Bureau International des Poids et Mesures

API KCDB

GUIDE

API KCDB 1.0.13
2026-05-29
www.bipm.org/kcdb

KCDB

1 EXECUTIVE SUMMARY

The Key Comparison Database - KCDB - supports the Mutual Recognition Arrangement of the International Committee for Weights and Measures (CIPM MRA), implemented in 1999. It contains data on Calibration and Measurement Capabilities (CMCs) and comparison results of measurements in physics, chemistry and biology, and ionizing radiation. The KCDB is an evidence-based database: all data included have been reviewed by international groups of experts and approved for mutual recognition.

The KCDB website www.bipm.org/kcdb gives access to the following open access services:

- Search published CMCs in the KCDB
- Search published comparison reports and results
- Information on statistics and recent news on issues linked to CMCs and comparisons
- A set of guidance documents and video demonstrations

The KCDB website also provides a restricted-access platform for users. As such, it gives support for the creation and review of CMCs, as well as tools for the registration of comparisons and submission of comparison reports and associated documents. Statistics on the review process are also available by restricted access.

In 2021 the BIPM made available an Application Programming Interface - API - for search of CMCs on the KCDB.

The API KCDB provides the data as a response of search queries on CMCs. Although it may provide the basis for digital CMCs on a longer term, this API is presently only intended for search on CMCs.

This document provides information on the structure of the KCDB and vocabulary to simplify the implementation of the API.

The BIPM withdraw all responsibility for potential needs of update of the implementation of the API, in case of needed upgrade of the database.

Contents

2 INTRODUCTION

The Key Comparison Database - KCDB - supports the Mutual Recognition Arrangement of the International Committee for Weights and Measures (CIPM MRA), implemented in 1999. It contains data on Calibration and Measurement Capabilities (CMCs) and comparison results of measurements in physics, chemistry and biology [https://www.bipm.org/en/cipm-mra/kcdb]. The KCDB is an evidence-based database: all data included have been reviewed by international groups of experts and approved for mutual recognition.

The KCDB website www.bipm.org/kcdb gives access to the following open access services:

- Search published CMCs in the KCDB
- Search published comparison reports and results
- Information on statistics and recent news on issues linked to CMCs and comparisons
- A set of guidance documents

The KCDB website also provides a restricted-access platform to support the creation and review of CMCs, as well as tools for the registration of comparisons and submission of comparison reports and associated documents. Statistics on the review process are available by restricted access.

The Application Programming Interface developed for the KCDB – **API KCDB** – **provides search facilities on CMCs** via advanced or quick search and is available via

https://www.bipm.org/api/kcdb/swagger-ui/index.html?configUrl=/api/kcdb/v3/api-docs/swagger-config.

The search made via the API KCDB targets the same database as the KCDB web. The generated search results are openly available data that includes published, archived, deleted and greyed out CMCs; comments included for the review process, or user account contents, are not available via the API KCDB.

The contents of the CMCs are framed by a pre-defined vocabulary for services and units, defined and approved by the Consultative Committees (CCs) of the International Committee for Measures and Weights (CIPM). The quantity and its associated uncertainty have a fixed numerical format. Additional non mandatory data are presently in a free format. The information given for a CMC is uttermost the choice and responsibility of the originating institute, for which the CMCs are peer reviewed and approved by the Regional Metrology Organizations [CIPM-MRA G-13] (p. 80).

The API KCDB link contains itself guidance on format of queries and results and gives a set of examples. It has been developed applying RESTful constraints. Nevertheless, a request for a detailed written guide was issued by external beta-testers, the reason for this guide.

The API has been developed using open-source software associated with Swagger[1], applying RESTful (representational state transfer) constraints [Fielding 2000] (p. 80). The API gives access to machine readable data following the FAIR principles - Findable, Accessible, Interoperable and Reusable [GoFAIR] (p. 80).

This guide includes parts of the information already accessible in the help documents https://www.bipm.org/en/cipm-mra/kcdb-help that are associated with the KCDB web: *Getting started on the KCDB web platform*
https://www.bipm.org/documents/20126/43909403/Getting_started_KCDB_platform.pdf/6428cae2-f7de-adce-dabe-c143d591fbbe
and *Help with searching*
https://www.bipm.org/documents/20126/43909403/Help_with_searching_guide.pdf/2fbe5e7c-d330-947a-1efd-d98cb055d66f.
It explains the applied format and the implemented vocabulary. It also gives examples of format for queries and results.

[1] This information is only given as technical information and not for commercial purposes.

3 CMC Model

The CMCs are drafted via a web platform accessible via a user account. The person who drafts the CMC represents the affiliating institute and should make sure that the content of the CMC reflects the targeted service or competence of the institute.

3.1 Domain and Metrology area

Different metrology areas classify their CMCs differently. As a consequence, there are three different structures - domains - depending on the meterology area:

- **PHYSICS**, covering the metrology areas
    - Acoustics, Ultrasound and Vibration (AUV)
    - Electricity and Magnetism (EM)
    - Length (L)
    - Mass and related quantities (M)
    - Photometry and Radiometry (PR)
    - Thermometry (T)
    - Time and Frequency (TF)
- **RADIATION**, covering the metrology area Ionizing Radiation (RI), and
- **CHEM-BIO**, covering the metrology area Chemistry and Biology (QM),

where the domain is indicated in bold.

3.2 CMC CONTENTS

Each domain has a taylored web form to indicate the information requested for the CMC. The web form is accessible to staff members of NMIs having the authority to write and submit CMCs. An example is reproduced in Figure 1, showing a CMC web form for Physics for the metrology area Electricity and Magnetism. More information on how to complete the CMC web form is given in [Getting started] (p. 80).

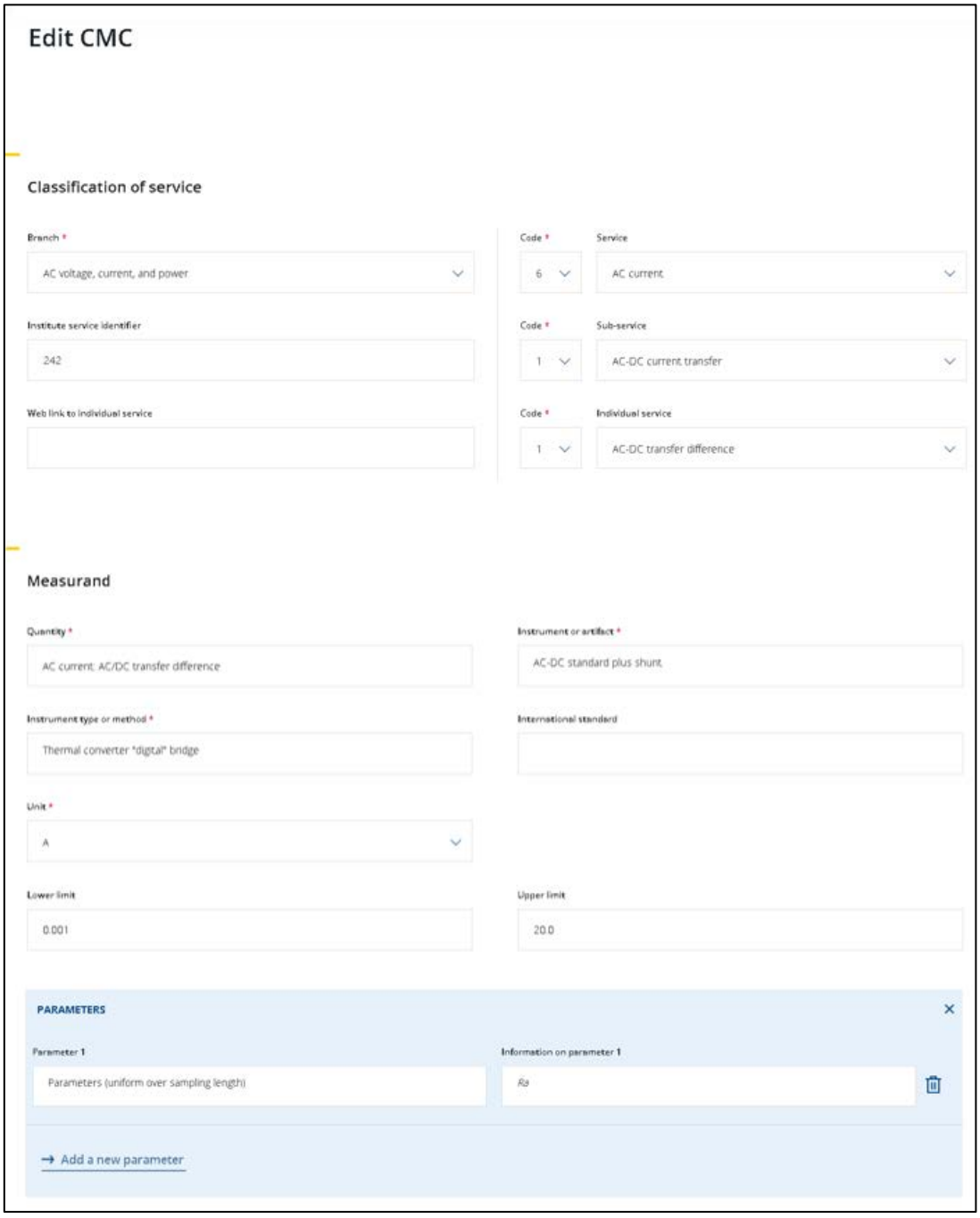

Figure 1 Example of a CMC form in Electricity and Magnetism (Physics)

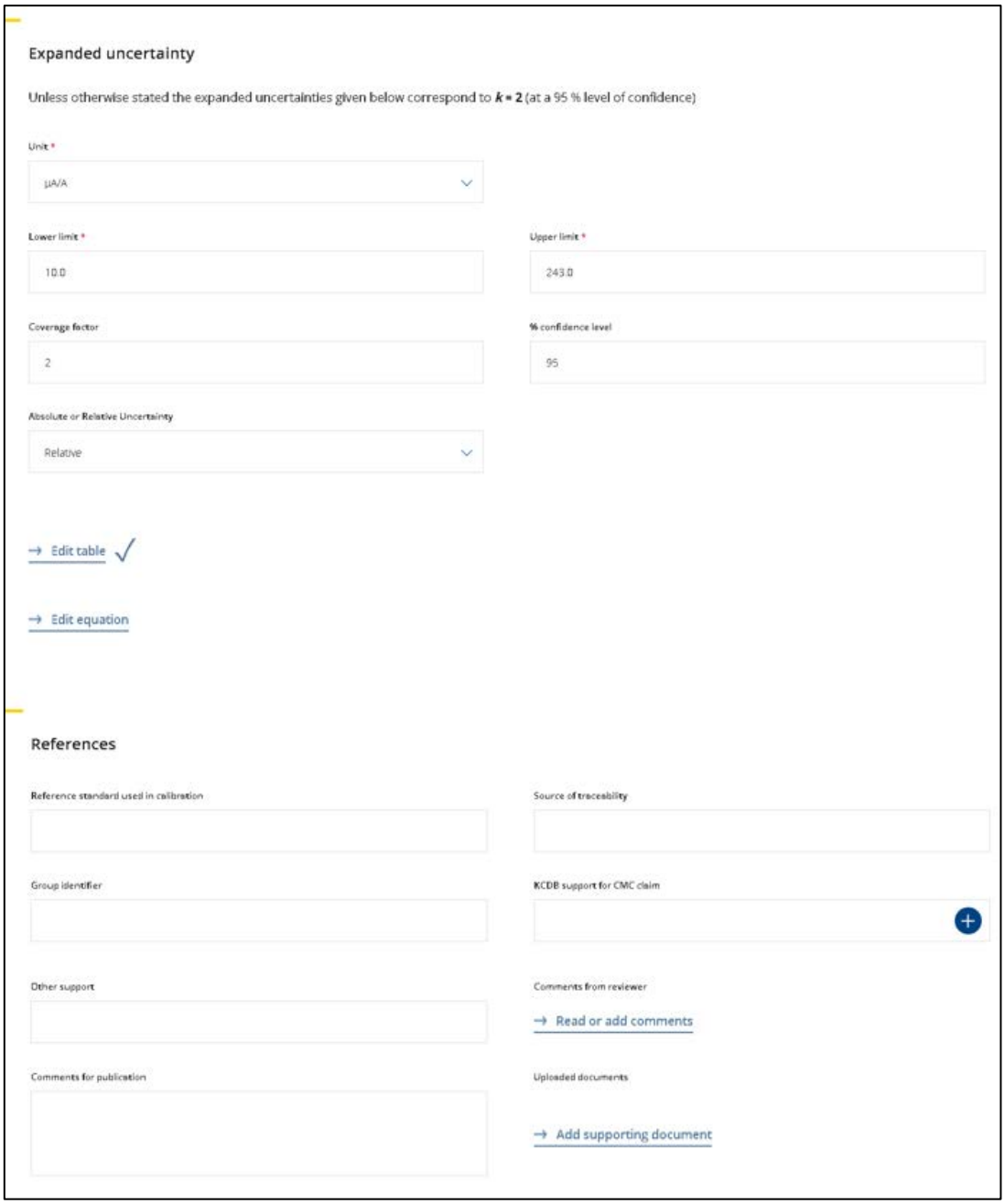

Figure 1. (…continued)

Inputs that have been subject for approval within the CCs are selected from a pre-defined list. Input that has not been subject for limitation by the CCs but where harmonization could be an advantage is based on auto complete, i.e. after writing 3 characters, choices of contents already included in the database are suggested. There are also input based on free text, mainly aimed for the review and not targeted for search.

Parts of the CMC content are displayed via the KCDB web as query results. The information indicated in the form for review purposes is only available to logged-in persons with an adapted profile.

The CMC content is grouped in different sections as listed in Table 1.

Table 1 CMC sections included for each domain

PHYSICS	RADIATION	CHEM-BIO
Classification of service	Classification of service	Classification of service
Measurand	Measurand	Measurand
		CMC value
Expanded Uncertainty	Expanded Uncertainty	Expanded Uncertainty
-	-	CRM value
-	-	CRM Expanded Uncertainty
References	References	References
-	-	Information to reviewer

4 API KCDB STRUCTURE

The web access for the API KCDB contains four main parts:

1. Summarized contents, information on the terms of use and licence, and contact details.

2. An API for the query operations, **cmc-search-data-contoller**, allowing queries and collecting results, and listing the format of the contents.

3. An API for the recovery of the reference data used for the queries, **reference-data-controller**, giving access to machine readable data generated by the queries.

4. A set of **models**, containing information on the format of queries and results.

A screenshot of the API KCDB home page is displayed in Figure 2.

The structure and content of the CMC-search-data-controller, the Reference-data-controller and the Models are indicated in the API. Nevertheless, more details on their representation and role in the KCDB is described in the sub-sections below.

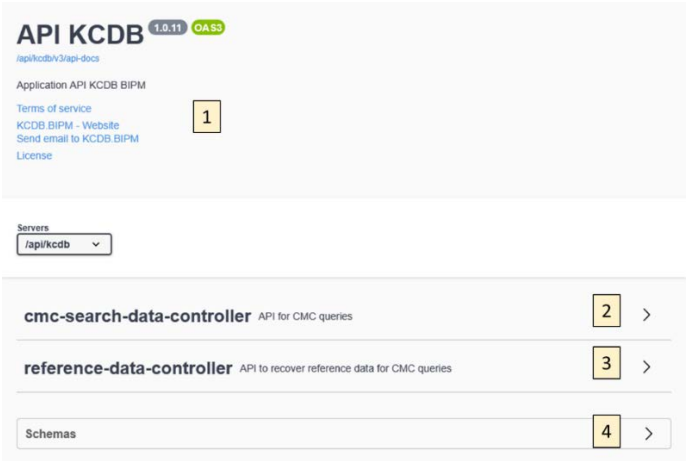

Figure 2 API KCDB Home page (only as illustration, indicated link and version number in the figure may be outdated)

Queries and results are available in XML and JSON. Only the XML representation is listed in this guide.

The vocabulary applied for the API is listed and explained in Appendix 1, Section 1.

4.1 API KCDB Format

The data format is represented in four XSD Schemes covering Advanced search for PHYSICS, RADIATION and CHEM-BIO available from the **CMC-search-data-controller** (cf. #2 in Figure 2).

https://www.bipm.org/api/kcdb/swagger-ui/index.html?configUrl=/api/kcdb/v3/api-docs/swagger-config#/cmc-search-data-controller/xsdSchema

Figure 3 Items included in the Reference-data-controller.

5 CMC CLASSIFICATION AND REFERENCE DATA

The structure, arborescence and vocabulary of the CMC classification is defined and approved by each accociated CC of the CIPM, to fit the purposes for each of the nine metrology areas.

The CMC structure and arborescence for each domain are presented in the following sections, where the data classification is listed in **reference-data-controller**, the API to recover the reference data used for the queries (see #3 Figure 2 and Figure 3).

The Reference Data may be accessed using a cURL for each Reference Data list listed in Appendix 2, Section 11.

5.1 DOMAIN

The classification of CMCs depends on the **domain**:

- **PHYSICS**, covering the metrology areas
    - Acoustics, Ultrasound and Vibration (AUV)
    - Electricity and Magnetism (EM)
    - Length (L)
    - Mass and related quantities (M)
    - Photometry and Radiometry (PR)
    - Thermometry (T)
    - Time and Frequency (TF)
- **RADIATION**, covering the metrology area Ionizing Radiation (RI), and
- **CHEM-BIO**, covering the metrology area Chemistry and Biology (QM),

where the **domain** is indicated in bold.

