



List of Good Practice Guides and similar sources of information in Length Metrology

Document history

Draft 0.1 This document was prepared for the WG-MRA meeting Oct 2019 and subsequently updated shortly after the meeting.

Draft 0.2 This document was updated with CEM information in January 2020.

Draft 0.3 Minor formatting.

1 Rationale

This is a CCL Guidance Document listing available Good Practice Guides and similar sources of information in Length Metrology, authored under the initiative of Andrew Lewis, during his last year as chair of CCL/WG-MRA. The intention is to serve as a single reference list for the benefit of new RMO TC-L chair persons and members or guests of CCL and its various Working Groups, who may not already be aware of the extensive set of guidance made available from various authors.

The document was given the official number GD-7 during the 2018 meeting of the WG-MRA.

Further additions to the document and ongoing updates are welcomed.

2 Good Practice Guides

2.1 NPL Good Practice Guides in Metrology

The NPL website has a general index to a range of Good Practice Guides across all metrology topics; the guides are free to download after supplying basic registration information:

<https://www.npl.co.uk/resources/gpgs/all-gpgs>

Simple registration reveals full access, though the following are direct links which should remain operational, however by registering, users may receive information on updates to documents at later dates.

1. **GPG5** - Software in scientific instruments
https://www.npl.co.uk/special-pages/guides/gpg5_computing
2. **GPG11** - The Beginner's Guide to Uncertainty of Measurement
https://www.npl.co.uk/special-pages/guides/gpg11_uncertainty
3. **GPG37** - The Measurement of Surface Texture using Stylus Instruments
https://www.npl.co.uk/special-pages/guides/gpg37_stylus
4. **GPG39** - Dimensional Measurement using Vision Systems
https://www.npl.co.uk/special-pages/guides/gpg39_dimensional
5. **GPG40** - Callipers and micrometers
https://www.npl.co.uk/special-pages/guides/gpg40_callipers
6. **GPG41** - CMM Measurement Strategies
https://www.npl.co.uk/special-pages/guides/gpg41_cmm
7. **GPG 42** - CMM verification
https://www.npl.co.uk/special-pages/guides/gpg42_cmmv
8. **GPG43** - CMM probing
https://www.npl.co.uk/special-pages/guides/gpg43_cmp
9. **GPG79** - Fundamental Good Practice in the Design and Interpretation of Engineering Drawings for Measurement Processes
https://www.npl.co.uk/special-pages/guides/gpg79_drawings
10. **GPG80** - Fundamental Good Practice in Dimensional Metrology
https://www.npl.co.uk/special-pages/guides/gpg80_metrology
11. **GPG108** - Guide for the Measurement of Smooth Surface Topography using Coherence Scanning Interferometry
https://www.npl.co.uk/special-pages/guides/gpg108_interferometry
12. **GPG116** - The Measurement of Rough Surface Topography using Coherence Scanning Interferometry
https://www.npl.co.uk/special-pages/guides/gpg116_rough
13. **GPG118** - A Beginner's Guide to Measurement

https://www.npl.co.uk/special-pages/guides/gpg118_begguide2measure

14. **GPG119** - Good Practice Guide for the Determination of the Size and Size Distribution of Spherical Nanoparticle samples
https://www.npl.co.uk/special-pages/guides/gpg119_nanoparticle
15. **GPG129** - Calibration of the metrological characteristics of areal contact stylus instruments
[https://www.npl.co.uk/special-pages/guides/gpg129_stylus-\(1\)](https://www.npl.co.uk/special-pages/guides/gpg129_stylus-(1))
16. **GPG130** - Co-ordinate measuring machine task-specific measurement uncertainties
https://www.npl.co.uk/special-pages/guides/gpg130_machine
17. **GPG131** - Beginner's Guide to Measurement in Mechanical Engineering
https://www.npl.co.uk/special-pages/guides/gpg131_mechanical
18. **GPG138** - Strategic Planning for Coordinate Metrology
<https://www.npl.co.uk/special-pages/guides/gpg138>
19. **GPG147** - Surface texture measurements of gear surfaces using stylus instruments
https://www.npl.co.uk/special-pages/guides/gpg147_gear
20. **GPG148** - Measurement of the surface texture of large roller bearings
<https://www.npl.co.uk/special-pages/guides/gpg148>
21. **GPG149** - Care and use of gauge blocks
https://www.npl.co.uk/special-pages/guides/gpg149_gauge

