BTEX Proficiency Testing

CSV Data Submission Guide

16/10/2026 – Version 1.0

Executive Summary

Participating laboratories submit their BTEX measurement results to the Proficiency Testing (PT) coordinator, the Joint Research Centre (JRC), through the **PT-DAP** web platform using CSV files.

This document describes the required CSV file structure and the rules for preparing, validating, and uploading laboratory measurement data.

The data submission process follows four main rules:

1. **Calculate the average**: for phase 1 and 2, the reported average concentration (**avg**) and its associated uncertainty (**su** and **eu**) must represent the stabilised concentration during the corresponding measurement step. For phase 3 each average and uncertainty will represent the corresponding 2 hours interval step.
2. **Report all recorded measurements**: All recorded measurement values must be provided to the PT coordinator (JRC), including values that were not used to calculate the average. Laboratories must not remove or omit recorded measurements from the CSV file simply because they were excluded from the average calculation.
3. **Upload the CSV file**: A separate CSV file must be prepared for each compound and instrument combination. Each reported step must include its identifier (step), standard uncertainty (**su**), expanded uncertainty (**eu**), declared average concentration (**avg**), and at least one measurement value (v1–v8).
4. **Identify excluded measurements**: After uploading all available measurement values, laboratories identify through the **PT-DAP web interface** which values were not used to calculate the declared average. These values are excluded from the average-validation selection but remain recorded in the platform. The average concentration originally reported by the laboratory (**avg**), together with its associated uncertainty, is retained and used for the subsequent proficiency testing performance assessment and inter-laboratory comparison.

The following sections in this document describe the exercise structure, CSV format requirements, and examples of valid data files.

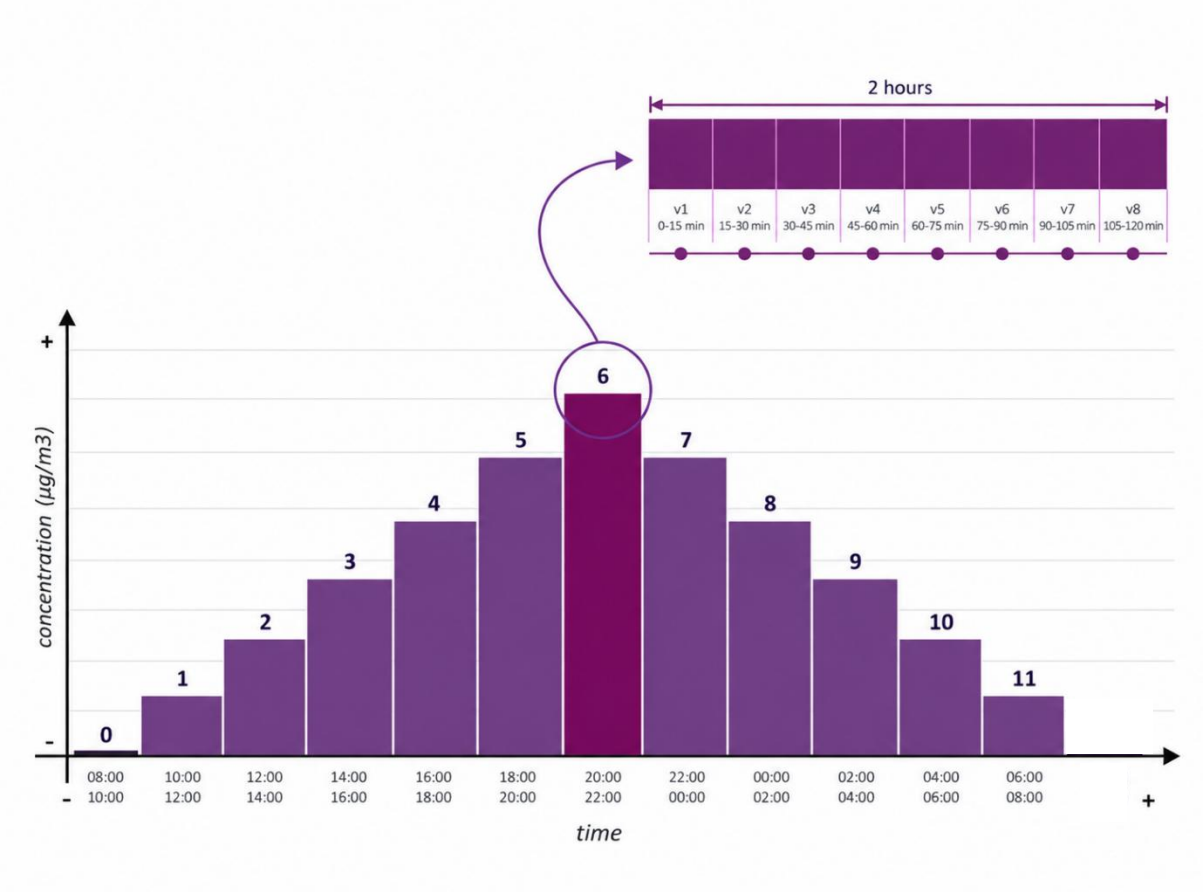
Important: All recorded measurement values must be submitted to the PT coordinator (JRC), including those not used to calculate the declared average (**avg**). Excluding a measurement from the average calculation does not mean omitting it from the CSV file or deleting it from the submitted dataset. **Providing all recorded values is essential to ensure the completeness, transparency, and traceability of the laboratory's results**, allowing the PT coordinator (JRC) to review both the measurements used and those excluded from the average calculation.