The reference data directly associated with **domain** is listed in https://www.bipm.org/api/kcdb/swagger-ui/index.html?configUrl=/api/kcdb/v3/api-docs/swagger-config#/reference-data-controller/getDomains (see #5 in Figure 3). The contents of the results are listed in Figure 4 and and an example of results is listed in Figure 5.

```
<ResultsDomain>
 <domains>
  <domains>
   <code>domainCode</code>
   <name>domainName</name>
  </domains>
…
 </domains>
</ResultsDomain>
```

Figure 4 Contents of referenceData domain

```
<ResultsDomain>
 <domains>
  <domains>
   <code>CHEM-BIO</code>
   <name>Chemistry and Biology</name>
  </domains>
  <domains>
   <code>PHYSICS</code>
   <name>General physics</name>
  </domains>
  <domains>
   <code>RADIATION</code>
   <name>Ionizing radiation</name>
  </domains>
 </domains>
</ResultsDomain>
```

Figure 5 Example of referenceData domain

5.2 CMC CLASSIFICATION FOR PHYSICS

The Classification of CMCs in PHYSICS is illustrated in Figure 6.

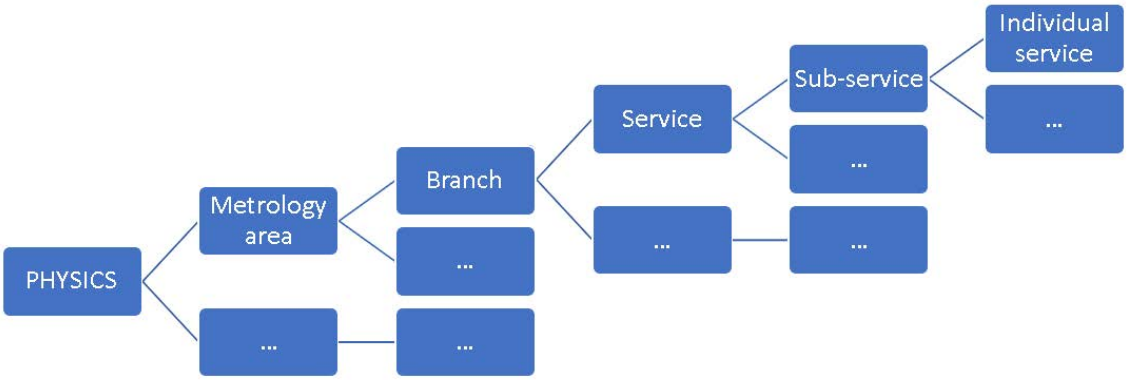

Figure 6 Structure of the CMC classification for metrology areas of "PHYSICS"

As a consequence of the arborescence, it is necessary to indicate **domain** to select **branch**; it is necessary to indicate **branch** to select **service,** etc...

5.2.1 Metrology Area

The reference data directly associated with **metrologyArea** is listed in https://www.bipm.org/api/kcdb/swagger-ui/index.html?configUrl=/api/kcdb/v3/api-docs/swagger-config#/reference-data-controller/getMetrologyAreas (see #7 in Figure 3).

Mandatory parameter: To generate the metrology areas the **domainCode** must be indicated, see Figure 7. The contents of the results are listed in Figure 8.

```
<ResultsReferenceData>
 <referenceData>
  <referenceData>
   <id>metrologyAreaID</id>
   <label>metrologyAreaLabel</label>
   <value>metrologyAreaValue</value>
  </referenceData>
 </referenceData>
</ResultsReferenceData>
```

Figure 7 Contents of referenceData metrologyArea

```
<ResultsReferenceData>
 <referenceData>
  <referenceData>
   <id>1</id>
   <label>AUV</label>
   <value>Acoustics, Ultrasound, Vibration</value>
  </referenceData>
…
 </referenceData>
</ResultsReferenceData>
```

Figure 8 Example of referenceData metrologyArea

5.2.2 Branch

The reference data directly associated with **branch** is listed in https://www.bipm.org/api/kcdb/swagger-ui/index.html?configUrl=/api/kcdb/v3/api-docs/swagger-config#/reference-data-controller/getBranches (see #2 in Figure 3).

Mandatory parameter: To generate the branches the **metrologyAreaLabel** must be indicated, see Figure 7

The contents of the results are listed in Figure 9 and an example of results is listed in Figure 10.

```
<ResultsReferenceData>
 <referenceData>
  <referenceData>
  <id>branchID</id>
  <label>branchLabel</label>
  <value>branchValue</value>
  </referenceData>
…
 </referenceData>
</ResultsReferenceData>
```

Figure 9 Contents of referenceData branch

```
<ResultsReferenceData>
 <referenceData>
  <referenceData>
   <id>14</id>
   <label>M/Dens</label>
   <value>Density</value>
  </referenceData>
…
 </referenceData>
</ResultsReferenceData>
```

Figure 10 Example of referenceData branch

5.2.3 Service, sub-service and individual service

The classification of Service, Sub-service and Individual service are coded by 3 integers (K, L and M), respectively, separated by a point (.), where the Individual Service represents the ultimate service available at the originating institute. The code K.L.M is referred to as physicsCode.

The classification is accessible via the following links:

Metrology area	Link
AUV	https://www.bipm.org/utils/common/pdf/KCDB_2.0/CMC_services/AUV_services.pdf
EM	https://www.bipm.org/utils/common/pdf/KCDB_2.0/CMC_services/EM_services.pdf
L	https://www.bipm.org/utils/common/pdf/KCDB_2.0/CMC_services/L_services.pdf
M	https://www.bipm.org/utils/common/pdf/KCDB_2.0/CMC_services/M_services.pdf
PR	https://www.bipm.org/utils/common/pdf/KCDB_2.0/CMC_services/PR_services.pdf
T	https://www.bipm.org/utils/common/pdf/KCDB_2.0/CMC_services/T_services.pdf
TF	https://www.bipm.org/utils/common/pdf/KCDB_2.0/CMC_services/TF_services.pdf

The reference data directly associated with **service** is listed in https://www.bipm.org/api/kcdb/swagger-ui/index.html?configUrl=/api/kcdb/v3/api-docs/swagger-config#/reference-data-controller/getServices (see #11 in Figure 3).

Mandatory parameter: To generate the services the **branchLabel** must be indicated, see Figure 9

The contents of the results are listed in Figure 11 and an example of results is listed in Figure 12.

```
<ResultsReferenceData>
 <referenceData>
  <referenceData>
   <id>servideID</id>
   <label>serviceLabel</label>
   <value>serviceValue</value>
  </referenceData>
…
 </referenceData>
</ResultsReferenceData>
```

Figure 11 Contents of referenceData service

```
<ResultsReferenceData>
 <referenceData>
  <referenceData>
   <id>16</id>
   <label>6</label>
   <value>AC current</value>
  </referenceData>
…
 </referenceData>
</ResultsReferenceData>
```

Figure 12 Example of referenceData service

The reference data directly associated with **subService** is listed in https://www.bipm.org/api/kcdb/swagger-ui/index.html?configUrl=/api/kcdb/v3/api-docs/swagger-config#/reference-data-controller/getSubServices (see #13 in Figure 3).

Mandatory parameter: To generate the sub-services the **serviceLabel** must be indicated, see Figure 11.

The contents of the results are listed in Figure 13 and an example of results is listed in Figure 14.

```
<ResultsReferenceData>
 <referenceData>
  <referenceData>
   <id>subServideID</id>
   <label>subServiceLabel</label>
   <value>subServiceValue</value>
  </referenceData>
…
 </referenceData>
</ResultsReferenceData>
```

Figure 13 Contents of referenceData subService

```
<ResultsReferenceData>
 <referenceData>
  <referenceData>
   <id>35</id>
   <label>3</label>
   <value>AC current ratio up to 100 A</value>
  </referenceData>
…
 </referenceData>
</ResultsReferenceData>
```

Figure 14 Example of referenceData subService

The reference data directly associated with **individualService** is listed in https://www.bipm.org/api/kcdb/swagger-ui/index.html?configUrl=/api/kcdb/v3/api-docs/swagger-config#/reference-data-controller/getIndividualServices (see #6 in Figure 3).

Mandatory parameter: To generate the individual services the **subServiceLabel** must be indicated, see Figure 13

The contents of the results are listed in Figure 15 and an example of results is listed in Figure 16.

```
<ResultsReferenceData>
 <referenceData>
  <referenceData>
   <id>individualServideID</id>
   <label>individualServiceLabel</label>
   <value>individualServiceValue</value>
  </referenceData>
…
 </referenceData>
</ResultsReferenceData>
```

Figure 15 Contents of referenceData individualService

```
<ResultsReferenceData>
 <referenceData>
  <referenceData>
   <id>76</id>
   <label>2</label>
   <value>Meters</value>
  </referenceData>
…
 </referenceData>
</ResultsReferenceData>
```

Figure 16 Example of referenceData individualService

5.3 CMC CLASSIFICATION FOR IONIZING RADIATION

The Classification of CMCs in RADIATION is illustrated inFigure 17.

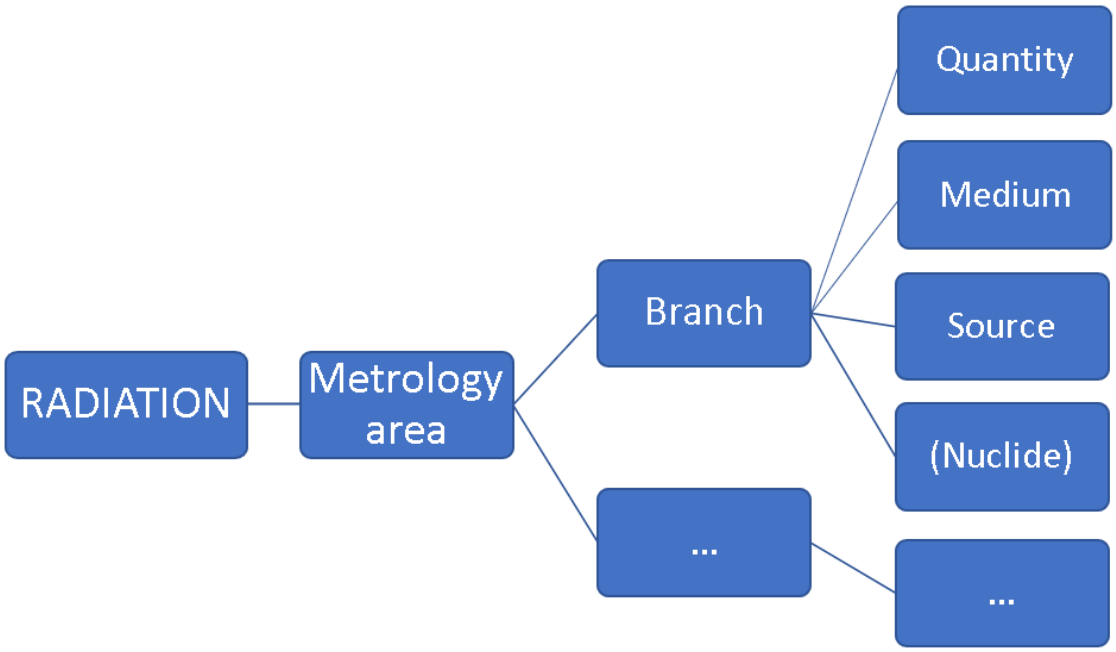

Figure 17 Structure of the CMC classification for "RADIATION"

As a consequence of the arborescence, it is necessary to indicate **domain** to select **branch**. For each branch a set of Quantity, Medium and Source has been defined which can be combined independently. For Radioactivity **nuclide** is associated mandatorely.

5.3.1 Metrology Area

The reference data directly associated with **metrologyArea** is listed in https://www.bipm.org/api/kcdb/swagger-ui/index.html?configUrl=/api/kcdb/v3/api-docs/swagger-config#/reference-data-controller/getMetrologyAreas (see #8 in Figure 3).

Mandatory parameter: To generate the metrology areas the **domainCode** must be indicated, see Figure 4.

The contents of the results are listed in Figure 18 and an example of results is listed in Figure 19.

```
<ResultsReferenceData>
 <referenceData>
  <referenceData>
   <id>metrologyAreaID</id>
   <label>metrologyAreaLabel</label>
   <value>metrologyAreaValue</value>
  </referenceData>
 </referenceData>
</ResultsReferenceData>
```

Figure 18 Contents of referenceData metrologyArea

```
<ResultsReferenceData>
 <referenceData>
  <referenceData>
   <id>9</id>
   <label>RI</label>
   <value>Ionizing Radiation</value>
  </referenceData>
 </referenceData>
</ResultsReferenceData>
```

Figure 19 Example of referenceData metrologyArea

The classification of services in RADIATION is coded by 4 components, respectively according to the following scheme:
https://www.bipm.org/utils/common/pdf/KCDB_2.0/CMC_services/RI_services.pdf

5.3.1 Branch

The reference data directly associated with **branch** is listed in https://www.bipm.org/api/kcdb/swagger-ui/index.html?configUrl=/api/kcdb/v3/api-docs/swagger-config#/reference-data-controller/getBranches (see #2 in Figure 3).

Mandatory parameter: To generate the branches the **metrologyAreaLabel** must be indicated, see Figure 7.

The contents of the results are listed in Figure 20 and an example of results is listed in Figure 21.

```
<ResultsReferenceData>
 <referenceData>
  <referenceData>
  <id>branchID</id>
  <label>branchLabel</label>
  <value>branchValue</value>
  </referenceData>
…
 </referenceData>
</ResultsReferenceData>
```

Figure 20 Contents of referenceData branch

```
<ResultsReferenceData>
 <referenceData>
  <referenceData>
   <id>32</id>
   <label>DOS</label>
   <value>Dosimetry</value>
  </referenceData>
…
 </referenceData>
</ResultsReferenceData>
```

Figure 21 Example of referenceData branch

5.3.2 Quantity

The reference data directly associated with **quantity** is listed in https://www.bipm.org/api/kcdb/swagger-ui/index.html?configUrl=/api/kcdb/v3/api-docs/swagger-config#/reference-data-controller/getQuantities (see #9 in Figure 3). The contents of the results are listed in Figure 22 and an example of results is listed in Figure 23.

```
<ResultsReferenceData>
 <referenceData>
  <referenceData>
   <id>quantityID</id>
   <label>quantityLabel</label>
   <value>quantityValue</value>
  </referenceData>
…
 </referenceData>
</ResultsReferenceData>
```

Figure 22 Contents of referenceData quantity

```
<ResultsReferenceData>
 <referenceData>
  <referenceData>
   <id>15</id>
   <label>15</label>
   <value>Absorbed dose/rate</value>
  </referenceData>
…
 </referenceData>
</ResultsReferenceData>
```

Figure 23 Example of referenceData quantity

5.3.3 Medium

The reference data directly associated with **medium** is listed in https://www.bipm.org/api/kcdb/swagger-ui/index.html?configUrl=/api/kcdb/v3/api-docs/swagger-config#/reference-data-controller/getMediums (see #10 in Figure 3). The contents of the results are listed in Figure 24 and an example of results is listed in Figure 25

```
<ResultsReferenceData>
 <referenceData>
  <referenceData>
   <id>mediumID</id>
   <label>mediumLabel</label>
   <value>mediumValue</value>
  </referenceData>
…
 </referenceData>
</ResultsReferenceData>
```

Figure 24 Contents of referenceData medium

```
<ResultsReferenceData>
 <referenceData>
  <referenceData>
   <id>2</id>
   <label>2</label>
   <value>Gas</value>
  </referenceData>
…
 </referenceData>
</ResultsReferenceData>
```

Figure 25 Example of referenceData medium

5.3.4 Source

The reference data directly associated with **source** is listed at https://www.bipm.org/api/kcdb/swagger-ui/index.html?configUrl=/api/kcdb/v3/api-docs/swagger-config#/reference-data-controller/getSources (see #11 in Figure 3). The contents of the results are listed in Figure 26 and an example of results is listed in Figure 27.

```
<ResultsReferenceData>
 <referenceData>
  <referenceData>
   <id>sourceID</id>
   <label>sourceLabel</label>
   <value>sourceValue</value>
  </referenceData>
…
 </referenceData>
</ResultsReferenceData>
```

Figure 26 Contents of referenceData source

```
<ResultsReferenceData>
 <referenceData>
  <referenceData>
   <id>3</id>
   <label>3</label>
   <value>Beta radiation</value>
  </referenceData>
…
 </referenceData>
</ResultsReferenceData>
```

Figure 27 Example of referenceData source

5.3.5 Nuclide

Nuclide is only available for branch “RAD”.

The reference data directly associated with **nuclide** is listed in https://www.bipm.org/api/kcdb/swagger-ui/index.html?configUrl=/api/kcdb/v3/api-docs/swagger-config#/reference-data-controller/getNuclides (see #8 in Figure 3). The contents of the results are listed in Figure 28 and an example of results is listed in Figure 29.

```
<ResultsReferenceData>
 <referenceData>
  <referenceData>
   <id>nuclideID</id>
   <label>nuclideLabel</label>
   <value>nuclideValue</value>
  </referenceData>
…
 </referenceData>
</ResultsReferenceData>
```

Figure 28 Contents of referenceData nuclide

```
<ResultsReferenceData>
 <referenceData>
  <referenceData>
   <id>2</id>
   <label>Br-82</label>
   <value>Br-82</value>
  </referenceData>
…
 </referenceData>
</ResultsReferenceData>
```

Figure 29 Example of referenceData nuclide

5.4 CMC CLASSIFICATION FOR CHEMISTRY - BIOLOGY

The Classification of CMCs in CHEM-BIO is illustrated in Figure 30.

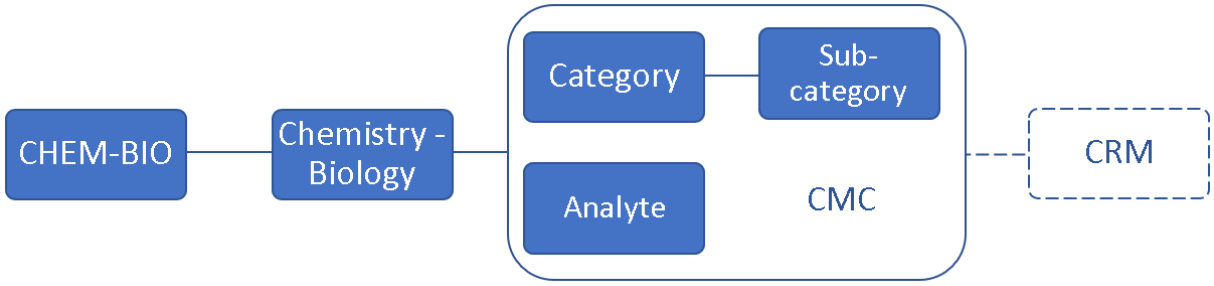

Figure 30 Structure of the CMC classification for "CHEM-BIO"

Each CMC is associated with a category and analyte which are intrinsically independent. A CMC may be associate to a Certified Reference Material (CRM) which is declared for the same category and analyte, but that can have a different measurement range or uncertainty.

