>
ASTM D2162	<i>Standard Practice for Basic Calibration of Master Viscometers and Viscosity Oil Standards</i>
EA-10/13	<i>EA Guidelines on the Calibration of Temperature Block Calibrators</i>
IEC 1260	<i>Electroacoustics - Octave Band and Fractional Octave Band</i>
IEC 60068-1	<i>Environmental testing. Part 1: General and guidance</i>
IEC 60068-2-38	<i>Environmental testing - Part 2-38: Tests - Test Z/AD: Composite temperature/humidity cyclic test</i>
IEC 60068-2-39	<i>Environmental testing - Part 2: Tests. Test Z/AMD: Combined sequential cold, low air pressure, and damp heat test</i>

ISO 6789	<i>Assembly tools for screws and nuts -- Hand torque tools -- Part 2: Requirements for calibration and determination of measurement uncertainty</i>
IP 71:	<i>Kinematic Viscosity of Transparent &amp; Opaque Liquids</i>
ISO/IEC Guide 99	<i>International vocabulary of metrology - Basic and general concepts and associated terms (VIM)</i>
ISO/IEC 17025	<i>General Requirements for the competence of calibration and testing laboratories</i>

## **NATA Publications**

### General Accreditation Criteria

*Metrological traceability policy;*

*Equipment assurance, in-house calibration and equipment verification*

### General Accreditation Guidance

*The in-situ calibration of barometers;*

*User checks of balance calibration;*

*Liquid-in-glass thermometers – selection, use and calibration checks;*

*Electronic measuring equipment as reference standards*

### Specific Accreditation Criteria

*ISO/IEC 17025 Application Document, Calibration - Annex, Electrical metrology*

## **Other Publications**

NMI Monograph 11 *Platinum Resistance Thermometry*

NMI Monograph 4 *The Calibration of Weights and Balances* EC Morris and KMK Fen

*Calibration of Pressure Calibrators, Indicators and Transducers, Test Method 1 - 2008, Metrology Society of Australia (MSA)*

*Calibration of Pressure Gauges, Test Method 2 - 2008, Metrology Society of Australia (MSA)*

## **EURAMET calibration guides**

EURAMET cg-15 *Guidelines on the Calibration of Digital Multimeters*

EURAMET cg-19 *Guidelines on the Determination of Uncertainty in Gravimetric Volume Calibration*

EURAMET cg-21 *Guidelines on the Calibration of Standard Capacity Measures using the Volumetric Method*

EURAMET cg-02 *Calibration of Gauge Block Comparators*

EURAMET cg-06 *Extent of Calibration for Cylindrical Diameter Standards*

EURAMET cg-10 *Determination of Pitch Diameter of Parallel Thread Gauges by Mechanical Probing*



EURAMET cg-22	<i>Guidelines on the Calibration of Autocollimators</i>
EURAMET cg-23	<i>Guidelines on the Calibration of Angular Encoders</i>
EURAMET cg-03	<i>Calibration of Pressure Balances</i>
EURAMET cg-04	Uncertainty of Force Measurements
EURAMET cg-14	<i>Guidelines on the Calibration of Static Torque Measuring Devices</i>
EURAMET cg-08	<i>Calibration of Thermocouples</i>
EURAMET cg-11	<i>Guidelines on the Calibration of Temperature Indicators and Simulators by Electrical Simulation and Measurement</i>
EURAMET cg-13	<i>Guidelines on the Calibration of Temperature Block Calibrators</i>
EURAMET cg-20	<i>Guidelines on the Calibration of Temperature and / or Humidity Controlled Enclosures</i>

## Amendment table

The table below provides a summary of changes made to the document with this issue.

Section or Clause	Amendment
Whole document	Reformatted
Referenced standards	<p>ISO 6789 has been replaced with ISO 6789-2 as an example calibration method.</p> <p>The following Australian Standards are no longer available and have been removed:</p> <ul style="list-style-type: none"> <li>• AS 1457 Gauge blocks</li> <li>• AS 2026 Density hydrometers</li> <li>• AS 2102 Micrometer calipers</li> <li>• AS 2853 Temperature controlled enclosures</li> </ul>