Introduction to data submission

The BTEX Proficiency Testing (PT) exercise is an inter-laboratory comparison designed to assess the measurement performance of participating laboratories for aromatic volatile organic compounds, including benzene, toluene, ethylbenzene and xylenes.

During the exercise, test gas mixtures are generated at different concentration levels according to a predefined schedule, with particular emphasis on low concentrations and levels approaching relevant limit or threshold values. Participating laboratories perform continuous measurements using their own automatic analysers, calibrated with their reference standards.

The figure below illustrates an example of the concentration profile for the first phase of the exercise. The measurement schedule is divided into consecutive two-hour periods, identified as steps. Each step represents a defined concentration level for which laboratories report their measurement results.



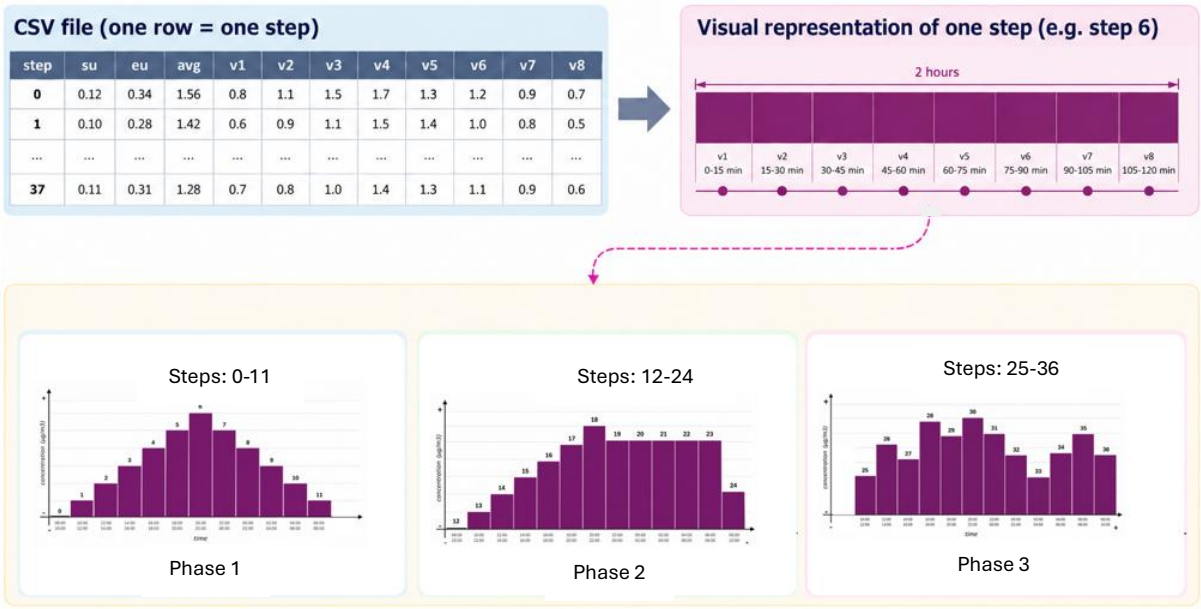
The highlighted step 6 illustrates how an individual two-hour period is divided into smaller measurement intervals. Depending on the measurement frequency, laboratories may report up to eight values (v1–v8) per step, corresponding, for example, to measurements recorded every 15 minutes. Instruments operating with a 30-minute reporting interval may instead provide four values per step.

Participating laboratories submit their measurement results through the Proficiency Testing – Data Acquisition Platform (PT-DAP) using Comma-Separated Values (CSV) files. A separate CSV file is submitted for each compound and instrument combination.

For each reported step, the CSV file contains the step identifier, standard uncertainty (su), expanded uncertainty (eu), declared average concentration (avg), and the available interval measurement values (v1–v8). The average is calculated by the laboratory from its selected measurement values. All available measurement values must be reported, including those not used in calculating the average.

The laboratory identifies the measurements used to calculate the declared average separately through the PT-DAP interface.

Uploaded data are stored in a central database and subsequently used for statistical calculations, performance assessment and inter-laboratory comparisons. These results contribute to the preparation of the final proficiency testing report.



Exercise schema

The BTEX proficiency testing exercise is organised over three consecutive phases, during which participating laboratories measure test gas mixtures generated at different concentration levels according to a predefined schedule.

Each phase of the exercise consists of a sequence of two-hour measurement periods, referred to as steps. Every step corresponds to a specific concentration level, and participating laboratories are required to report their measurement results for the relevant BTEX compounds.

Figures 1, 2 and 3 illustrate the concentration profiles and measurement schedules for the three phases of the exercise.

For data submission, the exercise comprises 37 measurement steps (0–36). Phase 1 covers steps 0–11, Phase 2 covers steps 12–24, and Phase 3 covers steps 25–36. Steps 12 and 24 are also shown in the adjacent phase diagrams to illustrate the transitions, but each step is reported only once.

Phase 1 – Increasing and decreasing concentration levels (Figure 1)

The first phase comprises steps 0–11. The concentration increases progressively from the initial zero-concentration level at step 0, reaching its maximum at step 6. It then decreases progressively, returning to zero air at phase 2. Throughout this phase, relative humidity remains below 5%.