5.4.1 Metrology Area

The reference data directly associated with **metrologyArea** is listed in https://www.bipm.org/api/kcdb/swagger-ui/index.html?configUrl=/api/kcdb/v3/api-docs/swagger-config#/reference-data-controller/getMetrologyAreas (see #7 in Figure 3).

Mandatory parameter: To generate the metrology areas the **domainCode** must be indicated, see Figure 4.

The contents of the results are listed in Figure 31 and an example of results is listed in Figure 32.

```
<ResultsReferenceData>
 <referenceData>
  <referenceData>
   <id>metrologyAreaID</id>
   <label>metrologyAreaLabel</label>
   <value>metrologyAreaValue</value>
  </referenceData>
 </referenceData>
</ResultsReferenceData>
```

Figure 31 Contents of referenceData metrologyArea

```
<ResultsReferenceData>
 <referenceData>
  <referenceData>
   <id>8</id>
   <label>QM</label>
   <value>Chemistry and Biology</value>
  </referenceData>
 </referenceData>
</ResultsReferenceData>
```

Figure 32 Example of referenceData metrologyArea

5.4.2 Category

The reference data directly associated with **category** are listed in https://www.bipm.org/api/kcdb/swagger-ui/index.html?configUrl=/api/kcdb/v3/api-docs/swagger-config#/reference-data-controller/getCategories (see #3 in Figure 3). The contents of the results are listed in Figure 33 and and an example of results is listed in Figure 34.

```
<ResultsReferenceData>
 <referenceData>
  <referenceData>
   <id>categoryID</id>
   <label>categoryLabel</label>
   <value>categoryValue</value>
  </referenceData>
…
 </referenceData>
</ResultsReferenceData>
```

Figure 33 Contents of referenceData category

```
<ResultsReferenceData>
 <referenceData>
  <referenceData>
   <id>1</id>
   <label>1</label>
   <value>High purity chemicals</value>
  </referenceData>
…
 </referenceData>
</ResultsReferenceData>
```

Figure 34 Example of referenceData category

5.4.3 Analyte

The reference data directly associated with **analyte** are listed in https://www.bipm.org/api/kcdb/swagger-ui/index.html?configUrl=/api/kcdb/v3/api-docs/swagger-config#/reference-data-controller/getAnalytes (see #1 in Figure 3).

The contents of the results are listed in Figure 35 and and an example of results is listed in Figure 36.

```
<ResultsReferenceData>
 <referenceData>
  <referenceData>
   <id>analyteID</id>
   <label>analyteLabel</label>
   <value>analyteValue</value>
  </referenceData>
…
 </referenceData>
</ResultsReferenceData>
```

Figure 35 Contents of referenceData analyte

```
<ResultsReferenceData>
 <referenceData>
  <referenceData>
   <id>1</id>
   <label>nitrogen</label>
   <value>nitrogen</value>
  </referenceData>
…
 </referenceData>
</ResultsReferenceData>
```

Figure 36 Example of referenceData analyte

6 QUERY STRUCTURE

The query structure is aligned with the search format used for the KCDB web site. The search routines are carried out via Elasticsearch where the search codes used for the API KCDB are the same as used in the indexing of the targeted data.

The KCDB search facilities are described in [Help Search].

There are two types of queries: **advanced search** based on predefined menus, and **quick search** which is a free key word search facility.

As has been demonstrated in 5.1, each domain has a different structure. For this reason there are three different advanced seach structures, one for each domain.

The quick search facility is global and interogates all CMCs not matter which domainis concerned.

Each of the four query configurations are presented below and accompanied by examples of queries and results. A complementary vocabulary is listed Appendix 1, Section 1.The associated cURLs are listed in Appendix 3, 12.

The advanced search query for PHYSICS is available at https://www.bipm.org/api/kcdb/swagger-ui/index.html?configUrl=/api/kcdb/v3/api-docs/swagger-config#/cmc-search-data-controller/advancedSearchPhysics

The description of contents of a query is indicated in Figure 37.

Mandatory parameter: The red dot indicates mandatory parameters. The red dot should not be included in the request.

Key words may be separated by AND and OR.

An example of query is listed in Figure 38.

```
<?xml version="1.0" encoding="UTF-8"?>
<SearchCriteriaPhysics>
● <page>seePageNumber</page>
● <pageSize>desired number of elements per page</pageSize>
● <showTable>booleanTable</showTable>
● <metrologyAreaLabel>metrologyAreaLabel</metrologyAreaLabel>
  <branchLabel>branchLabel</branchLabel>
  <physicsCode>physicsCode</physicsCode>
  <keywords>keywords</keywords>
  <countries>
    <countryLabel>countryLabel</countryLabel>
    <countryLabel>countryLabel</countryLabel>
  </countries>
  <publicDateFrom>dateISO</publicDateFrom>
  <publicDateTo>dateISO</publicDateTo>
  <status>Status</status>
</SearchCriteriaPhysics>
```

Figure 37 Description of contents of a query for Advanced Search for PHYSICS. The red dot indicates mandatory parameters. The red dot should not be included in the request.

```
<?xml version="1.0" encoding="UTF-8"?>
<SearchCriteriaPhysics>
  <page>0</page>
  <pageSize>20</pageSize>
  <showTable>false</showTable>
  <metrologyAreaLabel>EM</metrologyAreaLabel>
  <branchLabel>EM/RF</branchLabel>
  <physicsCode>11.3.3</physicsCode>
  <keywords>phase OR multichannel OR water</keywords>
  <countries>
    <countryLabel>CH</countryLabel>
    <countryLabel>FR</countryLabel>
  </countries>
  <publicDateFrom>2005-01-31</publicDateFrom>
  <publicDateTo>2025-09-30</publicDateTo>
   <status>Published</status>
</SearchCriteriaPhysics>
```

Figure 38 Example of contents of a query for Advanced Search for PHYSICS.

For the corresponding cURL, see Example of cURL for Advanced search in PHYSICS.

6.1 ADVANCED SEARCH FOR IONIZING RADIATION

The advanced search query for RADIATION is available at https://www.bipm.org/api/kcdb/swagger-ui/index.html?configUrl=/api/kcdb/v3/api-docs/swagger-config#/cmc-search-data-controller/advancedSearchRadiation

The description of contents of a query is indicated in Figure 39.

Mandatory parameter: The red dot indicates mandatory parameters. The red dot should not be included in the request.

Key words may be separated by AND and OR.

An example of query is listed in Figure 40.

```
<?xml version="1.0" encoding="UTF-8"?>
<SearchCriteriaRadiation>
● <page>seePageNumber</page>
● <pageSize>desired number of elements per page</pageSize>
● <showTable>booleanTable</showTable>
● <metrologyAreaLabel>metrologyAreaLabel</metrologyAreaLabel>
  <branchLabel>branchLabel</branchLabel>
  <quantityLabel>quantityLabel</quantityLabel>
  <mediumLabel>mediumLabel</mediumLabel>
  <sourceLabel>sourceLabel</sourceLabel>
  <nuclideLabel>nuclideLabel</nuclideLabel>
  <keywords>keywords</keywords>
  <countries>
    <countryLabel>countryLabel</countryLabel>
    <countryLabel>countryLabel</countryLabel>
  </countries>
  <publicDateFrom>dateISO</publicDateFrom>
  <publicDateTo>dateISO</publicDateTo>
  <status>Status</status>
</SearchCriteriaRadiation>
```

Figure 39 Description of contents of a query for Advanced Search for RADIATION. The red dot indicates mandatory parameters. The red dot should not be included in the request.

```
<?xml version="1.0" encoding="UTF-8"?>
<SearchCriteriaRadiation>
    <page>0</page>
    <pageSize>20</pageSize>
    <showTable>false</showTable>
    <metrologyAreaLabel>RI</metrologyAreaLabel>
    <branchLabel>RAD</branchLabel>
    <quantityLabel>1</quantityLabel>
    <mediumLabel>3</mediumLabel>
    <sourceLabel>2</sourceLabel>
    <nuclideLabel>Co-60</nuclideLabel>
    <keywords>phase OR multichannel OR water</keywords>
    <countries>
        <countryLabel>CH</countryLabel>
        <countryLabel>JP</countryLabel>
    </countries>
    <publicDateFrom>2005-01-31</publicDateFrom>
    <publicDateTo>2020-06-30</publicDateTo>
     <status>Published</status>
</SearchCriteriaRadiation>
```

Figure 40 Example of contents of a query for Advanced Search for RADIATION.

For the corresponding cURL, see Example of cURL for Advanced search in RADIATION.

6.2 ADVANCED SEARCH FOR CHEMISTRY AND BIOLOGY

The advanced search query for CHEM-BIO is available at

https://www.bipm.org/api/kcdb/swagger-ui/index.html?configUrl=/api/kcdb/v3/api-docs/swagger-config#/cmc-search-data-controller/advancedSearchChemistryAndBiology

The description of contents of a query is indicated inFigure 41.

Mandatory parameter: The red dot indicates mandatory parameters. The red dot should not be included in the request.

Key words may be separated by AND and OR.

An example of query is listed in Figure 42.

```
<?xml version="1.0" encoding="UTF-8"?>
<SearchCriteriaChemistryAndBiology>
● <page>seePageNumber</page>
● <pageSize>desired number of elements per page</pageSize>
● <showTable>booleanTable</showTable>
● <metrologyAreaLabel>metrologyAreaLabel</metrologyAreaLabel>
  <categoryLabel>categoryLabel</categoryLabel>
  <analyteLabel>analyteLabel</analyteLabel>
  <keywords>keywords</keywords>
  <countries>
    <countries>countryLabel</countries>
    <countries>countryLabel</countries>
  </countries>
  <publicDateFrom>dateISO</publicDateFrom>
  <publicDateTo>dateISO</publicDateTo>
  <status>Status</status>
</SearchCriteriaChemistryAndBiology>
```

Figure 41 Description of contents of a query for Advanced Search for CHEM-BIO. The red dot indicates mandatory parameters. The red dot should not be included in the request.

```
<?xml version="1.0" encoding="UTF-8"?>
<SearchCriteriaChemistry>
    <page>0</page>
    <pageSize>20</pageSize>
    <showTable>false</showTable>
    <areaCode>QM</areaCode>
    <categoryIdentifier>5</categoryIdentifier>
    <analyte>antimony</analyte>
    <keywords>phase OR multichannel OR water</keywords>
    <countries>
      <countries>CH</countries>
      <countries>FR</countries>
    </countries>
    <publicDateFrom>2005-01-31</publicDateFrom>
    <publicDateTo>2025-09-30</publicDateTo>
    <status>Published</status>
</SearchCriteriaChemistry>
```

Figure 42 Example of contents of a query for Advanced Search for CHEM-BIO.

For the corresponding cURL, see Example of cURL for Advanced search in CHEM-BIO.

6.3 QUICK SEARCH

The quick search query for CMCs in all domains is available at https://www.bipm.org/api/kcdb/swagger-ui/index.html?configUrl=/api/kcdb/v3/api-docs/swagger-config#/cmc-search-data-controller/quickSearch

The description of contents of a query is indicated in Figure 43.

Mandatory parameter: The red dot indicates mandatory parameters. The red dot should not be included in the request.

Key words may be separated by AND and OR.

An example of query is listed in Figure 44.

```
<?xml version="1.0" encoding="UTF-8"?>
<QuickSearchCriteria>
● <page>requested page number (0 = first, 1 = second…)</page>
● <pageSize>desired number of elements per page</pageSize>
● <showTable>boolean to see hide or see the uncertainty table</showTable>
● <keywords>keyword(s) separated by AND or OR</keywords>
  <includedFilters>
    <includedFilters>filter on domainCode</includedFilters>
    <includedFilters>filter on branchValue</includedFilters>
  </includedFilters>
  <excludedFilters>
    <excludedFilters>serviceValue not to include in results</excludedFilters>
    <excludedFilters>serviceValue not to include in results</excludedFilters>
  </excludedFilters>
  <status>Status</status>
</QuickSearchCriteria>
```

Figure 43 Description of contents of a query for Quick Search (all domains). The red dot indicates mandatory parameters. The red dot should not be included in the request.

```
<?xml version="1.0" encoding="UTF-8"?>
<QuickSearchCriteria>
    <page>0</page>
    <pageSize>20</pageSize>
    <showTable>false</showTable>
    <keywords>phase OR test</keywords>
    <includedFilters>
        <includedFilters>cmcDomain.PHYSICS</includedFilters>
        <includedFilters>cmcBranches.Dimensional metrology</includedFilters>
    </includedFilters>
    <excludedFilters>
        <excludedFilters>cmcServices.Form</excludedFilters>
        <excludedFilters>cmcServices.Complex geometry</excludedFilters>
    </excludedFilters>
    <status>Published</status>
</QuickSearchCriteria>
```

Figure 44 Example of contents of a query for Quick Search (all domains). The red dot indicates mandatory parameters. The red dot should not be included in the request.

For the corresponding cURL, see Example of cURL for Quick search.

6.3.1 Filters for Quick search

As shown in the model and example of Figure 43 and Figure 44, respectively, it is possible to program filters for quick search queries.

It is possible to use **includedFilters** which will give access to data that correspond to the filter. It is possible to use **excludedFilters** which will remove data that correspond to the filter.

The filter on **domain** is dominating – other **includedFilter** that does not correspond to the domain will be neglected.

Table 2 List of includedFilter

Targeted domain	includedFilter	Example
ALL	cmcDomain	cmcDomain.PHYSICS
	cmcRMO	cmc.AFRIMETS
PHYSICS	cmcBranches	cmcBranches.Mass
CHEM-BIO	cmcMaterial	cmcMaterial.water
	cmcAnalyte	cmcAnalyte.copper
RADIATION	cmcQuantity	cmcQuantyity.Activity

For **excludedFilters**, again the filter on **domain** is dominating – **excludedFilter** that does not correspond to the domain will be neglected.

Table 3 List of excludedFilter

Targeted domain	excludedFilter	Example
ALL	cmcDomain	cmcDomain.PHYSICS
	cmcRMO	cmcRMO.AFRIMETS
PHYSICS	cmcBranches	cmcBranches.Mass
	cmcServices	cmcServices.AC current
CHEM-BIO	cmcMaterial[2]	cmcMaterial.water
	cmcAnalyte	cmcAnalyte.copper
RADIATION	cmcQuantity	cmcQuantyity.Activity

7 QUERY RESULTS

The query results are the same as obtained from search using the KCDB web page, with slightly extended information. The extension covers notably information on the API version and status.

A first part of the results on Advanced search is in common, followed by data specific to the domain. The latter data is indicated in the lists below with a light yellow background.

7.1 RESULTS FROM ADVANCED SEARCH FOR PHYSICS

Below is listed an example of the results from advanced search after having made the query listed in Figure 38. The information listed on yellow background is specific to Physics.


```
<ResultsPhysics>
  <versionApiKcdb>1.0.12</versionApiKcdb>
  <pageNumber>0</pageNumber>
  <pageSize>20</pageSize>
  <numberOfElements>1</numberOfElements>
  <totalElements>1</totalElements>
  <totalPages>1</totalPages>
  <data>
    <data>
      <id>45729</id>
      <status>Published</status>
```


[2] Identical to “matrix”.

```
    <statusDate>2025-08-28</statusDate>
    <kcdbCode>EURAMET-EM-CH-00000GFB-7</kcdbCode>
    <domainCode>PHYSICS</domainCode>
    <metrologyAreaLabel>EM</metrologyAreaLabel>
    <rmo>EURAMET</rmo>
    <countryValue>Switzerland</countryValue>
    <nmiCode>METAS</nmiCode>
    <nmiName>Federal Institute of Metrology</nmiName>
    <nmiIdentifier>104</nmiIdentifier>
    <nmiRorIdentifier>0115xv923</nmiRorIdentifier>
    <nmiWikiDataIdentifier>Q1005465</nmiWikiDataIdentifier>
    <nmiServiceCode>217.01.04</nmiServiceCode>
    <nmiServiceLink>
    </nmiServiceLink>
    <quantityValue>Scattering parameters: transmission coefficient (Sij) in coaxial
line, phase</quantityValue>
    <cmc>
     <lowerLimit>-180.0</lowerLimit>
     <upperLimit>180.0</upperLimit>
     <unit>degree</unit>
    </cmc>
    <cmcUncertainty>
     <lowerLimit>0.2</lowerLimit>
     <upperLimit>1.4</upperLimit>
     <unit>degree</unit>
    </cmcUncertainty>
    <cmcBaseUnit>
     <lowerLimit>-3.141592653589794</lowerLimit>
     <upperLimit>3.141592653589794</upperLimit>
     <unit>rad</unit>
    </cmcBaseUnit>
    <cmcUncertaintyBaseUnit>
     <lowerLimit>0.0034906585039886605</lowerLimit>
     <upperLimit>0.024434609527920616</upperLimit>
     <unit>rad</unit>
    </cmcUncertaintyBaseUnit>
    <confidenceLevel>95.0</confidenceLevel>
    <coverageFactor>2.0</coverageFactor>
    <uncertaintyEquation>
     <equation>
     </equation>
     <equationComment>
     </equationComment>
    </uncertaintyEquation>
    <uncertaintyTable>
     <tableName>Scat_coax_atten_phase</tableName>
     <tableRows>122</tableRows>
     <tableCols>13</tableCols>
```

```
      <tableComment>
      </tableComment>
      <tableContents>&lt;masked></tableContents>
    </uncertaintyTable>
    <uncertaintyMode>Absolute</uncertaintyMode>
    <traceabilitySource>METAS</traceabilitySource>
    <comments>
    </comments>
    <groupIdentifier>F</groupIdentifier>
    <publicationDate>2025-08-28</publicationDate>
    <approvalDate>2025-08-22</approvalDate>
    <internationalStandard/>
    <branchValue>Radio frequency measurements</branchValue>
    <branchLabel>EM/RF</branchLabel>
    <serviceValue>Radio frequency measurements</serviceValue>
    <subServiceValue>Scattering parameters (vectors)</subServiceValue>
    <individualServiceValue>Transmission coefficient in coaxial line (real and
imaginary)</individualServiceValue>
    <physicsCode>11.3.3</physicsCode>
    <kcdbServiceCategory>EM/RF-11.3.3</kcdbServiceCategory>
    <instrument>Passive device</instrument>
    <instrumentMethod>Vector network analyser</instrumentMethod>
    <parameters>
      <parameters>
        <parameterName>Frequency</parameterName>
        <parameterValue>9 kHz to 116.5 GHz</parameterValue>
      </parameters>
      <parameters>
        <parameterName>Connector</parameterName>
        <parameterValue>BNC 50 ohm,&lt;br />&#xd;
Type-N 75 ohm,&lt;br />&#xd;
4.3-10&lt;br />&#xd;
Type-N 50 ohm,&lt;br />&#xd;
PC-7 mm,&lt;br />&#xd;
NEX10,&lt;br />&#xd;
PC-3.5 mm,&lt;br />&#xd;
PC-2.92 mm,&lt;br />&#xd;
PC-2.4 mm,&lt;br />&#xd;
PC-1.85 mm,&lt;br />&#xd;
PC-1.0 mm</parameterValue>
      </parameters>
      <parameters>
        <parameterName>S11 and S22</parameterName>
        <parameterValue>&amp;lt; 0.1</parameterValue>
      </parameters>
      <parameters>
        <parameterName>S21 and S12</parameterName>
        <parameterValue>-80 dB to 0 dB</parameterValue>
```

```
      </parameters>
     </parameters>
    </data>
   </data>
</ResultsPhysics>
```

