



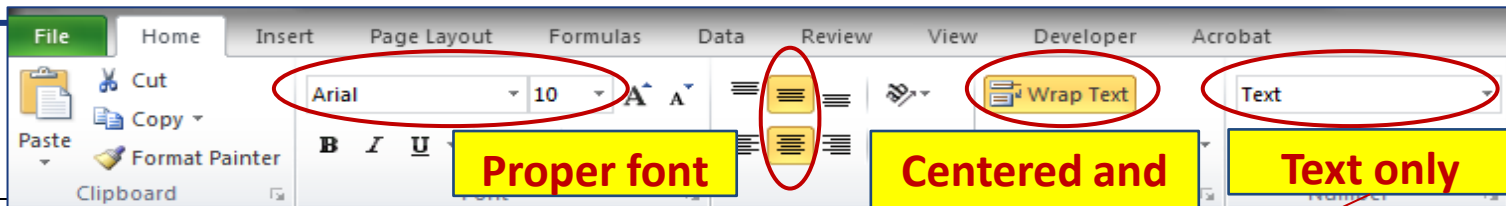
## Guidance on Review of CMC files

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# CMC file preparation guidelines: CIPM MRA-D-04

Use one Excel file per country, per metrology area and per category.



**Proper font**

**Centered and wrapped text**

**Text only**

*Formatting all cells in text ensures that information is safely imported into the database.*

Calibration or Measurement Service			Measurand Level or Range			Measurement Conditions/Independent Variable						
Quantity/ Class	Instrument or Artifact	Instrument Type or Method	Minimum value	Maximum value	Units	Parameter	Specifications	Value				
Mass	Mass standards	Subdivision method	1	100	mg	Temperature	((20 to 22) ± 0.5) °C	0.8 to 1.2				
						Relative humidity	((40 to 60) ± 3) %					
Mass	Mass standards	Subdivision method	0.1	1	g	Temperature	((20 to 22) ± 0.5) °C	1.2 to 3	µg	2	95%	No
						Relative humidity	((40 to 60) ± 3) %					
Mass	Mass standards	Subdivision method	1	10	g	Temperature	((20 to 22) ± 0.5) °C	3 to 6	µg	2	95%	No
						Relative humidity	((40 to 60) ± 3) %					
Mass	Mass standards	Subdivision method	10	100	g	Temperature	((20 to 22) ± 0.5) °C	6 to 16	µg	2	95%	No
						Relative humidity	((40 to 60) ± 3) %					
Mass	Mass standards	Subdivision method	0.1	1	kg	Temperature	((20 to 22) ± 0.5) °C	16 to 120	µg	2	95%	No
						Relative humidity	((40 to 60) ± 3) %					

Use the **period "."** as the decimal separator rather than a **comma ","**.

# CMC file preparation guidelines: CIPM MRA-D-04

## No merging of cells

WRONG!

Calibration or Measurement Service			Measurand Level or Range			Measurement Conditions/Independent Variable		Expanded Uncertainty				
Quantity/ Class	Instrument or Artifact	Instrument Type or Method	Minimum value	Maximum value	Units	Parameter	Specifications	Value	Units	Coverage Factor	Level of Confidence	Is the expanded uncertainty a relative one?
Mass	Mass standards	Subdivision method	1	100	mg	Temperature Relative humidity	((20 to 22) ± 0.5) °C ((40 to 60) ± 3) %	0.8 to 1.2	µg	2	95%	No
			0.1	1	g			1.2 to 3				
			1	10	g			3 to 6				

No blank rows

RIGHT

Quantity/ Class	Instrument or Artifact	Instrument Type or Method	Minimum value	Maximum value	Units	Parameter	Specifications	Value	Units	Coverage Factor	Level of Confidence	Is the expanded uncertainty a relative one?
Mass	Mass standards	Subdivision method	1	100	mg	Temperature	((20 to 22) ± 0.5) °C	0.8 to 1.2	µg	2	95%	No
						Relative humidity	((40 to 60) ± 3) %					
Mass	Mass standards	Subdivision method	0.1	1	g	Temperature	((20 to 22) ± 0.5) °C	1.2 to 3	µg	2	95%	No
						Relative humidity	((40 to 60) ± 3) %					
Mass	Mass standards	Subdivision method	1	10	g	Temperature	((20 to 22) ± 0.5) °C	3 to 6	µg	2	95%	No
						Relative humidity	((40 to 60) ± 3) %					

No vertical merging of cells. Repeat information if necessary

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# CMC file preparation guidelines: CIPM MRA-D-04

## Different ranges

WRONG!

Quantity/ Class	Instrument or Artifact	Instrument Type or Method	Minimum value	Maximum value	Units	Parameter	Specifications	Value	Units	Coverage Factor	Level of Confidence	Is the expanded uncertainty a relative one?
Mass	Mass standards	Subdivision method	1 100 1000	100 1000 10000	mg	Temperature	$((20 \text{ to } 22) \pm 0.5) ^\circ\text{C}$	0.8 to 1.2 1.2 to 3 3 to 6	$\mu\text{g}$	2	95%	No
						Relative humidity	$((40 \text{ to } 60) \pm 3) \%$					