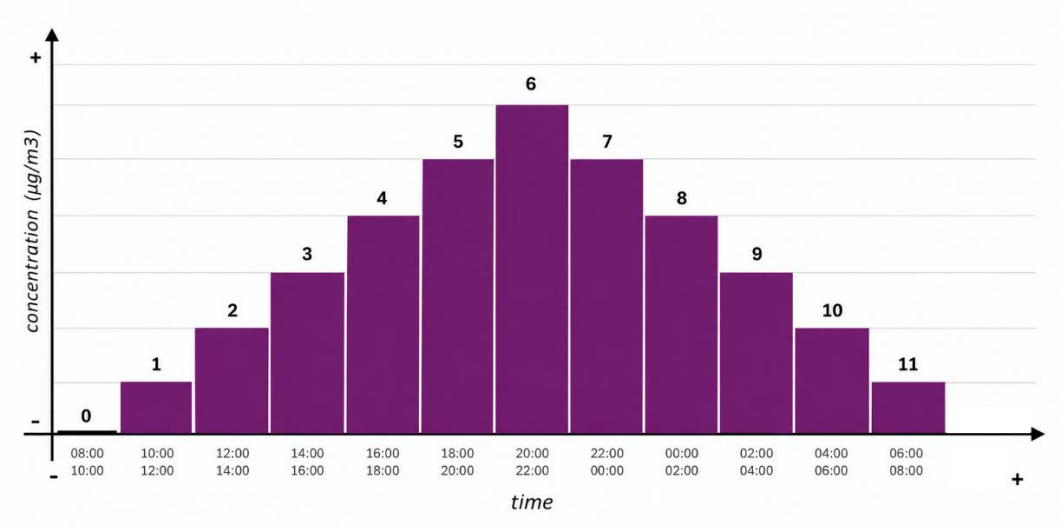


Figure 1 - Phase 1

Phase 2 – Increasing concentration levels and a stable concentration period (Figure 2)

The second phase is hold at humidities of around 70 %, covering steps 12–24, beginning with a zero-concentration level at step 12. The concentration then increases progressively, reaching its maximum at step 18, before decreasing to a lower level that remains constant from steps 19 to 23. A further decrease at step 24 marks the final concentration adjustment under the controlled conditions of the second phase.

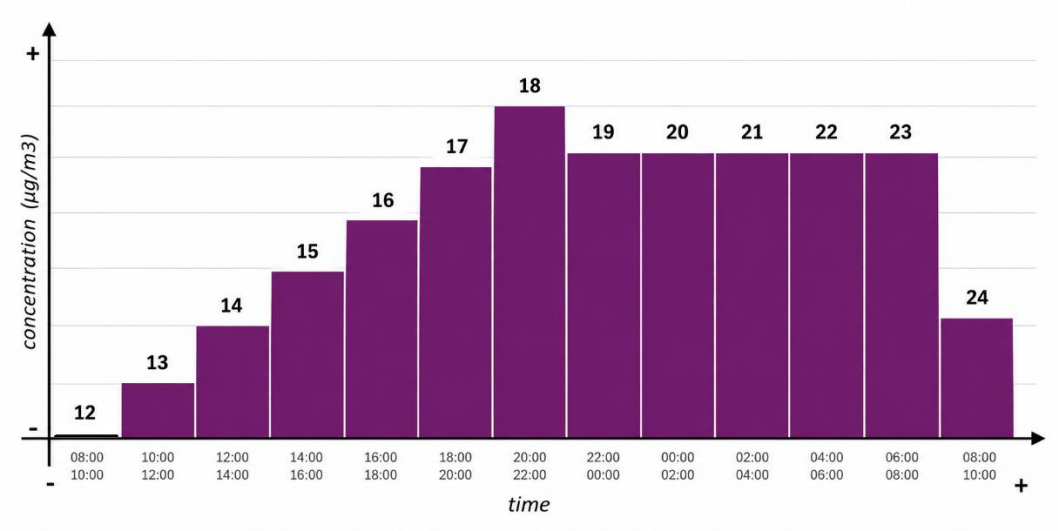


Figure 2 - Phase 2

Phase 3 – Variable concentration levels (Figure 3)

The third phase comprises steps 25–36. Unlike the previous phases, both pollutant concentrations and relative humidity may vary according to outdoor ambient conditions.