7.2 Results from Advanced Search for Ionizing radiation

Below is listed an example of the results from advanced search after having made the query listed in Figure 40. The information listed on yellow background is specific to Ionizing Radiation.

```
<ResultsRadiation>
 <versionApiKcdb>1.0.12</versionApiKcdb>
 <pageNumber>0</pageNumber>
 <pageSize>20</pageSize>
 <numberOfElements>1</numberOfElements>
 <totalElements>1</totalElements>
 <totalPages>1</totalPages>
 <data>
  <data>
   <id>23054</id>
   <status>Published</status>
   <statusDate>2005-02-14</statusDate>
   <kcdbCode>APMP-RI-JP-00000HSE-1</kcdbCode>
   <domainCode>RADIATION</domainCode>
   <metrologyAreaLabel>RI</metrologyAreaLabel>
   <rmo>APMP</rmo>
   <countryValue>Japan</countryValue>
   <nmiCode>NMIJ AIST</nmiCode>
   <nmiName>National Metrology Institute of Japan</nmiName>
   <nmiIdentifier>129</nmiIdentifier>
   <nmiRorIdentifier>01703db54</nmiRorIdentifier>
   <nmiWikiDataIdentifier>Q1076542</nmiWikiDataIdentifier>
   <nmiServiceCode>APM-RAD-NMIJ/AIST-2144</nmiServiceCode>
   <nmiServiceLink/>
   <quantityValue>Activity</quantityValue>
   <cmc>
    <lowerLimit>2000.0</lowerLimit>
    <upperLimit>200000.0</upperLimit>
    <unit>Bq</unit>
   </cmc>
   <cmcUncertainty>
```

```
      <lowerLimit>4.0</lowerLimit>
      <upperLimit>4.0</upperLimit>
      <unit>%</unit>
    </cmcUncertainty>
    <cmcBaseUnit>
      <lowerLimit>2000.0</lowerLimit>
      <upperLimit>200000.0</upperLimit>
      <unit>Bq</unit>
    </cmcBaseUnit>
    <cmcUncertaintyBaseUnit>
      <lowerLimit>80.0</lowerLimit>
      <upperLimit>8000.0</upperLimit>
      <unit>Bq</unit>
    </cmcUncertaintyBaseUnit>
    <confidenceLevel>95.0</confidenceLevel>
    <coverageFactor>2.0</coverageFactor>
    <uncertaintyEquation>
      <equation>
      </equation>
      <equationComment>
      </equationComment>
    </uncertaintyEquation>
    <uncertaintyTable>
      <tableName>
      </tableName>
      <tableRows>0</tableRows>
      <tableCols>0</tableCols>
      <tableComment>
      </tableComment>
      <tableContents>&lt;masked></tableContents>
    </uncertaintyTable>
    <uncertaintyMode>Relative</uncertaintyMode>
    <traceabilitySource>NMIJ/AIST</traceabilitySource>
    <comments/>
    <groupIdentifier/>
    <publicationDate>2005-02-14</publicationDate>
    <approvalDate>2005-02-14</approvalDate>
    <branchValue>Radioactivity</branchValue>
    <branchLabel>RAD</branchLabel>
    <instrument>Multiple nuclide source, solution</instrument>
    <instrumentMethod>Ge detector, multichannel
analyzer</instrumentMethod>
    <sourceValue>Multi-radionuclide source</sourceValue>
    <mediumValue>Liquid</mediumValue>
    <nuclideValue>Co-60</nuclideValue>
    <radiationSpecification>10 ml to 500 ml NMIJ/AIST standard cylindrical plastic
bottle</radiationSpecification>
    <internationalStandard/>
```

```
    <referenceStandard>Comparison with the NMIJ/AIST standard source</referenceStandard>
    <radiationCode>2.1.3.2</radiationCode>
    <kcdbServiceCategory>RI/RAD-1.3.2</kcdbServiceCategory>
   </data>
  </data>
 </ResultsRadiation>
```


7.3 Results from Advanced Search for Chemistry and Biology

Below is listed an example of the results from advanced search after having made the query listed in Figure 42. The information listed on yellow background is specific to Chemistry and Biology.


```
<ResultsChemistryAndBiology>
 <versionApiKcdb>1.0.12</versionApiKcdb>
 <pageNumber>0</pageNumber>
 <pageSize>20</pageSize>
 <numberOfElements>1</numberOfElements>
 <totalElements>1</totalElements>
 <totalPages>1</totalPages>
 <data>
  <data>
   <id>32770</id>
   <status>Published</status>
   <statusDate>2021-01-12</statusDate>
   <kcdbCode>APMP-QM-JP-000001GZ-2</kcdbCode>
   <domainCode>CHEM-BIO</domainCode>
   <metrologyAreaLabel>QM</metrologyAreaLabel>
   <rmo>APMP</rmo>
   <countryValue>Japan</countryValue>
   <nmiCode>NMIJ AIST</nmiCode>
   <nmiName>National Metrology Institute of Japan</nmiName>
   <nmiIdentifier>129</nmiIdentifier>
   <nmiRorIdentifier>01703db54</nmiRorIdentifier>
   <nmiWikiDataIdentifier>Q1076542</nmiWikiDataIdentifier>
   <nmiServiceCode>5-01-02</nmiServiceCode>
   <nmiServiceLink>
   </nmiServiceLink>
   <quantityValue>Mass fraction</quantityValue>
   <cmc>
    <lowerLimit>0.001</lowerLimit>
    <upperLimit>10.0</upperLimit>
    <unit>µg/kg</unit>
   </cmc>
```

```
<cmcUncertainty>
 <lowerLimit>10.0</lowerLimit>
 <upperLimit>1.0</upperLimit>
 <unit>%</unit>
</cmcUncertainty>
<cmcBaseUnit>
 <lowerLimit>1.0000000000000002E-12</lowerLimit>
 <upperLimit>1.0E-8</upperLimit>
 <unit>kg/kg</unit>
</cmcBaseUnit>
<cmcUncertaintyBaseUnit>
 <lowerLimit>1.0000000000000003E-13</lowerLimit>
 <upperLimit>1.0E-10</upperLimit>
 <unit>dimension 1</unit>
</cmcUncertaintyBaseUnit>
<confidenceLevel>95.0</confidenceLevel>
<coverageFactor>2.0</coverageFactor>
<uncertaintyEquation>
 <equation>
 </equation>
 <equationComment>
 </equationComment>
</uncertaintyEquation>
<uncertaintyTable>
 <tableName>
 </tableName>
 <tableRows>0</tableRows>
 <tableCols>0</tableCols>
 <tableComment>
 </tableComment>
 <tableContents>&lt;masked></tableContents>
</uncertaintyTable>
<uncertaintyMode>Relative</uncertaintyMode>
<traceabilitySource>
</traceabilitySource>
<comments>
</comments>
<groupIdentifier>
</groupIdentifier>
<publicationDate>2021-01-12</publicationDate>
<approvalDate>2017-08-30</approvalDate>
<uncertaintyConvention>Two</uncertaintyConvention>
<categoryValue>Water</categoryValue>
<categoryLabel>5</categoryLabel>
<subCategoryValue>Fresh water</subCategoryValue>
<subCategoryLabel>1</subCategoryLabel>
<kcdbServiceCategory>QM-5.1</kcdbServiceCategory>
<analyteMatrix>river water and drinking water</analyteMatrix>
```

```
    <analyteValue>antimony</analyteValue>
    <crm>
     <lowerLimit>0.0103</lowerLimit>
     <upperLimit>0.146</upperLimit>
     <unit>µg/kg</unit>
    </crm>
    <crmUncertainty>
     <lowerLimit>4.0E-4</lowerLimit>
     <upperLimit>0.009</upperLimit>
     <unit>µg/kg</unit>
    </crmUncertainty>
    <mechanism>NMIJ CRM 7202, NMIJ CRM 7203</mechanism>
    <crmConfidenceLevel>95.0</crmConfidenceLevel>
    <crmCoverageFactor>2.0</crmCoverageFactor>
    <crmUncertaintyEquation>
     <equation>
     </equation>
     <equationComment>
     </equationComment>
    </crmUncertaintyEquation>
    <crmUncertaintyTable>
     <tableName>
     </tableName>
     <tableRows>0</tableRows>
     <tableCols>0</tableCols>
     <tableComment>
     </tableComment>
     <tableContents>&lt;masked></tableContents>
    </crmUncertaintyTable>
    <crmUncertaintyMode>Absolute</crmUncertaintyMode>
    <measurmentTechnique>
    </measurmentTechnique>
   </data>
  </data>
</ResultsChemistryAndBiology>
```