2.2 CEM Calibration procedures

Calibration procedures (in Spanish) freely downloadable from the CEM webpage:

(<https://www.cem.es/divulgacion/otros-documentos-de-interes>)

1. **DI-001** Procedimiento para la calibración de proyectores de perfiles
(*Profile projectors*)
[Descargar documento DI-001 calibracion proyectores de perfiles 2.pdf](#)
2. **DI-002** Procedimiento para la calibración de bancos de calibración de comparadores
(*Calibration Benches for mechanical comparators*)
[Descargar documento DI-002 bancos de calibracion de comparadores 2019.pdf](#)
3. **DI-003** Procedimiento para la calibración de transportadores de ángulos
(*angle protractors*)
[Descargar documento DI-003 transportadores de ángulos 2019.pdf](#)
4. **DI-004** Procedimiento para la calibración de medidoras de una coordenada vertical
(*1D vertical measuring machines*)
[Descargar documento DI-004 calibracion medidoras coordenada vertical.pdf](#)
5. **DI-005** Procedimiento para la calibración de micrómetros de exteriores de dos contactos
(*2-contact external micrometers*)

[Descargar documento DI-005 micrometros de exteriores de dos contactos corr ene20.pdf](#)

6. **DI-006** Procedimiento para la calibración de microscopios de medida
(*measurement microscopes*)
[Descargar documento DI-006 microscopios de medida 2019.pdf](#)
7. **DI-007** Procedimiento para la calibración de máquinas de una coordenada horizontal
(*1D horizontal measuring machines*)
[Descargar documento DI-007 máquinas de una coordenada horizontal 2019.pdf](#)
8. **DI-008** Procedimiento para la calibración de pies de rey
(*callipers*)
[Descargar documento DI-008 calibracion pies de rey.pdf](#)
9. **DI-009** Procedimiento para la calibración de escuadras de perpendicularidad
(*perpendicularity standard squares*)
[Descargar documento DI-009 escuadras de perpendicularidad.pdf](#)
10. **DI-010** Procedimiento para la calibración de comparadores mecánicos
(*mechanical comparators*)
[Descargar documento DI-010 comparadores mecánicos.pdf](#)
11. **DI-011** Procedimiento para la calibración de flexómetros
(*short tapes*)
[Descargar documento DI-011 flexómetros.pdf](#)
12. **DI-012** Procedimiento para la calibración de reglas rígidas de trazos
(*rigid line scales*)
[Descargar documento DI-012 reglas rígidas de trazos.pdf](#)
13. **DI-013** Procedimiento para la calibración de reglas patrón de trazos
(*standard line scales*)
[Descargar documento DI-013 reglas patrón de trazos 2019.pdf](#)
14. **DI-014** Procedimiento para la calibración de bloques patrón longitudinales por comparación
(*longitudinal gauge blocks by comparison*)
[Descargar documento DI-014 bloques patrón longitudinales por comparación 2019.pdf](#)
15. **DI-015** Procedimiento para la calibración de mesas de planitud
(*flatness tables*)
[Descargar documento DI-015 mesas de planitud 2019.pdf](#)
16. **DI-016** Procedimiento para la calibración de patrones cilíndricos de diámetro
(*diameter standards*)
[Descargar documento DI-016 patrones cilíndricos de diámetro.pdf](#)
17. **DI-017** Procedimiento para la calibración de bloques patrón angulares
(*angular gauge blocks*)
[Descargar documento DI-017 bloques patrón angulares 2019.pdf](#)
18. **DI-018** Procedimiento para la calibración de patrones de redondez
(*roundness standards*)
[Descargar documento DI-018 patrones de redondez.pdf](#)

19. **DI-021** Procedimiento para la calibración de micrómetros de interiores de dos contactos
(*2-contact internal micrometers*)
[Descargar documento DI-021 micrómetros de interiores de dos contactos 2019.pdf](#)
20. **DI-022** Micrómetros de interiores de tres contactos
(*3-contact internal micrometers*)
[Descargar documento DI-022 micrometros de interiores de tres contactos 2019.pdf](#)
21. **DI-025** Procedimiento para la calibración de rugosímetros de palpador
(*stylus instruments for roughness measurement*)
[Descargar documento DI-025 rugosímetros de palpador.pdf](#)
22. **DI-026** Procedimiento para la calibración de mesas giratorias
(*rotating tables*)
[Descargar documento DI-026 mesas giratorias 2019.pdf](#)
23. **DI-030** Cabezas micrométricas
(*micrometric heads*)
[Descargar documento DI-030 cabezas micrometricas 2019.pdf](#)
24. **DI-032** Procedimiento para la calibración de polígonos patrón
(*optical polygons*)
[Descargar documento DI-032 polígonos patron 2019.pdf](#)
25. **DI-034** Procedimiento para la calibración de teodolitos
(*theodolites*)
[Descargar documento DI-034 teodolitos 2019.pdf](#)