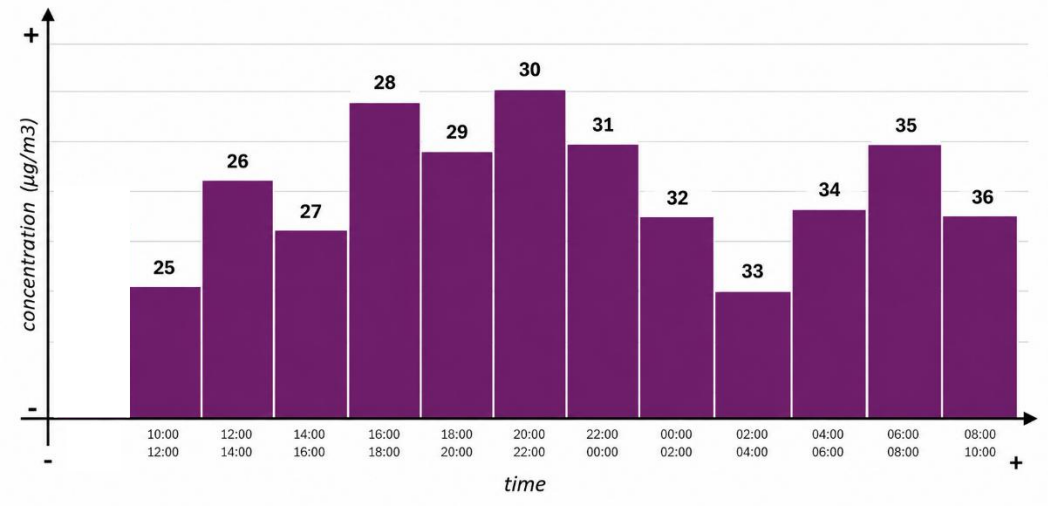


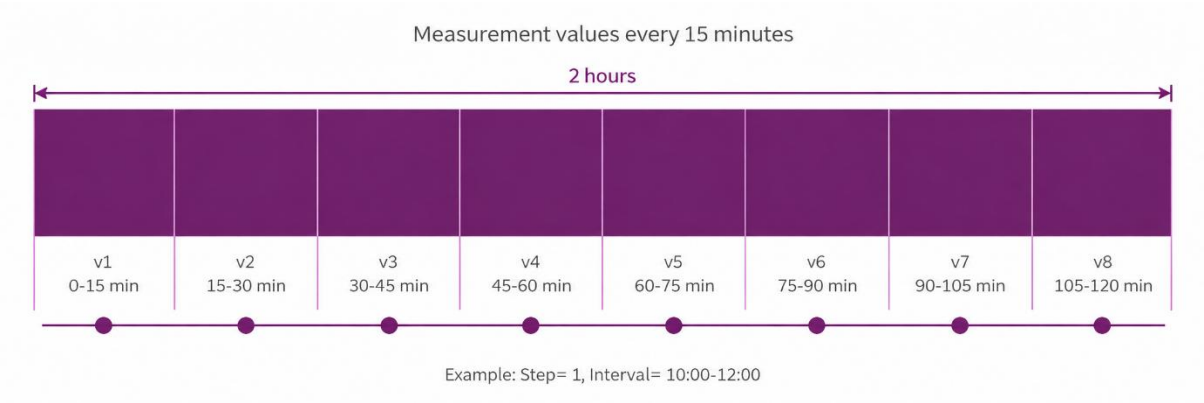
Figure 3 - Phase 3

Measurement intervals within each step

Each step covers a period of two hours. Depending on the measurement frequency and the configuration of the laboratory's automatic analyser, the two-hour period may be represented by a different number of interval measurement values.

The measurement-interval diagrams illustrate two examples:

- **15-minute intervals**: eight measurement values (v1–v8) within a two-hour step.
- **30-minute intervals**: four measurement values (v1–v4) within the same two-hour step.





Each measurement value represents the concentration reported for its corresponding time interval.

For every reported step, participating laboratories submit the available interval measurement values, the declared average concentration (**avg**), the standard uncertainty (**su**) and the expanded uncertainty (**eu**).

The resulting CSV files follow the same structure regardless of the number of available interval measurements, as described in the following sections.

Reporting of individual measurements and representative step concentrations

For each two-hour measurement step, laboratories must report all available individual measurement values, regardless of whether they were used to calculate the reported average concentration (avg).

Depending on the instrument's reporting frequency, up to eight values (v1–v8) may be reported for instruments providing measurements every 15 minutes, or four values (v1–v4) for instruments providing measurements every 30 minutes.

For phase 1 and 2 the reported average concentration (**avg**) and its associated uncertainty (**su** and **eu**) must represent **the stabilised concentration during the corresponding measurement step.** For phase 3 each average and uncertainty will represent the corresponding 2 hours interval step (i.e., it is not expected that any measurement will be removed).

Consequently, measurements obtained during unstable conditions, particularly at the beginning of a step following a change in concentration, may be excluded from the average calculation. Nevertheless, all recorded measurements, including those excluded from the calculation, must be included in the CSV file.

After uploading the CSV file, the PT-DAP interface allows participants to visualise all reported individual measurements and identify which values were used to calculate the declared average.

The platform automatically calculates the average of the selected measurements and compares it with the average concentration (avg) declared in the CSV file. As a consistency check, the declared average is considered valid when the absolute difference between the declared and calculated averages does not exceed **1%** of the declared average or **0.001** $\mu g/m^3$, whichever is greater.

This validation procedure does not modify the declared average. **The average concentration originally reported by the laboratory (avg), together with its associated uncertainty, is retained and used for the subsequent proficiency testing performance assessment and inter-laboratory comparison.**

CSV Format rules

The following rules define the CSV format used by the Proficiency Testing – Data Acquisition Platform (PT-DAP) for the submission of results for **BTEX aromatic volatile organic compounds**.

A separate CSV file is submitted for each **compound/instrument combination**. The relevant compound and instrument are selected or otherwise identified in the PT-DAP web interface before the file is uploaded. Therefore, the CSV file itself does not need to include additional fields identifying the compound or the instrument.

Within a single CSV file, all reported rows refer to the same compound and the same instrument. The number of interval measurement values reported for each step may vary, from a minimum of one to a maximum of eight (`v1–v8`).

These rules apply specifically to BTEX CSV files and do not define the format for other PT-DAP exercises:

1. **Data records**
   CSV files are used to represent measurement records. Each data row corresponds to a single step level for the relevant compound.

2. **Delimiter**
   The comma (,) is the only delimiter accepted by the PT-DAP. Other delimiters, such as semicolons or tabs, are not supported.

3. **Decimal separator**
   The dot (.) must be used as the decimal separator.

4. **CSV header**
   The first line of the CSV file must contain the complete and compulsory header defined by the CSV file schema. The header for BTEX must contain exactly the field names shown below, in the specified order. Fields must not be added, removed, duplicated, or reordered:

   ```
   step,su,eu,avg,v1,v2,v3,v4,v5,v6,v7,v8
   ```

   In fact, the header defines the maximum number and position of the fields that may occur in each data row.