7.4 Results from Quick Search

Below is listed an example of the results from quick search after having made the query listed in Figure 44.


```
  <ResultsQuick>
  <versionApiKcdb>1.0.12</versionApiKcdb>
  <pageNumber>0</pageNumber>
  <pageSize>20</pageSize>
  <numberOfElements>6</numberOfElements>
```

```
 <totalElements>6</totalElements>
 <totalPages>1</totalPages>
 <data>
  <data>
   <id>29061</id>
   <status>Published</status>
   <statusDate>2020-07-30</statusDate>
   <kcdbCode>EURAMET-L-FI-00000AM1-2</kcdbCode>
   <domainCode>PHYSICS</domainCode>
   <metrologyAreaLabel>L</metrologyAreaLabel>
   <rmo>EURAMET</rmo>
   <countryValue>Finland</countryValue>
   <nmiCode>MIKES</nmiCode>
   <nmiName>VTT Technical Research Centre of Finland Ltd, Centre for
Metrology/Mittatekniikan keskus</nmiName>
   <nmiIdentifier>105</nmiIdentifier>
   <nmiRorIdentifier>0398a1r53</nmiRorIdentifier>
   <nmiWikiDataIdentifier>Q4354916</nmiWikiDataIdentifier>
   <nmiServiceCode>MIKES/6</nmiServiceCode>
   <nmiServiceLink>
   </nmiServiceLink>
   <quantityValue>Length instruments</quantityValue>
   <cmc>
    <lowerLimit>0.0</lowerLimit>
    <upperLimit>5.0</upperLimit>
    <unit>m</unit>
   </cmc>
   <cmcUncertainty>
    <lowerLimit>0.2</lowerLimit>
    <upperLimit>2.6</upperLimit>
    <unit>µm</unit>
   </cmcUncertainty>
   <cmcBaseUnit>
    <lowerLimit>0.0</lowerLimit>
    <upperLimit>5.0</upperLimit>
    <unit>m</unit>
   </cmcBaseUnit>
   <cmcUncertaintyBaseUnit>
    <lowerLimit>2.0E-7</lowerLimit>
    <upperLimit>2.6000000000000005E-6</upperLimit>
    <unit>m</unit>
   </cmcUncertaintyBaseUnit>
   <confidenceLevel>95.0</confidenceLevel>
   <coverageFactor>2.0</coverageFactor>
   <uncertaintyEquation>
    <equation>Q[0.2 µm, 0.5E-06 &amp;lt;em&gt;L&amp;lt;/em&gt;]</equation>
    <equationComment>
    </equationComment>
```

```
      </uncertaintyEquation>
      <uncertaintyTable>
       <tableName>
       </tableName>
       <tableRows>0</tableRows>
       <tableCols>0</tableCols>
       <tableComment>
       </tableComment>
       <tableContents>&lt;masked></tableContents>
      </uncertaintyTable>
      <uncertaintyMode>Absolute</uncertaintyMode>
      <traceabilitySource>
      </traceabilitySource>
      <comments>
      </comments>
      <groupIdentifier>
      </groupIdentifier>
      <publicationDate>2020-07-30</publicationDate>
      <approvalDate>2001-10-21</approvalDate>
      <internationalStandard/>
      <branchValue>Dimensional metrology</branchValue>
      <branchLabel>L/DimMet</branchLabel>
      <serviceValue>Linear dimensions</serviceValue>
      <subServiceValue>Length instruments</subServiceValue>
      <individualServiceValue>One-dimension measuring
machine</individualServiceValue>
      <physicsCode>2.1.3</physicsCode>
      <kcdbServiceCategory>L/DimMet-2.1.3</kcdbServiceCategory>
      <instrument>1-D measuring machine: error of indicated size or displacement,
&lt;em>L&lt;/em></instrument>
      <instrumentMethod>Laser interferometer and test pieces,
comparison</instrumentMethod>
      <parameters/>
    </data>
    <data>
      <id>29145</id>
      <status>Published</status>
      <statusDate>2020-08-04</statusDate>
      <kcdbCode>EURAMET-L-IT-00000C31-2</kcdbCode>
      <domainCode>PHYSICS</domainCode>
      <metrologyAreaLabel>L</metrologyAreaLabel>
      <rmo>EURAMET</rmo>
      <countryValue>Italy</countryValue>
      <nmiCode>INRIM</nmiCode>
      <nmiName>Istituto Nazionale di Ricerca Metrologica</nmiName>
      <nmiIdentifier>74</nmiIdentifier>
      <nmiRorIdentifier>03vn1bh77</nmiRorIdentifier>
      <nmiWikiDataIdentifier>Q3803774</nmiWikiDataIdentifier>
```

```
<nmiServiceCode>INRIM/26</nmiServiceCode>
<nmiServiceLink>
</nmiServiceLink>
<quantityValue>Length instruments</quantityValue>
<cmc>
 <lowerLimit>0.0</lowerLimit>
 <upperLimit>50.0</upperLimit>
 <unit>µm</unit>
</cmc>
<cmcUncertainty>
 <lowerLimit>0.7</lowerLimit>
 <upperLimit>250.0</upperLimit>
 <unit>nm</unit>
</cmcUncertainty>
<cmcBaseUnit>
 <lowerLimit>0.0</lowerLimit>
 <upperLimit>4.9999999999999996E-5</upperLimit>
 <unit>m</unit>
</cmcBaseUnit>
<cmcUncertaintyBaseUnit>
 <lowerLimit>7.0E-10</lowerLimit>
 <upperLimit>2.5000000000000004E-7</upperLimit>
 <unit>m</unit>
</cmcUncertaintyBaseUnit>
<confidenceLevel>95.0</confidenceLevel>
<coverageFactor>2.0</coverageFactor>
<uncertaintyEquation>
 <equation>Q[0.7 nm, 0.5E-03&lt;em&amp;nbsp;L]&lt;/em></equation>
 <equationComment>
 </equationComment>
</uncertaintyEquation>
<uncertaintyTable>
 <tableName>
 </tableName>
 <tableRows>0</tableRows>
 <tableCols>0</tableCols>
 <tableComment>
 </tableComment>
 <tableContents>&lt;masked></tableContents>
</uncertaintyTable>
<uncertaintyMode>Absolute</uncertaintyMode>
<traceabilitySource>
</traceabilitySource>
<comments>
</comments>
<groupIdentifier>
</groupIdentifier>
<publicationDate>2020-08-04</publicationDate>
```

```
    <approvalDate>2005-03-21</approvalDate>
    <internationalStandard/>
    <branchValue>Dimensional metrology</branchValue>
    <branchLabel>L/DimMet</branchLabel>
    <serviceValue>Linear dimensions</serviceValue>
    <subServiceValue>Length instruments</subServiceValue>
    <individualServiceValue>One-dimension displacement transducer or actuator
(LVDT, PZT, etc.)</individualServiceValue>
    <physicsCode>2.1.5</physicsCode>
    <kcdbServiceCategory>L/DimMet-2.1.5</kcdbServiceCategory>
    <instrument>Displacement                                    transducer:
displacement&lt;em&amp;nbsp;L&lt;/em></instrument>
    <instrumentMethod>Heterodyne interferometer with high-resolution phase-
meter</instrumentMethod>
    <parameters/>
   </data>
   <data>
    <id>36701</id>
    <status>Published</status>
    <statusDate>2021-12-13</statusDate>
    <kcdbCode>APMP-L-SG-00000CVQ-2</kcdbCode>
    <domainCode>PHYSICS</domainCode>
    <metrologyAreaLabel>L</metrologyAreaLabel>
    <rmo>APMP</rmo>
    <countryValue>Singapore</countryValue>
    <nmiCode>NMC, A*STAR</nmiCode>
    <nmiName>National Metrology Centre, Agency for Science, Technology and
Research</nmiName>
    <nmiIdentifier>125</nmiIdentifier>
    <nmiRorIdentifier>035gbps25</nmiRorIdentifier>
    <nmiWikiDataIdentifier>Q30296097</nmiWikiDataIdentifier>
    <nmiServiceCode>NMC, A*STAR/LS/GB/002</nmiServiceCode>
    <nmiServiceLink>
    </nmiServiceLink>
    <quantityValue>End standards</quantityValue>
    <cmc>
     <lowerLimit>0.5</lowerLimit>
     <upperLimit>100.0</upperLimit>
     <unit>mm</unit>
    </cmc>
    <cmcUncertainty>
     <lowerLimit>36.0</lowerLimit>
     <upperLimit>110.0</upperLimit>
     <unit>nm</unit>
    </cmcUncertainty>
    <cmcBaseUnit>
     <lowerLimit>5.0E-4</lowerLimit>
     <upperLimit>0.1</upperLimit>
```

```
      <unit>m</unit>
    </cmcBaseUnit>
    <cmcUncertaintyBaseUnit>
      <lowerLimit>3.6000000000000005E-8</lowerLimit>
      <upperLimit>1.1E-7</upperLimit>
      <unit>m</unit>
    </cmcUncertaintyBaseUnit>
    <confidenceLevel>95.0</confidenceLevel>
    <coverageFactor>2.0</coverageFactor>
    <uncertaintyEquation>
      <equation>Q[36 nm, 1.0 x 10&lt;sup>-6&lt;/sup>
&lt;em>L&lt;/em>]</equation>
      <equationComment>&lt;em>L &lt;/em>is the central
length</equationComment>
    </uncertaintyEquation>
    <uncertaintyTable>
      <tableName>
      </tableName>
      <tableRows>0</tableRows>
      <tableCols>0</tableCols>
      <tableComment>
      </tableComment>
      <tableContents>&lt;masked></tableContents>
    </uncertaintyTable>
    <uncertaintyMode>Absolute</uncertaintyMode>
    <traceabilitySource>
    </traceabilitySource>
    <comments>
    </comments>
    <groupIdentifier>
    </groupIdentifier>
    <publicationDate>2021-12-13</publicationDate>
    <approvalDate>2010-11-04</approvalDate>
    <internationalStandard/>
    <branchValue>Dimensional metrology</branchValue>
    <branchLabel>L/DimMet</branchLabel>
    <serviceValue>Linear dimensions</serviceValue>
    <subServiceValue>End standards</subServiceValue>
    <individualServiceValue>Gauge block</individualServiceValue>
    <physicsCode>2.2.1</physicsCode>
    <kcdbServiceCategory>L/DimMet-2.2.1</kcdbServiceCategory>
    <instrument>Gauge block: central length L</instrument>
    <instrumentMethod>Mechanical comparison to gauge
block</instrumentMethod>
    <parameters>
      <parameters>
        <parameterName>Material</parameterName>
        <parameterValue>steel, reference and test the same</parameterValue>
```

```
      </parameters>
     </parameters>
    </data>
    <data>
     <id>36702</id>
     <status>Published</status>
     <statusDate>2021-12-13</statusDate>
     <kcdbCode>APMP-L-SG-00000CVR-2</kcdbCode>
     <domainCode>PHYSICS</domainCode>
     <metrologyAreaLabel>L</metrologyAreaLabel>
     <rmo>APMP</rmo>
     <countryValue>Singapore</countryValue>
     <nmiCode>NMC, A*STAR</nmiCode>
     <nmiName>National Metrology Centre, Agency for Science, Technology and
Research</nmiName>
     <nmiIdentifier>125</nmiIdentifier>
     <nmiRorIdentifier>035gbps25</nmiRorIdentifier>
     <nmiWikiDataIdentifier>Q30296097</nmiWikiDataIdentifier>
     <nmiServiceCode>NMC, A*STAR/LS/GB/002</nmiServiceCode>
     <nmiServiceLink>
     </nmiServiceLink>
     <quantityValue>End standards</quantityValue>
     <cmc>
      <lowerLimit>0.5</lowerLimit>
      <upperLimit>100.0</upperLimit>
      <unit>mm</unit>
     </cmc>
     <cmcUncertainty>
      <lowerLimit>36.0</lowerLimit>
      <upperLimit>97.0</upperLimit>
      <unit>nm</unit>
     </cmcUncertainty>
     <cmcBaseUnit>
      <lowerLimit>5.0E-4</lowerLimit>
      <upperLimit>0.1</upperLimit>
      <unit>m</unit>
     </cmcBaseUnit>
     <cmcUncertaintyBaseUnit>
      <lowerLimit>3.6000000000000005E-8</lowerLimit>
      <upperLimit>9.700000000000001E-8</upperLimit>
      <unit>m</unit>
     </cmcUncertaintyBaseUnit>
     <confidenceLevel>95.0</confidenceLevel>
     <coverageFactor>2.0</coverageFactor>
     <uncertaintyEquation>
      <equation>Q[36 nm, 0.9 x 10&lt;sup>-6&lt;/sup>
&lt;em>L&lt;/em>]</equation>
```

```
      <equationComment>&lt;em>L &lt;/em>is the central
length</equationComment>
    </uncertaintyEquation>
    <uncertaintyTable>
     <tableName>
     </tableName>
     <tableRows>0</tableRows>
     <tableCols>0</tableCols>
     <tableComment>
     </tableComment>
     <tableContents>&lt;masked></tableContents>
    </uncertaintyTable>
    <uncertaintyMode>Absolute</uncertaintyMode>
    <traceabilitySource>
    </traceabilitySource>
    <comments>
    </comments>
    <groupIdentifier>
    </groupIdentifier>
    <publicationDate>2021-12-13</publicationDate>
    <approvalDate>2010-11-04</approvalDate>
    <internationalStandard/>
    <branchValue>Dimensional metrology</branchValue>
    <branchLabel>L/DimMet</branchLabel>
    <serviceValue>Linear dimensions</serviceValue>
    <subServiceValue>End standards</subServiceValue>
    <individualServiceValue>Gauge block</individualServiceValue>
    <physicsCode>2.2.1</physicsCode>
    <kcdbServiceCategory>L/DimMet-2.2.1</kcdbServiceCategory>
    <instrument>Gauge block: central length L</instrument>
    <instrumentMethod>Mechanical comparison to gauge
block</instrumentMethod>
    <parameters>
     <parameters>
      <parameterName>Material</parameterName>
      <parameterValue>ceramic, reference and test the same</parameterValue>
     </parameters>
    </parameters>
   </data>
   <data>
    <id>36703</id>
    <status>Published</status>
    <statusDate>2021-12-13</statusDate>
    <kcdbCode>APMP-L-SG-00000CVS-2</kcdbCode>
    <domainCode>PHYSICS</domainCode>
    <metrologyAreaLabel>L</metrologyAreaLabel>
    <rmo>APMP</rmo>
    <countryValue>Singapore</countryValue>
```

```
    <nmiCode>NMC, A*STAR</nmiCode>
    <nmiName>National Metrology Centre, Agency for Science, Technology and
Research</nmiName>
    <nmiIdentifier>125</nmiIdentifier>
    <nmiRorIdentifier>035gbps25</nmiRorIdentifier>
    <nmiWikiDataIdentifier>Q30296097</nmiWikiDataIdentifier>
    <nmiServiceCode>NMC, A*STAR/LS/GB/002</nmiServiceCode>
    <nmiServiceLink>
    </nmiServiceLink>
    <quantityValue>End standards</quantityValue>
    <cmc>
     <lowerLimit>0.5</lowerLimit>
     <upperLimit>100.0</upperLimit>
     <unit>mm</unit>
    </cmc>
    <cmcUncertainty>
     <lowerLimit>36.0</lowerLimit>
     <upperLimit>79.0</upperLimit>
     <unit>nm</unit>
    </cmcUncertainty>
    <cmcBaseUnit>
     <lowerLimit>5.0E-4</lowerLimit>
     <upperLimit>0.1</upperLimit>
     <unit>m</unit>
    </cmcBaseUnit>
    <cmcUncertaintyBaseUnit>
     <lowerLimit>3.6000000000000005E-8</lowerLimit>
     <upperLimit>7.9E-8</upperLimit>
     <unit>m</unit>
    </cmcUncertaintyBaseUnit>
    <confidenceLevel>95.0</confidenceLevel>
    <coverageFactor>2.0</coverageFactor>
    <uncertaintyEquation>
     <equation>Q[36 nm, 0.7 x 10&lt;sup>-6&lt;/sup>
&lt;em>L&lt;/em>]</equation>
     <equationComment>&lt;em>L &lt;/em>is the central
length</equationComment>
    </uncertaintyEquation>
    <uncertaintyTable>
     <tableName>
     </tableName>
     <tableRows>0</tableRows>
     <tableCols>0</tableCols>
     <tableComment>
     </tableComment>
     <tableContents>&lt;masked></tableContents>
    </uncertaintyTable>
    <uncertaintyMode>Absolute</uncertaintyMode>
```

```
    <traceabilitySource>
    </traceabilitySource>
    <comments>
    </comments>
    <groupIdentifier>
    </groupIdentifier>
    <publicationDate>2021-12-13</publicationDate>
    <approvalDate>2010-11-04</approvalDate>
    <internationalStandard/>
    <branchValue>Dimensional metrology</branchValue>
    <branchLabel>L/DimMet</branchLabel>
    <serviceValue>Linear dimensions</serviceValue>
    <subServiceValue>End standards</subServiceValue>
    <individualServiceValue>Gauge block</individualServiceValue>
    <physicsCode>2.2.1</physicsCode>
    <kcdbServiceCategory>L/DimMet-2.2.1</kcdbServiceCategory>
    <instrument>Gauge block: central length L</instrument>
    <instrumentMethod>Mechanical comparison to gauge
block</instrumentMethod>
    <parameters>
     <parameters>
      <parameterName>Material</parameterName>
      <parameterValue>tungsten carbide, reference and test the
same</parameterValue>
     </parameters>
    </parameters>
   </data>
   <data>
    <id>40574</id>
    <status>Published</status>
    <statusDate>2023-05-24</statusDate>
    <kcdbCode>EURAMET-L-FI-00000AM2-2</kcdbCode>
    <domainCode>PHYSICS</domainCode>
    <metrologyAreaLabel>L</metrologyAreaLabel>
    <rmo>EURAMET</rmo>
    <countryValue>Finland</countryValue>
    <nmiCode>MIKES</nmiCode>
    <nmiName>VTT Technical Research Centre of Finland Ltd, Centre for
Metrology/Mittatekniikan keskus</nmiName>
    <nmiIdentifier>105</nmiIdentifier>
    <nmiRorIdentifier>0398a1r53</nmiRorIdentifier>
    <nmiWikiDataIdentifier>Q4354916</nmiWikiDataIdentifier>
    <nmiServiceCode>MIKES/7</nmiServiceCode>
    <nmiServiceLink>
    </nmiServiceLink>
    <quantityValue>Length instruments</quantityValue>
    <cmc>
     <lowerLimit>0.0</lowerLimit>
```

```
 <upperLimit>1.0</upperLimit>
 <unit>m</unit>
</cmc>
<cmcUncertainty>
 <lowerLimit>0.2</lowerLimit>
 <upperLimit>0.54</upperLimit>
 <unit>µm</unit>
</cmcUncertainty>
<cmcBaseUnit>
 <lowerLimit>0.0</lowerLimit>
 <upperLimit>1.0</upperLimit>
 <unit>m</unit>
</cmcBaseUnit>
<cmcUncertaintyBaseUnit>
 <lowerLimit>2.0E-7</lowerLimit>
 <upperLimit>5.4E-7</upperLimit>
 <unit>m</unit>
</cmcUncertaintyBaseUnit>
<confidenceLevel>95.0</confidenceLevel>
<coverageFactor>2.0</coverageFactor>
<uncertaintyEquation>
 <equation>Q[0.20 &amp;micro;m, 0.50E-06L]</equation>
 <equationComment>
 </equationComment>
</uncertaintyEquation>
<uncertaintyTable>
 <tableName>
 </tableName>
 <tableRows>0</tableRows>
 <tableCols>0</tableCols>
 <tableComment>
 </tableComment>
 <tableContents>&lt;masked></tableContents>
</uncertaintyTable>
<uncertaintyMode>Absolute</uncertaintyMode>
<traceabilitySource>MIKES</traceabilitySource>
<comments>
</comments>
<groupIdentifier>
</groupIdentifier>
<publicationDate>2023-05-24</publicationDate>
<approvalDate>2001-10-21</approvalDate>
<internationalStandard/>
<branchValue>Dimensional metrology</branchValue>
<branchLabel>L/DimMet</branchLabel>
<serviceValue>Linear dimensions</serviceValue>
<subServiceValue>Length instruments</subServiceValue>
```

```
    <individualServiceValue>Height measuring
instrument</individualServiceValue>
    <physicsCode>2.1.4</physicsCode>
    <kcdbServiceCategory>L/DimMet-2.1.4</kcdbServiceCategory>
    <instrument>Height measuring instruments: error of indicated vertical size or
displacement, L</instrument>
    <instrumentMethod>Laser interferometer and test pieces,
comparison</instrumentMethod>
    <parameters/>
   </data>
  </data>
  <filtersList>
   <filtersList>
    <code>cmcDomain</code>
    <name>cmcDomain</name>
    <count>0</count>
    <order>0</order>
    <children>
     <children>
      <code>cmcDomain.CHEM-BIO</code>
      <name>CHEM-BIO</name>
      <count>69</count>
      <order>-1</order>
      <children/>
     </children>
     <children>
      <code>cmcDomain.PHYSICS</code>
      <name>PHYSICS</name>
      <count>1211</count>
      <order>-1</order>
      <children/>
     </children>
     <children>
      <code>cmcDomain.RADIATION</code>
      <name>RADIATION</name>
      <count>13</count>
      <order>-1</order>
      <children/>
     </children>
    </children>
   </filtersList>
   <filtersList>
    <code>cmcBranches</code>
    <name>cmcBranches</name>
    <count>0</count>
    <order>1</order>
    <children>
     <children>
```

```
  <code>cmcBranches.AC voltage, current, and power</code>
  <name>AC voltage, current, and power</name>
  <count>327</count>
  <order>-1</order>
  <children>
   <children>
    <code>cmcServices.AC and DC power</code>
    <name>AC and DC power</name>
    <count>324</count>
    <order>-1</order>
    <children/>
   </children>
   <children>
    <code>cmcServices.AC voltage (up to the MHz range)</code>
    <name>AC voltage (up to the MHz range)</name>
    <count>3</count>
    <order>-1</order>
    <children/>
   </children>
  </children>
 </children>
 <children>
  <code>cmcBranches.DC voltage, current, and resistance</code>
  <name>DC voltage, current, and resistance</name>
  <count>23</count>
  <order>-1</order>
  <children>
   <children>
    <code>cmcServices.DC resistance</code>
    <name>DC resistance</name>
    <count>21</count>
    <order>-1</order>
    <children/>
   </children>
   <children>
    <code>cmcServices.DC voltage (up to 1100 V)</code>
    <name>DC voltage (up to 1100 V)</name>
    <count>2</count>
    <order>-1</order>
    <children/>
   </children>
  </children>
 </children>
 <children>
  <code>cmcBranches.Dimensional metrology</code>
  <name>Dimensional metrology</name>
  <count>31</count>
  <order>-1</order>
```

```
  <children>
   <children>
    <code>cmcServices.Complex geometry</code>
    <name>Complex geometry</name>
    <count>10</count>
    <order>-1</order>
    <children/>
   </children>
   <children>
    <code>cmcServices.Form</code>
    <name>Form</name>