2.3 EURAMET Calibration Guidelines

The following range of EURAMET-authored guidance documents are freely available from:
<https://www.euramet.org/publications-media-centre/calibration-guidelines/>

1. [No. 2 | Calibration of Gauge Block Comparators](#)
2. [No. 6 | Extent of Calibration for Cylindrical Diameter Standards](#)
3. [No. 10 | Determination of Pitch Diameter of Parallel Thread Gauges by Mechanical Probing](#)
4. [No. 22 | Guidelines on the Calibration of Autocollimators](#)
5. [No. 23 | Guidelines on the Calibration of Angular Encoders](#)

2.4 Other guidance documents

1. The NIST Gauge Block Handbook
<https://www.nist.gov/sites/default/files/documents/calibrations/mono180.pdf>

3 CCL and CCL Working Groups Guidance Documents

The CCL has authorized a series of Guidance Documents prepared by CCL Working Groups. They are available from the main CCL website (<https://www.bipm.org/en/committees/cc/ccl/>), within the Publications section (<https://www.bipm.org/en/committees/cc/ccl/publications-cc.html>).

3.1 CCL service classification of CMCs in Length

Classification of services in Length (the so-called 'DimVIM')

https://www.bipm.org/utils/common/pdf/KCDB_2.0/CMC_services/L_services.pdf

3.2 CCL Guidance Documents

CCL-GD-1: Running of MRA comparisons in length metrology and monitoring their impact on CMCs.

https://www.bipm.org/utils/common/pdf/KCDB_2.0/CMC_services/L_services.pdf

CCL-GD-2: Comparison scheme applied in dimensional metrology.

<https://www.bipm.org/utils/common/pdf/CC/CCL/CCL-GD-2.pdf>

CCL-GD-3: Guide to preparation of Key Comparison Reports in Dimensional Metrology.

<https://www.bipm.org/utils/common/pdf/CC/CCL/CCL-GD-3.pdf>

CCL-GD-3.1: KC Technical Protocol Template.

<https://www.bipm.org/utils/common/pdf/CC/CCL/CCL-GD-3.1.doc>

CCL-GD-3.2: KC Report Template.

<https://www.bipm.org/utils/common/pdf/CC/CCL/CCL-GD-3.2.doc>

CCL-GD-3.2b: Bilateral Report Template.

<https://www.bipm.org/utils/common/pdf/CC/CCL/CCL-GD-3.3.doc>

CCL-GD-3.3: Executive Report Template.

<https://www.bipm.org/utils/common/pdf/CC/CCL/CCL-GD-3.3.doc>

CCL-GD-4: KC Planning V1.40.

<https://www.bipm.org/utils/common/pdf/CC/CCL/CCL-GD-4.xls>

CCL-GD-5: Guide to formatting CMC entries ('DimVIM Guide') and to their inter-RMO review.

<https://www.bipm.org/utils/common/pdf/CC/CCL/CCL-GD-5.pdf>

CCL-GD-6: CMCs of category "Standards of 1D point-to-point dimensions".

<https://www.bipm.org/utils/common/pdf/CC/CCL/CCL-GD-6.pdf>

3.3 Template files for use by comparison pilots

Example Excel file for comparison analysis.

<https://www.bipm.org/utils/common/pdf/CC/CCL/CCL-KC-evaluation.xlsx>

Example Excel file for comparison analysis of linked-loop comparisons

<https://www.bipm.org/utils/common/pdf/CC/CCL/CCL-KC-evaluation-linked-loops.xls>

WGMRA Comparison progress report template

<https://www.bipm.org/utils/common/pdf/CC/CCL/CCL-WG-MRA-comparison-progress-report.pptx>

Registration and progress report form for KCs and SCs

https://www.bipm.org/utils/common/documents/jcrb/registration_and_progress_form.pdf

Publication of a Final Report in Metrologia's Technical Supplement

<https://www.bipm.org/utils/common/documents/CIPM-MRA/MET-Technical-Supplement.docx>