5. **Mandatory fields**
   For every **reported step**, the fields **step**, **su**, **eu**, **avg** and at least one measurement value from v1 to v8 must be reported. If no data are available for a particular step, the corresponding row may be omitted entirely from the CSV file.

   However, when a step is reported, its mandatory fields must contain valid values and must not be left empty. In this example, all mandatory fields step, su, eu, avg and value v1 are correctly filled in. Therefore, the row related to step 6 is valid:

   ```
   step,su,eu,avg,v1,v2,v3,v4,v5,v6,v7,v8
   6,0.012,0.024,3.082,3.082
   ```

6. **Variable number of interval measurements**

   A data row may contain a variable number of interval measurements. For example, an instrument providing three interval measurements may report:

   ```
   step,su,eu,avg,v1,v2,v3,v4,v5,v6,v7,v8
   0,0.009,0.018,1.245,1.246,1.239,1.250
   ```

   while an instrument providing eight interval measurements may report:

   ```
   step,su,eu,avg,v1,v2,v3,v4,v5,v6,v7,v8
   0,0.009,0.018,1.245,1.246,1.239,1.250,1.248,1.244,1.247,1.243,1.243
   ```

   Unused measurement fields at the end of a row do not need to be explicitly reported. Therefore, for values fields (v1-v8) trailing empty fields may be omitted.

7. **Missing measurement values**

   If a measurement is missing **between other reported measurement values**, its position must be preserved by using an empty CSV field. For example:

   ```
   step,su,eu,avg,v1,v2,v3,v4,v5,v6,v7,v8
   0,0.009,0.018,1.245,1.246,,1.250,1.248
   ```

   This means:

   step = 0

   su = 0.009

   eu = 0.018

   avg = 1.245

   v1 = 1.246

   v2 = missing

   v3 = 1.250

   v4 = 1.248

   The empty field between two commas (...,1.246,,1.250,...) is significant and must not be removed. This is valid and means that only v1, v3, and v4 are reported; values v2 and v5 to v8 are not provided. Although missing measurement values are permitted, all available measurement values must be reported, even if they were not used to calculate the average (**avg**).

   Optional trailing measurement fields may either be omitted from the row or represented as empty fields. In both cases they are interpreted as missing measurement values.

   For example:
   step,su,eu,avg,v1,v2,v3,v4,v5,v6,v7,v8
   0,0.009,0.018,1.245,1.246,1.239,1.250
   and:
   step,su,eu,avg,v1,v2,v3,v4,v5,v6,v7,v8
   0,0.009,0.018,1.245,1.246,1.239,1.250,,,,,
   are equivalent.

8. **Missing steps and step ordering**
   If no data are available for a particular step, the corresponding data row may be omitted. Step numbers are therefore not required to be consecutive in the CSV file. The same step must not appear more than once in the CSV file. Rows do not need to be ordered by step number.

   For example:

```
step,su,eu,avg,v1,v2,v3,v4,v5,v6,v7,v8
4,0.010,0.020,2.342,2.342,2.336,2.349
5,0.011,0.022,2.695,2.695,2.701,2.690
7,0.014,0.028,3.529,3.529,3.534,3.522
8,0.015,0.030,4.015,4.015,4.022,4.009
```

   In this example, step 6 is not reported. Empty rows must not be used as substitutes for missing steps.

   The following CSV dataset is equivalent to the previous example, despite the different order of the rows:

```
step,su,eu,avg,v1,v2,v3,v4,v5,v6,v7,v8
7,0.014,0.028,3.529,3.529,3.534,3.522
4,0.010,0.020,2.342,2.342,2.336,2.349
8,0.015,0.030,4.015,4.015,4.022,4.009
5,0.011,0.022,2.695,2.695,2.701,2.690
```

9. **Field position**
   Field positions are determined by the CSV header and must always be preserved. A missing intermediate value must never cause subsequent values to shift to another column.

   Correct:

```
step,su,eu,avg,v1,v2,v3,v4,v5,v6,v7,v8
0,0.009,0.018,1.245,1.246,,1.250,1.248
```

   Here, **v2** is missing and **v3** remains correctly assigned to its declared position.

   Incorrect:

```
step,su,eu,avg,v1,v2,v3,v4,v5,v6,v7,v8
0,0.009,0.018,1.245,1.246,1.250,1.248
```

   If **v2** were actually missing, this row would incorrectly shift the subsequent values so that 1.250 would be interpreted as **v2**.

10. **Maximum number of fields**
    A data row must never contain more fields than those declared in the CSV header. For the BTEX schema, a row may contain a maximum of 12 fields:

```
step,su,eu,avg,v1,v2,v3,v4,v5,v6,v7,v8
```

11. **Text and comments**
    CSV data records must contain only values defined by the schema. Comments, descriptive text, or additional undeclared fields are not accepted. For example, the following is not valid:

    ```
    step,su,eu,avg,v1,v2,v3,v4,v5,v6,v7,v8
    0,0.009,0.018,1.245,1.246,1.239,1.250,measurement checked
    ```

12. **Empty lines**
    Empty lines are discarded by the PT-DAP and should preferably not be included in the CSV file.

13. **Character encoding**
    CSV files must be encoded using UTF-8.

14. **Numeric format**
    Decimal values may be reported with up to three digits after the decimal point.