    <count>15</count>
    <order>-1</order>
    <children/>
   </children>
   <children>
    <code>cmcServices.Linear dimensions</code>
    <name>Linear dimensions</name>
    <count>6</count>
    <order>-1</order>
    <children/>
   </children>
  </children>
 </children>
 <children>
  <code>cmcBranches.Fibre optics</code>
  <name>Fibre optics</name>
  <count>16</count>
  <order>-1</order>
  <children>
   <children>
    <code>cmcServices.Fibre optics</code>
    <name>Fibre optics</name>
    <count>16</count>
    <order>-1</order>
    <children/>
   </children>
  </children>
 </children>
 <children>
  <code>cmcBranches.Fluid flow</code>
  <name>Fluid flow</name>
  <count>83</count>
  <order>-1</order>
  <children>
   <children>
    <code>cmcServices.Fluid flow</code>
    <name>Fluid flow</name>
```

```
      <count>83</count>
      <order>-1</order>
      <children/>
     </children>
    </children>
   </children>
   <children>
    <code>cmcBranches.Force</code>
    <name>Force</name>
    <count>15</count>
    <order>-1</order>
    <children>
     <children>
      <code>cmcServices.Force</code>
      <name>Force</name>
      <count>15</count>
      <order>-1</order>
      <children/>
     </children>
    </children>
   </children>
   <children>
    <code>cmcBranches.Frequency</code>
    <name>Frequency</name>
    <count>160</count>
    <order>-1</order>
    <children>
     <children>
      <code>cmcServices.Frequency</code>
      <name>Frequency</name>
      <count>160</count>
      <order>-1</order>
      <children/>
     </children>
    </children>
   </children>
   <children>
    <code>cmcBranches.Hardness</code>
    <name>Hardness</name>
    <count>89</count>
    <order>-1</order>
    <children>
     <children>
      <code>cmcServices.Hardness</code>
      <name>Hardness</name>
      <count>89</count>
      <order>-1</order>
      <children/>
```

```
    </children>
   </children>
  </children>
  <children>
   <code>cmcBranches.High voltage and current</code>
   <name>High voltage and current</name>
   <count>151</count>
   <order>-1</order>
   <children>
    <children>
     <code>cmcServices.High voltage and current</code>
     <name>High voltage and current</name>
     <count>151</count>
     <order>-1</order>
     <children/>
    </children>
   </children>
  </children>
  <children>
   <code>cmcBranches.Humidity</code>
   <name>Humidity</name>
   <count>11</count>
   <order>-1</order>
   <children>
    <children>
     <code>cmcServices.Hygrometers</code>
     <name>Hygrometers</name>
     <count>11</count>
     <order>-1</order>
     <children/>
    </children>
   </children>
  </children>
  <children>
   <code>cmcBranches.Impedance up to the MHz range</code>
   <name>Impedance up to the MHz range</name>
   <count>7</count>
   <order>-1</order>
   <children>
    <children>
     <code>cmcServices.Impedance (up to the MHz range)</code>
     <name>Impedance (up to the MHz range)</name>
     <count>7</count>
     <order>-1</order>
     <children/>
    </children>
   </children>
  </children>
```

```
<children>
 <code>cmcBranches.Other DC and low frequency measurements</code>
 <name>Other DC and low frequency measurements</name>
 <count>30</count>
 <order>-1</order>
 <children>
  <children>
   <code>cmcServices.Other DC and low frequency measurements</code>
   <name>Other DC and low frequency measurements</name>
   <count>30</count>
   <order>-1</order>
   <children/>
  </children>
 </children>
</children>
<children>
 <code>cmcBranches.Pressure</code>
 <name>Pressure</name>
 <count>8</count>
 <order>-1</order>
 <children>
  <children>
   <code>cmcServices.Pressure</code>
   <name>Pressure</name>
   <count>8</count>
   <order>-1</order>
   <children/>
  </children>
 </children>
</children>
<children>
 <code>cmcBranches.Properties of detectors and sources</code>
 <name>Properties of detectors and sources</name>
 <count>2</count>
 <order>-1</order>
 <children>
  <children>
   <code>cmcServices.Properties of detectors</code>
   <name>Properties of detectors</name>
   <count>2</count>
   <order>-1</order>
   <children/>
  </children>
 </children>
</children>
<children>
 <code>cmcBranches.Radio frequency measurements</code>
 <name>Radio frequency measurements</name>
```

```
      <count>126</count>
      <order>-1</order>
      <children>
       <children>
        <code>cmcServices.Radio frequency measurements</code>
        <name>Radio frequency measurements</name>
        <count>126</count>
        <order>-1</order>
        <children/>
       </children>
      </children>
     </children>
     <children>
      <code>cmcBranches.Sound in air</code>
      <name>Sound in air</name>
      <count>47</count>
      <order>-1</order>
      <children>
       <children>
        <code>cmcServices.Measurement microphones</code>
        <name>Measurement microphones</name>
        <count>47</count>
        <order>-1</order>
        <children/>
       </children>
      </children>
     </children>
     <children>
      <code>cmcBranches.Temperature</code>
      <name>Temperature</name>
      <count>1</count>
      <order>-1</order>
      <children>
       <children>
        <code>cmcServices.Items for disseminating ITS-90 and PLTS
2000</code>
        <name>Items for disseminating ITS-90 and PLTS 2000</name>
        <count>1</count>
        <order>-1</order>
        <children/>
       </children>
      </children>
     </children>
     <children>
      <code>cmcBranches.Time interval</code>
      <name>Time interval</name>
      <count>8</count>
      <order>-1</order>
```

```
        <children>
          <children>
            <code>cmcServices.Time interval</code>
            <name>Time interval</name>
            <count>8</count>
            <order>-1</order>
            <children/>
          </children>
        </children>
      </children>
      <children>
        <code>cmcBranches.Time scale difference</code>
        <name>Time scale difference</name>
        <count>6</count>
        <order>-1</order>
        <children>
          <children>
            <code>cmcServices.Time scale difference</code>
            <name>Time scale difference</name>
            <count>6</count>
            <order>-1</order>
            <children/>
          </children>
        </children>
      </children>
      <children>
        <code>cmcBranches.Vibration</code>
        <name>Vibration</name>
        <count>70</count>
        <order>-1</order>
        <children>
          <children>
            <code>cmcServices.Acceleration measuring chain /
accelerometer</code>
            <name>Acceleration measuring chain / accelerometer</name>
            <count>60</count>
            <order>-1</order>
            <children/>
          </children>
          <children>
            <code>cmcServices.Angular acceleration measuring chain /
accelerometer</code>
            <name>Angular acceleration measuring chain / accelerometer</name>
            <count>4</count>
            <order>-1</order>
            <children/>
          </children>
          <children>
```

```
        <code>cmcServices.Linear vibration</code>
        <name>Linear vibration</name>
        <count>4</count>
        <order>-1</order>
        <children/>
       </children>
       <children>
        <code>cmcServices.Vibration signal conditioner</code>
        <name>Vibration signal conditioner</name>
        <count>2</count>
        <order>-1</order>
        <children/>
       </children>
      </children>
     </children>
    </children>
</filtersList>
<filtersList>
 <code>cmcRmo</code>
 <name>cmcRmo</name>
 <count>0</count>
 <order>5</order>
 <children>
  <children>
   <code>cmcRmo.AFRIMETS</code>
   <name>AFRIMETS</name>
   <count>30</count>
   <order>-1</order>
   <children>
    <children>
     <code>cmcCountry.Egypt</code>
     <name>Egypt</name>
     <count>3</count>
     <order>-1</order>
     <children/>
    </children>
    <children>
     <code>cmcCountry.South Africa</code>
     <name>South Africa</name>
     <count>27</count>
     <order>-1</order>
     <children/>
    </children>
   </children>
  </children>
  <children>
   <code>cmcRmo.APMP</code>
   <name>APMP</name>
```

```
<count>254</count>
<order>-1</order>
<children>
 <children>
  <code>cmcCountry.Australia</code>
  <name>Australia</name>
  <count>13</count>
  <order>-1</order>
  <children/>
 </children>
 <children>
  <code>cmcCountry.China</code>
  <name>China</name>
  <count>69</count>
  <order>-1</order>
  <children/>
 </children>
 <children>
  <code>cmcCountry.Chinese Taipei</code>
  <name>Chinese Taipei</name>
  <count>30</count>
  <order>-1</order>
  <children/>
 </children>
 <children>
  <code>cmcCountry.Hong Kong, China</code>
  <name>Hong Kong, China</name>
  <count>23</count>
  <order>-1</order>
  <children/>
 </children>
 <children>
  <code>cmcCountry.India</code>
  <name>India</name>
  <count>7</count>
  <order>-1</order>
  <children/>
 </children>
 <children>
  <code>cmcCountry.Indonesia</code>
  <name>Indonesia</name>
  <count>3</count>
  <order>-1</order>
  <children/>
 </children>
 <children>
  <code>cmcCountry.Japan</code>
  <name>Japan</name>
```

```
      <count>32</count>
      <order>-1</order>
      <children/>
    </children>
    <children>
      <code>cmcCountry.Korea, Republic of</code>
      <name>Korea, Republic of</name>
      <count>36</count>
      <order>-1</order>
      <children/>
    </children>
    <children>
      <code>cmcCountry.Malaysia</code>
      <name>Malaysia</name>
      <count>7</count>
      <order>-1</order>
      <children/>
    </children>
    <children>
      <code>cmcCountry.Mongolia</code>
      <name>Mongolia</name>
      <count>2</count>
      <order>-1</order>
      <children/>
    </children>
    <children>
      <code>cmcCountry.New Zealand</code>
      <name>New Zealand</name>
      <count>11</count>
      <order>-1</order>
      <children/>
    </children>
    <children>
      <code>cmcCountry.Singapore</code>
      <name>Singapore</name>
      <count>13</count>
      <order>-1</order>
      <children/>
    </children>
    <children>
      <code>cmcCountry.Thailand</code>
      <name>Thailand</name>
      <count>8</count>
      <order>-1</order>
      <children/>
    </children>
  </children>
</children>
```

```
<children>
 <code>cmcRmo.COOMET</code>
 <name>COOMET</name>
 <count>78</count>
 <order>-1</order>
 <children>
  <children>
   <code>cmcCountry.Belarus</code>
   <name>Belarus</name>
   <count>18</count>
   <order>-1</order>
   <children/>
  </children>
  <children>
   <code>cmcCountry.Kazakhstan</code>
   <name>Kazakhstan</name>
   <count>17</count>
   <order>-1</order>
   <children/>
  </children>
  <children>
   <code>cmcCountry.Russian Federation</code>
   <name>Russian Federation</name>
   <count>43</count>
   <order>-1</order>
   <children/>
  </children>
 </children>
</children>
<children>
 <code>cmcRmo.EURAMET</code>
 <name>EURAMET</name>
 <count>578</count>
 <order>-1</order>
 <children>
  <children>
   <code>cmcCountry.Austria</code>
   <name>Austria</name>
   <count>28</count>
   <order>-1</order>
   <children/>
  </children>
  <children>
   <code>cmcCountry.Belgium</code>
   <name>Belgium</name>
   <count>2</count>
   <order>-1</order>
   <children/>
```

```
</children>
<children>
 <code>cmcCountry.Bosnia and Herzegovina</code>
 <name>Bosnia and Herzegovina</name>
 <count>7</count>
 <order>-1</order>
 <children/>
</children>
<children>
 <code>cmcCountry.Bulgaria</code>
 <name>Bulgaria</name>
 <count>13</count>
 <order>-1</order>
 <children/>
</children>
<children>
 <code>cmcCountry.Czechia</code>
 <name>Czechia</name>
 <count>17</count>
 <order>-1</order>
 <children/>
</children>
<children>
 <code>cmcCountry.Denmark</code>
 <name>Denmark</name>
 <count>18</count>
 <order>-1</order>
 <children/>
</children>
<children>
 <code>cmcCountry.Finland</code>
 <name>Finland</name>
 <count>31</count>
 <order>-1</order>
 <children/>
</children>
<children>
 <code>cmcCountry.France</code>
 <name>France</name>
 <count>14</count>
 <order>-1</order>
 <children/>
</children>
<children>
 <code>cmcCountry.Georgia</code>
 <name>Georgia</name>
 <count>4</count>
 <order>-1</order>
```

```
  <children/>
</children>
<children>
  <code>cmcCountry.Germany</code>
  <name>Germany</name>
  <count>63</count>
  <order>-1</order>
  <children/>
</children>
<children>
  <code>cmcCountry.Greece</code>
  <name>Greece</name>
  <count>6</count>
  <order>-1</order>
  <children/>
</children>
<children>
  <code>cmcCountry.Hungary</code>
  <name>Hungary</name>
  <count>23</count>
  <order>-1</order>
  <children/>
</children>
<children>
  <code>cmcCountry.Ireland</code>
  <name>Ireland</name>
  <count>2</count>
  <order>-1</order>
  <children/>
</children>
<children>
  <code>cmcCountry.Italy</code>
  <name>Italy</name>
  <count>26</count>
  <order>-1</order>
  <children/>
</children>
<children>
  <code>cmcCountry.Lithuania</code>
  <name>Lithuania</name>
  <count>8</count>
  <order>-1</order>
  <children/>
</children>
<children>
  <code>cmcCountry.Netherlands</code>
  <name>Netherlands</name>
  <count>44</count>
```

```
 <order>-1</order>
 <children/>
</children>
<children>
 <code>cmcCountry.North Macedonia</code>
 <name>North Macedonia</name>
 <count>2</count>
 <order>-1</order>
 <children/>
</children>
<children>
 <code>cmcCountry.Norway</code>
 <name>Norway</name>
 <count>5</count>
 <order>-1</order>
 <children/>
</children>
<children>
 <code>cmcCountry.Poland</code>
 <name>Poland</name>
 <count>32</count>
 <order>-1</order>
 <children/>
</children>
<children>
 <code>cmcCountry.Portugal</code>
 <name>Portugal</name>
 <count>2</count>
 <order>-1</order>
 <children/>
</children>
<children>
 <code>cmcCountry.Romania</code>
 <name>Romania</name>
 <count>9</count>
 <order>-1</order>
 <children/>
</children>
<children>
 <code>cmcCountry.Serbia</code>
 <name>Serbia</name>
 <count>13</count>
 <order>-1</order>
 <children/>
</children>
<children>
 <code>cmcCountry.Slovakia</code>
 <name>Slovakia</name>
```

```
 <count>9</count>
 <order>-1</order>
 <children/>
</children>
<children>
 <code>cmcCountry.Slovenia</code>
 <name>Slovenia</name>
 <count>17</count>
 <order>-1</order>
 <children/>
</children>
<children>
 <code>cmcCountry.Spain</code>
 <name>Spain</name>
 <count>41</count>
 <order>-1</order>
 <children/>
</children>
<children>
 <code>cmcCountry.Sweden</code>
 <name>Sweden</name>
 <count>20</count>
 <order>-1</order>
 <children/>
</children>
<children>
 <code>cmcCountry.Switzerland</code>
 <name>Switzerland</name>
 <count>33</count>
 <order>-1</order>
 <children/>
</children>
<children>
 <code>cmcCountry.Türkiye</code>
 <name>Türkiye</name>
 <count>41</count>
 <order>-1</order>
 <children/>
</children>
<children>
 <code>cmcCountry.Ukraine</code>
 <name>Ukraine</name>
 <count>29</count>
 <order>-1</order>
 <children/>
</children>
<children>
 <code>cmcCountry.United Kingdom</code>
```

```
      <name>United Kingdom</name>
      <count>19</count>
      <order>-1</order>
      <children/>
     </children>
    </children>
   </children>
   <children>
    <code>cmcRmo.GULFMET</code>
    <name>GULFMET</name>
    <count>15</count>
    <order>-1</order>
    <children>
     <children>
      <code>cmcCountry.Saudi Arabia</code>
      <name>Saudi Arabia</name>
      <count>11</count>
      <order>-1</order>
      <children/>
     </children>
     <children>
      <code>cmcCountry.United Arab Emirates</code>
      <name>United Arab Emirates</name>
      <count>4</count>
      <order>-1</order>
      <children/>
     </children>
    </children>
   </children>
   <children>
    <code>cmcRmo.SIM</code>
    <name>SIM</name>
    <count>338</count>
    <order>-1</order>
    <children>
     <children>
      <code>cmcCountry.Argentina</code>
      <name>Argentina</name>
      <count>13</count>
      <order>-1</order>
      <children/>
     </children>
     <children>
      <code>cmcCountry.Bolivia</code>
      <name>Bolivia</name>
      <count>3</count>
      <order>-1</order>
      <children/>
```

```
</children>
<children>
 <code>cmcCountry.Brazil</code>
 <name>Brazil</name>
 <count>53</count>
 <order>-1</order>
 <children/>
</children>
<children>
 <code>cmcCountry.Canada</code>
 <name>Canada</name>
 <count>32</count>
 <order>-1</order>
 <children/>
</children>
<children>
 <code>cmcCountry.Chile</code>
 <name>Chile</name>
 <count>10</count>
 <order>-1</order>
 <children/>
</children>
<children>
 <code>cmcCountry.Colombia</code>
 <name>Colombia</name>
 <count>6</count>
 <order>-1</order>
 <children/>
</children>
<children>
 <code>cmcCountry.Costa Rica</code>
 <name>Costa Rica</name>
 <count>8</count>
 <order>-1</order>
 <children/>
</children>
<children>
 <code>cmcCountry.Mexico</code>
 <name>Mexico</name>
 <count>69</count>
 <order>-1</order>
 <children/>
</children>
<children>
 <code>cmcCountry.Panama</code>
 <name>Panama</name>
 <count>2</count>
 <order>-1</order>
```

```
        <children/>
       </children>
       <children>
        <code>cmcCountry.Paraguay</code>
        <name>Paraguay</name>
        <count>6</count>
        <order>-1</order>
        <children/>
       </children>
       <children>
        <code>cmcCountry.Peru</code>
        <name>Peru</name>
        <count>13</count>
        <order>-1</order>
        <children/>
       </children>
       <children>
        <code>cmcCountry.United States</code>
        <name>United States</name>
        <count>118</count>
        <order>-1</order>
        <children/>
       </children>
       <children>
        <code>cmcCountry.Uruguay</code>
        <name>Uruguay</name>
        <count>5</count>
        <order>-1</order>
        <children/>
       </children>
      </children>
     </children>
    </children>
   </filtersList>
  </filtersList>
  <aggregations>
   <aggregations>
    <name>cmcCountry</name>
    <values>
     <values>Singapore</values>
     <values>China</values>
     <values>Finland</values>
     <values>Poland</values>
     <values>Italy</values>
     <values>United Kingdom</values>
     <values>Slovenia</values>
     <values>Thailand</values>
     <values>Kazakhstan</values>
```

```
      <values>Switzerland</values>
      <values>Türkiye</values>
      <values>Germany</values>
     </values>
    </aggregations>
    <aggregations>
     <name>cmcRmo</name>
     <values>
      <values>EURAMET</values>
      <values>COOMET</values>
      <values>APMP</values>
     </values>
    </aggregations>
    <aggregations>
     <name>cmcDomain</name>
     <values>
      <values>PHYSICS</values>
     </values>
    </aggregations>
    <aggregations>
     <name>cmcBranches</name>
     <values>
      <values>Dimensional metrology</values>
     </values>
    </aggregations>
    <aggregations>
     <name>cmcServices</name>
     <values>
      <values>Complex geometry</values>
      <values>Form</values>
      <values>Linear dimensions</values>
     </values>
    </aggregations>
   </aggregations>
</ResultsQuick>
```