RIGHT

Quantity/ Class	Instrument or Artifact	Instrument Type or Method	Minimum value	Maximum value	Units	Parameter	Specifications	Value	Units	Coverage Factor	Level of Confidence	Is the expanded uncertainty a relative one?
Mass	Mass standards	Subdivision method	1	100	mg	Temperature	$((20 \text{ to } 22) \pm 0.5) ^\circ\text{C}$	0.8 to 1.2	$\mu\text{g}$	2	95%	No
						Relative humidity	$((40 \text{ to } 60) \pm 3) \%$					
Mass	Mass standards	Subdivision method	0.1	1	g	Temperature	$((20 \text{ to } 22) \pm 0.5) ^\circ\text{C}$	1.2 to 3	$\mu\text{g}$	2	95%	No
						Relative humidity	$((40 \text{ to } 60) \pm 3) \%$					
Mass	Mass standards	Subdivision method	1	10	g	Temperature	$((20 \text{ to } 22) \pm 0.5) ^\circ\text{C}$	3 to 6	$\mu\text{g}$	2	95%	No
						Relative humidity	$((40 \text{ to } 60) \pm 3) \%$					

Each range and uncertainty should be a unique CMC

# CMC file preparation guidelines: CIPM MRA-D-04

WRONG!

Calibration or Measurement Service			Measurand Level or Range			Measurement Conditions/Independent Variable		Expanded Uncertainty				
Quantity/ Class	Instrument or Artifact	Instrument Type or Method	Minimum value	Maximum value	Units	Parameter	Specifications	Value	Units	Coverage Factor	Level of Confidence	Is the expanded uncertainty a relative one?
Mass	Mass standards	Subdivision method	1	100	mg	Temperature Relative humidity	((20 to 22) ± 0.5) °C ((40 to 60) ± 3) %	0.8 to 1.2	µg	2	95%	No

RIGHT

Calibration or Measurement Service			Measurand Level or Range			Measurement Conditions/Independent Variable		Expanded Uncertainty				
Quantity/ Class	Instrument or Artifact	Instrument Type or Method	Minimum value	Maximum value	Units	Parameter	Specifications	Value	Units	Coverage Factor	Level of Confidence	Is the expanded uncertainty a relative one?
Mass	Mass standards	Subdivision method	1	100	mg	Temperature	((20 to 22) ± 0.5) °C	0.8 to 1.2	µg	2	95%	No
						Relative humidity	((40 to 60) ± 3) %					

**Each parameter and specification needs its own cell**

# CMC file preparation guidelines: CIPM MRA-D-04

WRONG!

<u>Quantity/ Class</u>	<u>Instrument or Artifact</u>	<u>Instrument Type or Method</u>	<u>Minimum value</u>	<u>Maximum value</u>	<u>Units</u>	<u>Parameter</u>	<u>Specifications</u>	<u>Value</u>	<u>Units</u>	<u>Coverage Factor</u>	<u>Level of Confidence</u>	<u>Is the expanded uncertainty a relative one?</u>
Mass	Mass standards	Subdivision method	1 100 1000	100 1000 10000	mg	Temperature	((20 to 22) ± 0.5) °C	0.8 to 1.2 1.2 to 3 3 to 6	µg	2	95%	No
						Relative humidity	((40 to 60) ± 3) %					



RIGHT

<u>Quantity/ Class</u>	<u>Instrument or Artifact</u>	<u>Instrument Type or Method</u>	<u>Minimum value</u>	<u>Maximum value</u>	<u>Units</u>	<u>Parameter</u>	<u>Specifications</u>	<u>Value</u>	<u>Units</u>	<u>Coverage Factor</u>	<u>Level of Confidence</u>	<u>Is the expanded uncertainty a relative one?</u>
Mass	Mass standards	Subdivision method	1	100	mg	Temperature	((20 to 22) ± 0.5) °C	0.8 to 1.2	µg	2	95%	No
						Relative humidity	((40 to 60) ± 3) %					
Mass	Mass standards	Subdivision method	0.1	1	g	Temperature	((20 to 22) ± 0.5) °C	1.2 to 3	µg	2	95%	No
						Relative humidity	((40 to 60) ± 3) %					
Mass	Mass standards	Subdivision method	1	10	g	Temperature	((20 to 22) ± 0.5) °C	3 to 6	µg	2	95%	No
						Relative humidity	((40 to 60) ± 3) %					

**Individual measurand levels and uncertainties must have separate lines**

# Formatting Do's/Don'ts

- For modifications of an existing CMC set, is the source file from “Get published CMCs”? For the intra-RMO review, recommend asking NMI to resubmit in proper form
  - This will save time/reduce errors for KCDB office
- Is the service category correct?
- Has an NMI service identifier been added?
- A modified CMC submission should show all the existing CMCs, with **red bold** used for changes/additions, and pink background for deletions
- Have the formatting guidelines from CIPM MRA-D-04, section 2 been followed?
- Have the metrology area-specific rules for formatting been followed (additional instructions available for AUV, EM, PR, QM, RI, TF)?
- Published CMCs in the same area/sub-area can be used to guide review

# Formatting Do's/Don'ts

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- ***Note: poorly formatted CMCs can change the focus of the review from a technical one (where reviewers can add the most value) to one of formatting. The TC/WG chair of the submitting NMI's RMO is in the best position to pre-screen CMCs***



# Supporting evidence Do's/Don'ts

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- CIPM MRA-D-04 is not the supporting evidence
- Check status of comparisons used as evidence for CMCs
  - KC reports need to be in Draft B or Final Report
  - SC reports need to be published through the KCDB



Thank you!

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