    Correct:

    ```
    step,su,eu,avg,v1,v2,v3,v4,v5,v6,v7,v8
    0,0.009,0.018,1.229,1.24,1.239,1.25
    ```

    Scientific notation is not permitted in any field.
    In this example fields **su** and **eu** are incorrect:

    ```
    step,su,eu,avg,v1,v2,v3,v4,v5,v6,v7,v8
    0,9.00E-3,1.80E-2,1.245,1.246,1.239,1.250
    ```

    It is recommended that the CSV file be checked with a plain-text editor before being uploaded to the PT-DAP. Only well-formed CSV files are accepted by the validation procedures.

15. **BTEX compounds**
    A separate CSV file must be provided for each BTEX compound:

    - BENZ
    - TOL
    - ETHYL-BENZ
    - mp-XYL
    - o-XYL

    All compound files use the same CSV schema. However, the set of reported steps and the number of interval measurements available for individual records may differ between compounds and instruments.

CSV file schema

- **step** (integer)= measurement step level
- **su** (decimal) = standard uncertainty
- **eu** (decimal) = expanded uncertainty
- **avg** (decimal) = average concentration calculated from the selected measurement values (v1-v8)(*)
- **v1,v2,v3,…,v8** (decimal) = interval measurement values (all recorded values must be reported)

(*) *The CSV contains the declared average (**avg**) but does not identify which measurements were selected for its calculation. That information is provided separately through the PT-DAP interface. All available measurement values must be reported in the CSV files.*

CSV file: valid examples

1. Complete dataset – all steps and measurement values reported

This example shows a **fully populated CSV file**. All expected step levels are reported, and each row contains all eight interval measurement values (v1 to v8):

```
step,su,eu,avg,v1,v2,v3,v4,v5,v6,v7,v8
0,0.009,0.018,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000
1,0.008,0.016,2.000,1.995,2.007,1.994,2.004,1.997,2.005,1.996,2.002
2,0.009,0.018,4.000,3.994,4.003,4.005,3.996,4.002,3.995,4.007,3.998
3,0.010,0.020,6.000,5.993,6.004,5.997,6.006,5.995,6.003,5.998,6.004
4,0.010,0.020,8.000,7.995,8.007,7.994,8.004,7.997,8.005,7.996,8.002
5,0.011,0.022,10.000,9.994,10.003,10.005,9.996,10.002,9.995,10.007,9.998
6,0.012,0.024,12.000,11.993,12.004,11.997,12.006,11.995,12.003,11.998,12.004
7,0.014,0.028,10.000,9.995,10.007,9.994,10.004,9.997,10.005,9.996,10.002
8,0.015,0.030,8.000,7.994,8.003,8.005,7.996,8.002,7.995,8.007,7.998
9,0.016,0.032,6.000,5.993,6.004,5.997,6.006,5.995,6.003,5.998,6.004
10,0.018,0.036,4.000,3.995,4.007,3.994,4.004,3.997,4.005,3.996,4.002
11,0.019,0.038,2.000,1.994,2.003,2.005,1.996,2.002,1.995,2.007,1.998
12,0.021,0.042,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000
13,0.022,0.044,2.500,2.495,2.507,2.494,2.504,2.497,2.505,2.496,2.502
14,0.023,0.046,5.000,4.994,5.003,5.005,4.996,5.002,4.995,5.007,4.998
15,0.024,0.048,7.500,7.493,7.504,7.497,7.506,7.495,7.503,7.498,7.504
16,0.025,0.050,10.000,9.995,10.007,9.994,10.004,9.997,10.005,9.996,10.002
17,0.026,0.052,12.500,12.494,12.503,12.505,12.496,12.502,12.495,12.507,12.498
18,0.027,0.054,15.000,14.993,15.004,14.997,15.006,14.995,15.003,14.998,15.004
19,0.028,0.056,12.000,11.995,12.007,11.994,12.004,11.997,12.005,11.996,12.002
20,0.029,0.058,12.000,11.994,12.003,12.005,11.996,12.002,11.995,12.007,11.998
```

21,0.030,0.060,12.000,11.993,12.004,11.997,12.006,11.995,12.003,11.998,12.004
22,0.031,0.062,12.000,11.995,12.007,11.994,12.004,11.997,12.005,11.996,12.002
23,0.032,0.064,12.000,11.994,12.003,12.005,11.996,12.002,11.995,12.007,11.998
24,0.033,0.066,6.000,5.993,6.004,5.997,6.006,5.995,6.003,5.998,6.004
25,0.034,0.068,3.000,2.995,3.007,2.994,3.004,2.997,3.005,2.996,3.002
26,0.035,0.070,9.000,8.994,9.003,9.005,8.996,9.002,8.995,9.007,8.998
27,0.036,0.072,6.000,5.993,6.004,5.997,6.006,5.995,6.003,5.998,6.004
28,0.037,0.074,15.000,14.995,15.007,14.994,15.004,14.997,15.005,14.996,15.002
29,0.038,0.076,11.000,10.994,11.003,11.005,10.996,11.002,10.995,11.007,10.998
30,0.039,0.078,16.000,15.993,16.004,15.997,16.006,15.995,16.003,15.998,16.004
31,0.040,0.080,11.500,11.495,11.507,11.494,11.504,11.497,11.505,11.496,11.502
32,0.041,0.082,7.000,6.994,7.003,7.005,6.996,7.002,6.995,7.007,6.998
33,0.042,0.084,3.500,3.493,3.504,3.497,3.506,3.495,3.503,3.498,3.504
34,0.043,0.086,7.000,6.995,7.007,6.994,7.004,6.997,7.005,6.996,7.002
35,0.044,0.088,11.500,11.494,11.503,11.505,11.496,11.502,11.495,11.507,11.498
36,0.045,0.090,7.000,6.993,7.004,6.997,7.006,6.995,7.003,6.998,7.004