7.5 Display of Uncertainty Table

A CMC may contain an uncertainty table. In all query examples given in Section 6, the declaration

<showTable>**false**</showTable> has been included. This indicated that the contents of the uncertainty table should not be exported.

However, in most cases the uncertainty table contents will be requested. It is hence necessary to replace this statement by

<showTable>**true**</showTable>.

An example of an Uncertainty Table is given in Figure 45. The exported contents of the same uncertainty table (in blue text) is listed in Figure 46.

	Expanded uncertainty (for 0 dB devices)	Expanded uncertainty (for -20 dB devices)
30 MHz to 300 MHz	0.200	1.200
300 MHz to 400 MHz	0.200	2.500
400 MHz to 1 GHz	0.400	6.000

Figure 45 Example of uncertainty table.

```
<uncertaintyTable>
  <tableName>MX-1863</tableName>
  <tableRows>4</tableRows>
  <tableCols>3</tableCols>
  <tableComment>The expanded uncertainties given in this table are expressed in
  dB</tableComment>

  <tableContents>{"row_1":{"col_1":"","col_2":"Expanded uncertainty (for 0 dB
  devices)","col_3":"Expanded uncertainty (for -20 dB devices)"},"row_2":{"col_1":"30 MHz
  to 300 MHz","col_2":"0.200","col_3":"1.200"},"row_3":{"col_1":"300 MHz to 400
  MHz","col_2":"0.200","col_3":"2.500"},"row_4":{"col_1":"400 MHz to 1
  GHz","col_2":"0.400","col_3":"6.000"}}</tableContents>

</uncertaintyTable>
```

Figure 46 Example of exported data of the table depicted in Figure 52.

8 XLS SCHEMA

An XSD schema is available via CMC-search-data-controller (Figure 2) via

https://www.bipm.org/api/kcdb/swagger-ui/index.html?configUrl=/api/kcdb/v3/api-docs/swagger-config#/cmc-search-data-controller/xsdSchema describing the structure of the API and allowing validating the XML contents. It is listed in Appendix 4, Section 13.

9 REFERENCES

[CIPM-MRA G-13] CMCs in the context of the CIPM MRA: Guidelines for their review, acceptance and maintenance https://www.bipm.org/documents/20126/43742162/CIPM-MRA-G-13.pdf/f8b8c429-42e0-4cf1-dc6c-bc60ab7f371a

[Fielding 2000] Architectural Styles and the Design of Network-based Software Architectures, 2000 R.T. Fielding https://www.ics.uci.edu/~fielding/pubs/dissertation/top.htm

[Getting Started] Getting started on the KCDB web platform https://www.bipm.org/documents/20126/43909403/Getting_started_KCDB_platform.pdf/6428cae2-f7de-adce-dabe-c143d591fbbe

[GoFAIR] The GoFAIR initiative https://www.go-fair.org/

[Help Search] Help with searching https://www.bipm.org/documents/20126/43909403/Help_with_searching_guide.pdf/2fbe5e7c-d330-947a-1efd-d98cb055d66f

10 APPENDIX 1: VOCABULARY

PH	Physics
RAD	Radiation
CH	Chemistry and Biology
(empty field for domain represents ALL domains)	
Q	Query
R	Result
int	integer
string	string of characters
real	decimal number
boolean	false or true

DOMAIN	ITEM	REPRESENTATION	FORMAT	QUERY
	RMO	Regional Metrology Organization	-	-
	CMC	Calibration and Measurement Capability	-	-
CH	**CRM**	Certified Reference Material	-	-
CH	<analyteID>	database ID for analyte	int	R
CH	<analyteLabel>	label for analyte (water, bioethanol etc.) - see also analyteValue	string	Q

CH	<analyteMatrix>	matrix for chemical measurements (see also <cmcMaterial>)	string	R
CH	<analyteValue>	equal to analyteLabel	string	Q+R
	<approvalDate>	date of approval	string	R
PH+RAD	<branchID>	database ID for branch	int	R
PH+RAD	<branchLabel>	label for a branch (AUV/A, M/Mass etc.)	string	Q
PH+RAD	<branchValue>	full name of branch	string	Q+R
CH	<categoryID>	database ID for category	int	R
CH	<categoryLabel>	label for category (1, 2, 3 etc.)	string	Q
CH	<categoryValue>	full name of category	string	R
	<cmc>	child node for cmc measurement numerical limits and unit		R
CH	<cmcMaterial>	filter for matrix data	string	R
	<cmcUncertainty>	child node for cmc measurement uncertainty numerical limits and unit		R
	<comments>	comments	string	R
	<confidenceLevel>	level of confidence expressed in % (mostly 95) for cmc	real	R
	<countries>	child node for targeted countries	string	Q
	<countryLabel>	ISO 3166 2-letter country code (CH, GB etc.)	string	Q
	<countryValue>	country, full name	string	R
	<coverageFactor>	coverage factor to achieve 95 % of confidence for cmc	real	R
CH	<crm>	child node for crm measurement numerical limits and unit	string	R
CH	<crmConfidenceLevel>	<confidenceLevel> applied to crm	string	R
CH	<crmCoverageFactor>	<coverageFactor> applied to crm	string	R
CH	<crmUncertainty>	child node for crm measurement uncertainty numerical limits and unit	string	R
CH	<crmUncertaintyEquation>	<uncertaintyEquation> applied to crm	string	R
CH	<crmUncertaintyMode>	<uncertaintyMode> applied to crm	string	R

CH	<crmUncertaintyTable>	<uncertaintyTable> applied to crm	string	R
	<data>	child node for data of one CMC		R
	<domainCode>	PHYSICS, RADIATION or CHEM-BIO	string	Q+R
	<domainName>	full name for domain	string	Q+R
	<equation>	equation	string	R
	<equationComment>	comment for equation	string	R
	<excludedFilters>	child node for excluded filters	string	Q
	<groupIdentifier>	tag to associate related CMCs	string	R
	<id>	database ID for CMC	string	R
	<includedFilters>	child node for included filters	string	Q
PH	<individualServiceID>	database ID for individual service	int	R
PH	<individualServiceLabel>	label for individual service	string	R
PH	<individualServiceValue>	full name of individual service	string	R
PH+RAD	<instrument>	instrument under study	string	R
PH+RAD	<instrumentMethod>	applied method for measurements	string	R
PH+RAD	<internationalStandard>	reference to international standard	string	R
	<kcdbCode>	kcdbCode: a unique CMC identifier generated by the software The code corresponds to RMO-MA-CO-N-V: RMO - rmoLabel MA - metrologyAreaLabel CO - countryLabel N - 8-carachter code (0, 1, 2…9, A, B…Y, Z) V - version number	string	R
	<kcdbServiceCategory>	a classification of service code in format <branchLabel>-<physicsCode> (EM/RF-11.3.3)	string	R
	<keywords>	freely chosen key words for search	string	Q
	<lowerLimit>	numerical lower limit	real	R

CH	<measurmentTechnique/>	applied technique for measurements	string	R
CH	<mechanism>	type of mechanism	string	R
RAD	<mediumID>	database ID for medium	int	R
RAD	<mediumLabel>	label for medium (1, 2, 3 etc.)	string	Q
RAD	<mediumValue>	full name of medium	string	R
	<metrologyAreaID>	database ID for merologyArea	int	r
	<metrologyAreaLabel>	label for a metrologyArea (AUV, EM etc.)	string	Q+R
	<metrologyAreaValuel>	full name for metrologyArea	string	R
	<nmiCode>	institute acronym	string	R
	<nmiIdentifier>	database ID for institute	string	R
	<nmiName>	institute, full name	string	R
	<nmiRorIdentifier>	Institute ROR[3] ID	string	R
	<nmiWikiDataIdentifier>	Institute WikiData[4] ID	string	R
	<nmiServiceCode>	institute's code for service	string	R
	<nmiServiceLink>	link to institute's code for service	string	R
RAD	<nuclideID>	database ID for nuclide	int	R
RAD	<nuclideLabel>	label for nuclide (Am-241, Co-58 etc.) - see also nuclideValue	string	Q
RAD	<nuclideValue>	nuclide representation (equal to nuclideValue)	string	R
	<numberOfElements>	number of results on displayed page	int	R
	<page>	to indicate which result page to show (start from 0)	int	Q
	<pageNumber>	page shown (start from 0)	int	
	<pageSize>	to indicate the number of results per page	int	Q+R
PH	<parameterName>	parameter topic	string	R

[3] Research Organization Registry (ROR)
[4] WikiData

PH	<parameters>	child node for parameters (5 parameters maximum)		R
PH	<parameterValue>	parameter value	string	R
PH	<physicsCode>	a service code in format K.L.M where K, L and M are integers, only applicable to PHYSICS (cf. Section 5.2.3)	string	Q+R
	<publicationDate>	date of last publication	string	R
	<publicDateFrom>	search on publicationDate after this date	string	Q
	<publicDateTo>	search on publicationDate before this date	string	Q
RAD	<quantityID>	database ID for quantity	int	r
RAD	<quantityLabel>	label for quantity (1, 2, 3 etc.)	string	Q
	<quantityValue>	full name for quantity	string	R
	<QuickSearchCriteria>	root element for quick search	-	Q
RAD	<radiationCode>	a service code in format J.K.L.M where J, K, L and M are integers, only applicable to RADIATION (cf. 7.2)	string	R
RAD	<radiationSpecification>	specification on radiation conditions	string	R
RAD	<referenceStandard>	reference standard	string	R
CH	<ResultsChemistryAndBiology>	root element for results of advanced search in CHEM-BIO	-	R
PH	<ResultsPhysics>	root element for results of advanced search in PHYSICS	-	R
	<ResultsQuick>	root element for results of quick search	-	R
RAD	<ResultsRadiation>	root element for results of advanced search in RADIATION	-	R
	<rmo>	RMO acronym	string	R
CH	<SearchCriteriaChemistryAndBiology>	root element for advanced search in CHEM-BIO	-	Q
PH	<SearchCriteriaPhysics>	root element for advanced search in PHYSICS	-	Q
RAD	<SearchCriteriaRadiation>	root element for advanced search in RADIATION	-	Q
PH	<serviceID>	database IF for service	int	R
PH	<serviceLable>	label for service	string	R
PH	<serviceValue>	full name of service (cf. Section 5.2.3)	string	Q+R

	<showTable>	to indicate if an uncertainty table should be displayed or not	boolean	Q
RAD	<sourceid>	database ID for source	int	R
RAD	<sourceLabel>	label for source (1, 2, 3 etc.)	string	Q
RAD	<sourceValue>	full name of source	string	R
	<status>	status of CMC ("Published", "Archived","Deleted" or "Greyed out")	string	R
	<statusDate>	date of publication (see dateISO)	string	R
CH	<subCategoryValue>	full name of sub-category	string	R
PH	<subServiceID>	database code for sub-service	int	R
PH	<subServiceLabel>	label for sub-service	string	R
PH	<subServiceValue>	full name of sub-service	string	R
	<tableCols>	number of columns (including header)	int	R
	<tableComment>	comment for table	string	R
	<tableContents>	contents of table: <masked> - <showTable> = false for <showTable>=true, see Section 7.5	string	R
	<tableName>	name of table (less than 30 characters)	string	R
	<tableRows>	number of rows (including header)	int	R
	<totalElements>	total number of results	int	R
	<totalPages>	total number of accessible pages	int	R
	<traceabilitySource>	institute acronym for traceability	string	R
CH	<uncertaintyConvention>	One or Two	string	R
	<uncertaintyEquation>	child node for uncertainty equation for cmc		R
	<uncertaintyMode>	Absolute or Relative	string	R
	<uncertaintyTable>	child node for uncertainty table for cmc	string	R
	<unit>	unit	string	R
	<upperLimit>	numerical upper limit	real	R

	<versionApiKcdb>	API KCDB version of software support	string	R
	dataISO	ISO 8601 date format YYYY-MM-DD	string	Q

11 APPENDIX 2: CURL FOR REFERENCE DATA

The cURLs can be realized in XML or JSON. This guide uses XML as example.

Each cURL should start with

**curl -X 'GET' **

and end with

-H 'accept: application/xml' .

The XLM "phrase to be placed between these two lines are listed in Table A-1.

Hence, the cURL for "Analyte list" would become

```
curl -X 'GET' \
  'https://www.bipm.org/api/kcdb/referenceData/analyte' \
  -H 'accept: application/xml'
```

In some cases it is necessary to add a parameter. For example, to obtain the "Branches" for "Electricity and Magnetism" the query would become

```
curl -X 'GET' \
  'https://www.bipm.org/api/kcdb/referenceData/branch?areaId=2' \
  -H 'accept: application/xml'
```

where the number "2" is the ID for Electricity and Magnetism.

Table A-1 List of cURLs to obtain Reference Data

Item	Parameter	Type	cURL
Analyte list	N/A	N/A	'https://www.bipm.org/api/kcdb/referenceData/analyte' \
Branch list	metrologyAreaID	integer	'https://www.bipm.org/api/kcdb/referenceData/branch?areaId=**metrologyAreaID**' \
Category list	N/A	N/A	'https://www.bipm.org/api/kcdb/referenceData/category' \
Country sorted by name	N/A	N/A	'https://www.bipm.org/api/kcdb/referenceData/country' \
Domain list	N/A	N/A	'https://www.bipm.org/api/kcdb/referenceData/domain' \
Individual service list	subServiceID	integer	'https://www.bipm.org/api/kcdb/referenceData/individualService?subServiceId=**subServieID**' \
Metrology area list	domainCode	string	'https://www.bipm.org/api/kcdb/referenceData/metrologyArea?domainCode=**domainCode**' \
Nuclide list	N/A	N/A	'https://www.bipm.org/api/kcdb/referenceData/nuclide' \
Quantity list	N/A	N/A	'https://www.bipm.org/api/kcdb/referenceData/quantity' \
Radiation medium list	N/A	N/A	'https://www.bipm.org/api/kcdb/referenceData/radiationMedium' \
Radiation source list	N/A	N/A	'https://www.bipm.org/api/kcdb/referenceData/radiationSource' \
Service list	branchID	integer	'https://www.bipm.org/api/kcdb/referenceData/service?branchId=**branchID**' \
Sub service list	serviceID	integer	'https://www.bipm.org/api/kcdb/referenceData/subService?serviceId=**serviceID**' \

N/A - not applicable

12 APPENDIX 3 : CURL FOR QUERIES

12.1 EXAMPLE OF CURL FOR ADVANCED SEARCH IN PHYSICS

The example below is the corresponding cURL of the query listed in Figure 38.

```
curl -X 'POST' \
https://www.bipm.org/api/kcdb/cmc/searchData/physics' \
-H 'accept: application/xml' \
-H 'Content-Type: application/xml' \
-d '<?xml version="1.0" encoding="UTF-8"?>
<SearchCriteriaPhysics>
   <page>0</page>
   <pageSize>20</pageSize>
   <showTable>false</showTable>
   <metrologyAreaLabel>EM</metrologyAreaLabel>
   <branchLabel>EM/RF</branchLabel>
   <physicsCode>11.3.3</physicsCode>
   <keywords>phase OR multichannel OR water</keywords>
   <countries>
      <countryLabel>CH</countryLabel>
      <countryLabel>FR</countryLabel>
   </countries>
   <publicDateFrom>2005-01-31</publicDateFrom>
   <publicDateTo>2025-06-30</publicDateTo>
    <status>Published</status>
</SearchCriteriaPhysics>'
```

12.2 EXAMPLE OF CURL FOR ADVANCED SEARCH IN RADIATION

The example below is the corresponding cURL of the query listed in Figure 40

```
curl -X 'POST' \
https://www.bipm.org/api/kcdb/cmc/searchData/radiation' \
-H 'accept: application/xml' \
-H 'Content-Type: application/xml' \
-d '<?xml version="1.0" encoding="UTF-8"?>
<SearchCriteriaRadiation>
   <page>0</page>
   <pageSize>20</pageSize>
   <showTable>false</showTable>
   <metrologyAreaLabel>RI</metrologyAreaLabel>
   <branchLabel>RAD</branchLabel>
```

```
    <quantityLabel>1</quantityLabel>
    <mediumLabel>3</mediumLabel>
    <sourceLabel>2</sourceLabel>
    <nuclideLabel>Co-60</nuclideLabel>
    <keywords>phase OR multichannel OR water</keywords>
    <countries>
       <countryLabel>CH</countryLabel>
       <countryLabel>JP</countryLabel>
    </countries>
    <publicDateFrom>2005-01-31</publicDateFrom>
    <publicDateTo>2025-09-30</publicDateTo>
    <status>Published</status>
</SearchCriteriaRadiation>'
```

12.3 EXAMPLE OF CURL FOR ADVANCED SEARCH IN CHEM-BIO

The example below is the corresponding cURL of the query listed in Figure 42.

```
curl -X 'POST' \
https://www.bipm.org/api/kcdb/cmc/searchData/chemistryAndBiology' \
-H 'accept: application/xml' \
-H 'Content-Type: application/xml' \
-d '<?xml version="1.0" encoding="UTF-8"?>
<SearchCriteriaChemistryAndBiology>
    <page>0</page>
    <pageSize>20</pageSize>
    <showTable>false</showTable>
    <metrologyAreaLabel>QM</metrologyAreaLabel>
    <categoryLabel>5</categoryLabel>
    <analyteLabel>antimony</analyteLabel>
    <keywords>phase OR multichannel OR water</keywords>
    <countries>
       <countryLabel>CH</countryLabel>
       <countryLabel>JP</countryLabel>
    </countries>
    <publicDateFrom>2005-01-31</publicDateFrom>
    <publicDateTo>2025-09-30</publicDateTo>
    <status>Published</status>
</SearchCriteriaChemistryAndBiology>'
```

12.4 EXAMPLE OF CURL FOR QUICK SEARCH

The example below is the corresponding cURL of the query listed in Figure 44

```
curl -X 'POST' \
https://www.bipm.org/api/kcdb/cmc/searchData/quickSearch' \
-H 'accept: application/xml' \
-H 'Content-Type: application/xml' \
-d '<?xml version="1.0" encoding="UTF-8"?>
<QuickSearchCriteria>
   <page>0</page>
   <pageSize>20</pageSize>
   <showTable>false</showTable>
   <keywords>phase OR test</keywords>
   <includedFilters>
      <includedFilter>cmcDomain.PHYSICS</includedFilter>
      <includedFilter>cmcBranches.Dimensional metrology</includedFilter>
   </includedFilters>
   <excludedFilters>
      <excludedFilter>cmcServices.Form</excludedFilter>
      <excludedFilter>cmcServices.Complex geometry</excludedFilter>
   </excludedFilters>
    <status>Published</status>
</QuickSearchCriteria>'
```