2. Dataset with missing steps and missing measurement values

This example shows a CSV **file containing both missing step levels and missing interval measurement values**. A step for which no measurement data are available may be omitted entirely from the file. Individual measurement values may also be missing within a reported row. Missing intermediate values must be represented by an empty field (,,) so that the positions of subsequent values are preserved, while unused trailing measurement fields may be omitted:

```
step,su,eu,avg,v1,v2,v3,v4,v5,v6,v7,v8
0,0.009,0.018,1.245,1.246,1.239,1.251,1.241,1.243,1.247,1.249,1.244
1,0.008,0.016,1.487,1.487,1.493,1.481
2,0.009,0.018,1.732,1.732,1.727,1.737,1.728,1.736,1.730,1.734
3,0.010,0.020,2.019,2.019,2.025,2.013,2.015,2.023
14,0.010,0.020,2.342,2.342,2.336,2.348,,2.338,,2.346,2.342
15,0.011,0.022,2.695,2.695,2.701,2.690,2.691,2.693,2.697,2.699,2.694
17,0.014,0.028,3.529,3.529,3.535,3.523,3.525,3.533,3.529
18,0.015,0.030,4.015,4.015,4.022,,4.008,4.011,4.019,4.013,4.017
21,0.018,0.036,5.232,5.232,5.240,5.224,5.228,5.236,5.230,5.234
31,0.019,0.038,5.964,5.964,5.958,5.970,5.960,,5.968,5.962,5.966
32,0.021,0.042,6.782,6.782,6.790,6.774,6.778,6.786,6.780,6.784
```

3. Dataset with a variable number of interval measurement values

This example shows how different rows in the **same CSV file may contain different numbers of interval measurement values**. In this example, the first 10 step levels contain two measurement values (v1 to v2), while the remaining step levels contain eight measurement values (v1 to v8). Although the complete header declares all supported measurement fields, unused trailing fields do not need to be reported. This format supports measurements originating from instruments that produce different numbers of interval values:

```
step,su,eu,avg,v1,v2,v3,v4,v5,v6,v7,v8
0,0.009,0.018,0.000,0.000,0.000
1,0.008,0.016,2.000,1.995,2.007
2,0.009,0.018,4.000,3.994,4.003
3,0.010,0.020,6.000,5.993,6.004
4,0.010,0.020,8.000,7.995,8.007
5,0.011,0.022,10.000,9.994,10.003
6,0.012,0.024,12.000,11.993,12.004
7,0.014,0.028,10.000,9.995,10.007
8,0.015,0.030,8.000,7.994,8.003
9,0.016,0.032,6.000,5.993,6.004
10,0.018,0.036,4.000,3.995,4.007,3.994,4.004,3.997,4.005,3.996,4.002
11,0.019,0.038,2.000,1.994,2.003,2.005,1.996,2.002,1.995,2.007,1.998
12,0.021,0.042,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000
```

13,0.022,0.044,2.500,2.495,2.507,2.494,2.504,2.497,2.505,2.496,2.502
14,0.023,0.046,5.000,4.994,5.003,5.005,4.996,5.002,4.995,5.007,4.998
15,0.024,0.048,7.500,7.493,7.504,7.497,7.506,7.495,7.503,7.498,7.504
16,0.025,0.050,10.000,9.995,10.007,9.994,10.004,9.997,10.005,9.996,10.002
17,0.026,0.052,12.500,12.494,12.503,12.505,12.496,12.502,12.495,12.507,12.498
18,0.027,0.054,15.000,14.993,15.004,14.997,15.006,14.995,15.003,14.998,15.004
19,0.028,0.056,12.000,11.995,12.007,11.994,12.004,11.997,12.005,11.996,12.002
20,0.029,0.058,12.000,11.994,12.003,12.005,11.996,12.002,11.995,12.007,11.998
21,0.030,0.060,12.000,11.993,12.004,11.997,12.006,11.995,12.003,11.998,12.004
22,0.031,0.062,12.000,11.995,12.007,11.994,12.004,11.997,12.005,11.996,12.002
23,0.032,0.064,12.000,11.994,12.003,12.005,11.996,12.002,11.995,12.007,11.998
24,0.033,0.066,6.000,5.993,6.004,5.997,6.006,5.995,6.003,5.998,6.004
25,0.034,0.068,3.000,2.995,3.007,2.994,3.004,2.997,3.005,2.996,3.002
26,0.035,0.070,9.000,8.994,9.003,9.005,8.996,9.002,8.995,9.007,8.998
27,0.036,0.072,6.000,5.993,6.004,5.997,6.006,5.995,6.003,5.998,6.004
28,0.037,0.074,15.000,14.995,15.007,14.994,15.004,14.997,15.005,14.996,15.002
29,0.038,0.076,11.000,10.994,11.003,11.005,10.996,11.002,10.995,11.007,10.998
30,0.039,0.078,16.000,15.993,16.004,15.997,16.006,15.995,16.003,15.998,16.004
31,0.040,0.080,11.500,11.495,11.507,11.494,11.504,11.497,11.505,11.496,11.502
32,0.041,0.082,7.000,6.994,7.003,7.005,6.996,7.002,6.995,7.007,6.998
33,0.042,0.084,3.500,3.493,3.504,3.497,3.506,3.495,3.503,3.498,3.504
34,0.043,0.086,7.000,6.995,7.007,6.994,7.004,6.997,7.005,6.996,7.002
35,0.044,0.088,11.500,11.494,11.503,11.505,11.496,11.502,11.495,11.507,11.498
36,0.045,0.090,7.000,6.993,7.004,6.997,7.006,6.995,7.003,6.998,7.004

4. Dataset with missing step levels

This example shows a dataset in which **measurement results are not available for step levels 6 and 9**. The corresponding rows are omitted entirely from the CSV file. The absence of a step does not require an empty row or placeholder record. All reported step levels otherwise contain the complete set of interval measurement values (v1 to v8):

step,su,eu,avg,v1,v2,v3,v4,v5,v6,v7,v8
0,0.009,0.018,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000
1,0.008,0.016,2.000,1.995,2.007,1.994,2.004,1.997,2.005,1.996,2.002
2,0.009,0.018,4.000,3.994,4.003,4.005,3.996,4.002,3.995,4.007,3.998
3,0.010,0.020,6.000,5.993,6.004,5.997,6.006,5.995,6.003,5.998,6.004
4,0.010,0.020,8.000,7.995,8.007,7.994,8.004,7.997,8.005,7.996,8.002
5,0.011,0.022,10.000,9.994,10.003,10.005,9.996,10.002,9.995,10.007,9.998
7,0.014,0.028,10.000,9.995,10.007,9.994,10.004,9.997,10.005,9.996,10.002
8,0.015,0.030,8.000,7.994,8.003,8.005,7.996,8.002,7.995,8.007,7.998
10,0.018,0.036,4.000,3.995,4.007,3.994,4.004,3.997,4.005,3.996,4.002
11,0.019,0.038,2.000,1.994,2.003,2.005,1.996,2.002,1.995,2.007,1.998
12,0.021,0.042,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000

```
13,0.022,0.044,2.500,2.495,2.507,2.494,2.504,2.497,2.505,2.496,2.502
14,0.023,0.046,5.000,4.994,5.003,5.005,4.996,5.002,4.995,5.007,4.998
15,0.024,0.048,7.500,7.493,7.504,7.497,7.506,7.495,7.503,7.498,7.504
16,0.025,0.050,10.000,9.995,10.007,9.994,10.004,9.997,10.005,9.996,10.002
17,0.026,0.052,12.500,12.494,12.503,12.505,12.496,12.502,12.495,12.507,12.498
18,0.027,0.054,15.000,14.993,15.004,14.997,15.006,14.995,15.003,14.998,15.004
19,0.028,0.056,12.000,11.995,12.007,11.994,12.004,11.997,12.005,11.996,12.002
20,0.029,0.058,12.000,11.994,12.003,12.005,11.996,12.002,11.995,12.007,11.998
21,0.030,0.060,12.000,11.993,12.004,11.997,12.006,11.995,12.003,11.998,12.004
22,0.031,0.062,12.000,11.995,12.007,11.994,12.004,11.997,12.005,11.996,12.002
23,0.032,0.064,12.000,11.994,12.003,12.005,11.996,12.002,11.995,12.007,11.998
24,0.033,0.066,6.000,5.993,6.004,5.997,6.006,5.995,6.003,5.998,6.004
25,0.034,0.068,3.000,2.995,3.007,2.994,3.004,2.997,3.005,2.996,3.002
26,0.035,0.070,9.000,8.994,9.003,9.005,8.996,9.002,8.995,9.007,8.998
27,0.036,0.072,6.000,5.993,6.004,5.997,6.006,5.995,6.003,5.998,6.004
28,0.037,0.074,15.000,14.995,15.007,14.994,15.004,14.997,15.005,14.996,15.002
29,0.038,0.076,11.000,10.994,11.003,11.005,10.996,11.002,10.995,11.007,10.998
30,0.039,0.078,16.000,15.993,16.004,15.997,16.006,15.995,16.003,15.998,16.004
31,0.040,0.080,11.500,11.495,11.507,11.494,11.504,11.497,11.505,11.496,11.502
32,0.041,0.082,7.000,6.994,7.003,7.005,6.996,7.002,6.995,7.007,6.998
33,0.042,0.084,3.500,3.493,3.504,3.497,3.506,3.495,3.503,3.498,3.504
34,0.043,0.086,7.000,6.995,7.007,6.994,7.004,6.997,7.005,6.996,7.002
35,0.044,0.088,11.500,11.494,11.503,11.505,11.496,11.502,11.495,11.507,11.498
36,0.045,0.090,7.000,6.993,7.004,6.997,7.006,6.995,7.003,6.998,7.004
```

Final notes

Participating laboratories prepare their measurement results in CSV files according to the format and validation rules described in this document.

A separate CSV file must be prepared for each compound and instrument combination. Each file contains the available measurement results for the corresponding exercise steps, including the declared average concentration and associated uncertainties.

Before uploading, laboratories should verify that the CSV header, numeric values, measurement fields and step identifiers comply with the specified format.

To verify the correctness of the CSV format, it is recommended to open the file using a plain-text editor (e.g., Notepad). This allows the file structure, delimiters, and field values to be inspected without interference from spreadsheet formatting or automatic data conversions.

CSV files are submitted through the PT-DAP web application. Uploaded data are validated and, when accepted, stored for subsequent statistical analysis and inter-laboratory comparison.