13 APPENDIX 4: XSD SCHEMA

The XSD schema of the API KCDB is listed below.

```
s:schema xmlns:xs="http://www.w3.org/2001/XMLSchema" version="1.0">
xs:element name="ResultsChemistryAndBiology" type="resultsChemistryAndBiology"/>
xs:element name="ResultsDomain" type="resultsDomain"/>
xs:element name="ResultsPhysics" type="resultsPhysics"/>
xs:element name="ResultsQuick" type="resultsQuick"/>
xs:element name="ResultsRadiation" type="resultsRadiation"/>
xs:element name="ResultsReferenceData" type="resultsReferenceData"/>
xs:element name="quickSearchCriteria" type="quickSearchCriteria"/>
xs:element name="searchCriteriaChemistryAndBiology" type="searchCriteriaChemistryAndBiology"/>
xs:element name="searchCriteriaPhysics" type="searchCriteriaPhysics"/>
xs:element name="searchCriteriaRadiation" type="searchCriteriaRadiation"/>
xs:complexType name="quickSearchCriteria">
xs:sequence>
xs:element name="page" type="xs:int"/>
xs:element name="pageSize" type="xs:int"/>
xs:element name="showTable" type="xs:boolean"/>
xs:element minOccurs="0" name="keywords" type="xs:string"/>
xs:element minOccurs="0" name="includedFilters">
xs:complexType>
xs:sequence>
xs:element maxOccurs="unbounded" minOccurs="0" name="includedFilter" type="xs:string"/>
/xs:sequence>
/xs:complexType>
```

/xs:element>
xs:element minOccurs="0" name="excludedFilters">
xs:complexType>
xs:sequence>
xs:element maxOccurs="unbounded" minOccurs="0" name="excludedFilter" type="xs:string"/>
/xs:sequence>
/xs:complexType>
/xs:element>
xs:element minOccurs="0" name="status" type="xs:string"/>
/xs:sequence>
/xs:complexType>
xs:complexType name="searchCriteriaChemistryAndBiology">
xs:complexContent>
xs:extension base="searchCriteriaCommon">
xs:sequence>
xs:element minOccurs="0" name="metrologyAreaLabel" type="xs:string"/>
xs:element minOccurs="0" name="categoryLabel" type="xs:string"/>
xs:element minOccurs="0" name="analyteLabel" type="xs:string"/>
/xs:sequence>
/xs:extension>
/xs:complexContent>
/xs:complexType>
xs:complexType abstract="true" name="searchCriteriaCommon">
xs:sequence>
xs:element name="page" type="xs:int"/>
xs:element name="pageSize" type="xs:int"/>
xs:element name="showTable" type="xs:boolean"/>
xs:element minOccurs="0" name="keywords" type="xs:string"/>
xs:element minOccurs="0" name="countries">

```
xs:complexType>
xs:sequence>
xs:element maxOccurs="unbounded" minOccurs="0" name="countryLabel" type="xs:string"/>
/xs:sequence>
/xs:complexType>
/xs:element>
xs:element minOccurs="0" name="publicDateFrom" type="xs:string"/>
xs:element minOccurs="0" name="publicDateTo" type="xs:string"/>
xs:element minOccurs="0" name="status" type="xs:string"/>
/xs:sequence>
/xs:complexType>
xs:complexType name="searchCriteriaPhysics">
xs:complexContent>
xs:extension base="searchCriteriaCommon">
xs:sequence>
xs:element minOccurs="0" name="metrologyAreaLabel" type="xs:string"/>
xs:element minOccurs="0" name="branchLabel" type="xs:string"/>
xs:element minOccurs="0" name="physicsCode" type="xs:string"/>
xs:element minOccurs="0" name="serviceLabel" type="xs:string"/>
xs:element minOccurs="0" name="subServiceLabel" type="xs:string"/>
xs:element minOccurs="0" name="individualServiceLabel" type="xs:string"/>
/xs:sequence>
/xs:extension>
/xs:complexContent>
/xs:complexType>
xs:complexType name="searchCriteriaRadiation">
xs:complexContent>
xs:extension base="searchCriteriaCommon">
xs:sequence>
```

xs:element minOccurs="0" name="metrologyAreaLabel" type="xs:string"/>
xs:element minOccurs="0" name="branchLabel" type="xs:string"/>
xs:element minOccurs="0" name="quantityLabel" type="xs:string"/>
xs:element minOccurs="0" name="mediumLabel" type="xs:string"/>
xs:element minOccurs="0" name="sourceLabel" type="xs:string"/>
xs:element minOccurs="0" name="nuclideLabel" type="xs:string"/>
/xs:sequence>
/xs:extension>
/xs:complexContent>
/xs:complexType>
xs:complexType name="resultAggregation">
xs:sequence>
xs:element minOccurs="0" name="name" type="xs:string"/>
xs:element minOccurs="0" name="values">
xs:complexType>
xs:sequence>
xs:element maxOccurs="unbounded" minOccurs="0" name="values" type="xs:string"/>
/xs:sequence>
/xs:complexType>
/xs:element>
/xs:sequence>
/xs:complexType>
xs:complexType name="resultChemistryAndBiology">
xs:complexContent>
xs:extension base="resultCommon">
xs:sequence>
xs:element minOccurs="0" name="uncertaintyConvention" type="uncertaintyConversion"/>
xs:element minOccurs="0" name="categoryValue" type="xs:string"/>
xs:element minOccurs="0" name="categoryLabel" type="xs:int"/>

xs:element minOccurs="0" name="subCategoryValue" type="xs:string"/>
xs:element minOccurs="0" name="subCategoryLabel" type="xs:int"/>
xs:element minOccurs="0" name="kcdbServiceCategory" type="xs:string"/>
xs:element minOccurs="0" name="analyteMatrix" type="xs:string"/>
xs:element minOccurs="0" name="analyteValue" type="xs:string"/>
xs:element minOccurs="0" name="crm" type="resultUnit"/>
xs:element minOccurs="0" name="crmUncertainty" type="resultUnit"/>
xs:element minOccurs="0" name="mechanism" type="xs:string"/>
xs:element minOccurs="0" name="crmConfidenceLevel" type="xs:double"/>
xs:element minOccurs="0" name="crmCoverageFactor" type="xs:double"/>
xs:element minOccurs="0" name="crmUncertaintyEquation" type="resultEquation"/>
xs:element minOccurs="0" name="crmUncertaintyTable" type="resultTable"/>
xs:element minOccurs="0" name="crmUncertaintyMode" type="absoluteRelative"/>
xs:element minOccurs="0" name="measurmentTechnique" type="xs:string"/>
/xs:sequence>
/xs:extension>
/xs:complexContent>
/xs:complexType>
xs:complexType name="resultCommon">
xs:sequence>
xs:element minOccurs="0" name="id" type="xs:int"/>
xs:element minOccurs="0" name="status" type="xs:string"/>
xs:element minOccurs="0" name="statusDate" type="xs:string"/>
xs:element minOccurs="0" name="kcdbCode" type="xs:string"/>
xs:element minOccurs="0" name="domainCode" type="xs:string"/>
xs:element minOccurs="0" name="metrologyAreaLabel" type="xs:string"/>
xs:element minOccurs="0" name="rmo" type="xs:string"/>
xs:element minOccurs="0" name="countryValue" type="xs:string"/>
xs:element minOccurs="0" name="nmiCode" type="xs:string"/>

xs:element minOccurs="0" name="nmiName" type="xs:string"/>
xs:element minOccurs="0" name="nmiIdentifier" type="xs:int"/>
xs:element minOccurs="0" name="nmiRorIdentifier" type="xs:string"/>
xs:element minOccurs="0" name="nmiWikiDataIdentifier" type="xs:string"/>
xs:element minOccurs="0" name="nmiServiceCode" type="xs:string"/>
xs:element minOccurs="0" name="nmiServiceLink" type="xs:string"/>
xs:element minOccurs="0" name="quantityValue" type="xs:string"/>
xs:element minOccurs="0" name="cmc" type="resultUnit"/>
xs:element minOccurs="0" name="cmcUncertainty" type="resultUnit"/>
xs:element minOccurs="0" name="confidenceLevel" type="xs:double"/>
xs:element minOccurs="0" name="coverageFactor" type="xs:double"/>
xs:element minOccurs="0" name="uncertaintyEquation" type="resultEquation"/>
xs:element minOccurs="0" name="uncertaintyTable" type="resultTable"/>
xs:element minOccurs="0" name="uncertaintyMode" type="absoluteRelative"/>
xs:element minOccurs="0" name="traceabilitySource" type="xs:string"/>
xs:element minOccurs="0" name="comments" type="xs:string"/>
xs:element minOccurs="0" name="groupIdentifier" type="xs:string"/>
xs:element minOccurs="0" name="publicationDate" type="xs:string"/>
xs:element minOccurs="0" name="approvalDate" type="xs:string"/>
/xs:sequence>
/xs:complexType>
xs:complexType name="resultUnit">
xs:sequence>
xs:element minOccurs="0" name="lowerLimit" type="xs:double"/>
xs:element minOccurs="0" name="upperLimit" type="xs:double"/>
xs:element minOccurs="0" name="unit" type="xs:string"/>
/xs:sequence>
/xs:complexType>
xs:complexType name="resultEquation">

```
xs:sequence>
xs:element minOccurs="0" name="equation" type="xs:string"/>
xs:element minOccurs="0" name="equationComment" type="xs:string"/>
/xs:sequence>
/xs:complexType>
xs:complexType name="resultTable">
xs:sequence>
xs:element minOccurs="0" name="tableName" type="xs:string"/>
xs:element name="tableRows" type="xs:int"/>
xs:element name="tableCols" type="xs:int"/>
xs:element minOccurs="0" name="tableComment" type="xs:string"/>
xs:element minOccurs="0" name="tableContents" type="xs:string"/>
/xs:sequence>
/xs:complexType>
xs:complexType name="resultPhysics">
xs:complexContent>
xs:extension base="resultCommon">
xs:sequence>
xs:element minOccurs="0" name="internationalStandard" type="xs:string"/>
xs:element minOccurs="0" name="branchValue" type="xs:string"/>
xs:element minOccurs="0" name="branchLabel" type="xs:string"/>
xs:element minOccurs="0" name="serviceValue" type="xs:string"/>
xs:element minOccurs="0" name="subServiceValue" type="xs:string"/>
xs:element minOccurs="0" name="individualServiceValue" type="xs:string"/>
xs:element minOccurs="0" name="physicsCode" type="xs:string"/>
xs:element minOccurs="0" name="kcdbServiceCategory" type="xs:string"/>
xs:element minOccurs="0" name="instrument" type="xs:string"/>
xs:element minOccurs="0" name="instrumentMethod" type="xs:string"/>
xs:element minOccurs="0" name="parameters">
```

```
xs:complexType>
xs:sequence>
xs:element maxOccurs="unbounded" minOccurs="0" name="parameters" type="resultParam"/>
/xs:sequence>
/xs:complexType>
/xs:element>
/xs:sequence>
/xs:extension>
/xs:complexContent>
/xs:complexType>
xs:complexType name="resultParam">
xs:sequence>
xs:element minOccurs="0" name="parameterName" type="xs:string"/>
xs:element minOccurs="0" name="parameterValue" type="xs:string"/>
/xs:sequence>
/xs:complexType>
xs:complexType name="resultRadiation">
xs:complexContent>
xs:extension base="resultCommon">
xs:sequence>
xs:element minOccurs="0" name="branchValue" type="xs:string"/>
xs:element minOccurs="0" name="branchLabel" type="xs:string"/>
xs:element minOccurs="0" name="instrument" type="xs:string"/>
xs:element minOccurs="0" name="instrumentMethod" type="xs:string"/>
xs:element minOccurs="0" name="sourceValue" type="xs:string"/>
xs:element minOccurs="0" name="mediumValue" type="xs:string"/>
xs:element minOccurs="0" name="nuclideValue" type="xs:string"/>
xs:element minOccurs="0" name="radiationSpecification" type="xs:string"/>
xs:element minOccurs="0" name="internationalStandard" type="xs:string"/>
```

xs:element minOccurs="0" name="referenceStandard" type="xs:string"/>
xs:element minOccurs="0" name="radiationCode" type="xs:string"/>
xs:element minOccurs="0" name="kcdbServiceCategory" type="xs:string"/>
/xs:sequence>
/xs:extension>
/xs:complexContent>
/xs:complexType>
xs:complexType name="resultFilter">
xs:sequence>
xs:element minOccurs="0" name="code" type="xs:string"/>
xs:element minOccurs="0" name="name" type="xs:string"/>
xs:element name="count" type="xs:long"/>
xs:element name="order" type="xs:int"/>
xs:element minOccurs="0" name="children">
xs:complexType>
xs:sequence>
xs:element maxOccurs="unbounded" minOccurs="0" name="children" type="resultFilter"/>
/xs:sequence>
/xs:complexType>
/xs:element>
/xs:sequence>
/xs:complexType>
xs:complexType abstract="true" name="results">
xs:sequence>
xs:element minOccurs="0" name="versionApiKcdb" type="xs:string"/>
xs:element name="pageNumber" type="xs:int"/>
xs:element name="pageSize" type="xs:int"/>
xs:element name="numberOfElements" type="xs:int"/>
xs:element name="totalElements" type="xs:long"/>

```
xs:element name="totalPages" type="xs:int"/>
/xs:sequence>
/xs:complexType>
xs:complexType name="resultsChemistryAndBiology">
xs:complexContent>
xs:extension base="results">
xs:sequence>
xs:element minOccurs="0" name="data">
xs:complexType>
xs:sequence>
xs:element maxOccurs="unbounded" minOccurs="0" name="data" type="resultChemistryAndBiology"/>
/xs:sequence>
/xs:complexType>
/xs:element>
/xs:sequence>
/xs:extension>
/xs:complexContent>
/xs:complexType>
xs:complexType name="resultsPhysics">
xs:complexContent>
xs:extension base="results">
xs:sequence>
xs:element minOccurs="0" name="data">
xs:complexType>
xs:sequence>
xs:element maxOccurs="unbounded" minOccurs="0" name="data" type="resultPhysics"/>
/xs:sequence>
/xs:complexType>
/xs:element>
```

/xs:sequence>
/xs:extension>
/xs:complexContent>
/xs:complexType>
xs:complexType name="resultsQuick">
xs:sequence>
xs:element minOccurs="0" name="versionApiKcdb" type="xs:string"/>
xs:element name="pageNumber" type="xs:int"/>
xs:element name="pageSize" type="xs:long"/>
xs:element name="numberOfElements" type="xs:int"/>
xs:element name="totalElements" type="xs:long"/>
xs:element name="totalPages" type="xs:int"/>
xs:element minOccurs="0" name="data">
xs:complexType>
xs:sequence>
xs:element maxOccurs="unbounded" minOccurs="0" name="data" type="xs:anyType"/>
/xs:sequence>
/xs:complexType>
/xs:element>
xs:element minOccurs="0" name="filtersList">
xs:complexType>
xs:sequence>
xs:element maxOccurs="unbounded" minOccurs="0" name="filtersList" type="resultFilter"/>
/xs:sequence>
/xs:complexType>
/xs:element>
xs:element minOccurs="0" name="aggregations">
xs:complexType>
xs:sequence>

```
xs:element maxOccurs="unbounded" minOccurs="0" name="aggregations" type="resultAggregation"/>
/xs:sequence>
/xs:complexType>
/xs:element>
/xs:sequence>
/xs:complexType>
xs:complexType name="resultsRadiation">
xs:complexContent>
xs:extension base="results">
xs:sequence>
xs:element minOccurs="0" name="data">
xs:complexType>
xs:sequence>
xs:element maxOccurs="unbounded" minOccurs="0" name="data" type="resultRadiation"/>
/xs:sequence>
/xs:complexType>
/xs:element>
/xs:sequence>
/xs:extension>
/xs:complexContent>
/xs:complexType>
xs:complexType name="domain">
xs:sequence>
xs:element minOccurs="0" name="code" type="xs:string"/>
xs:element minOccurs="0" name="name" type="xs:string"/>
/xs:sequence>
/xs:complexType>
xs:complexType name="referenceData">
xs:sequence>
```

```
xs:element name="id" type="xs:int"/>
xs:element minOccurs="0" name="label" type="xs:string"/>
xs:element minOccurs="0" name="value" type="xs:string"/>
/xs:sequence>
/xs:complexType>
xs:complexType name="resultsDomain">
xs:sequence>
xs:element maxOccurs="unbounded" minOccurs="0" name="domain" type="domain"/>
/xs:sequence>
/xs:complexType>
xs:complexType name="resultsReferenceData">
xs:sequence>
xs:element maxOccurs="unbounded" minOccurs="0" name="referenceData" type="referenceData"/>
/xs:sequence>
/xs:complexType>
xs:simpleType name="uncertaintyConversion">
xs:restriction base="xs:string">
xs:enumeration value="One"/>
xs:enumeration value="Two"/>
/xs:restriction>
/xs:simpleType>
xs:simpleType name="absoluteRelative">
xs:restriction base="xs:string">
xs:enumeration value="Absolute"/>
xs:enumeration value="Relative"/>
/xs:restriction>
/xs:simpleType>
/xs:schema>
```

14 REVISION HISTORY

Version	Modification
2021-06-22	First edition.
2021-06-25	Editorial udate.
2025-10-02	Update following the extension of the search of CMCs no longer published; addition of external IDs for organization (ROR and WIkiData) and reference to the KCDB Service Category code.
2026-05-22	Editorial update to API linked references in sections 2 to 8
2026-05-29	Editorial update of cURL links in **Table A-1** List of cURLs to obtain Reference Data

Bureau
International des
Poids et
Mesures

Bureau International des Poids et Mesures
BIPM - Pavillon de Breteuil F-92312 Sèvres Cedex FRANCE