

Passive Sampler-Related Entry – DRAFT

Passive Samplers consist of sorbent contained within a housing canister. They do not have moving parts¹ and can be left in the waterbody to be sampled from a couple of days to several weeks, resulting in an indication of analyte within the waterbody over time. The results of sorbent analysis provide a mass of analyte per sampler², not the typical mass per volume of sample water. For some types of passive samplers, the analyte mass per sample volume of water can be calculated, though the equations and coefficients change depending on the analyte of interest, device and sorbent used, and environmental conditions present during deployment. In some cases, the coefficients may not be known, or the model being used not well understood so deriving an accurate sample water concentration may be difficult. Therefore, the priority is to enter the results of the sorbent analysis, and use the metadata specified below to inform the data user that the results are not comparable to most of the other data in CEDEN. However, Semi-permeable Membrane Device (SPMD) passive samplers are well understood and the coefficients documented. For these results the data provider shall add the calculated aqueous concentration.

These business rules are meant to provide guidance on entering passive sampler monitoring results in the CEDEN Chemistry results template and to aid in user interpretation. Not all template columns are listed below. Those that are not, should be completed consistent with other rows of chemistry data. There are two sections, one for the entry of the mass per sample and one for the entry of the calculated aqueous concentration resulting from SPMDs samplers and the USGS calculator.

Mass Per Sample Entry

A row of data is the result of sorbent analysis (or accompanying quality control sample).

- Station Code – Monitoring location where passive sampler was deployed
- SampleDate – End date of passive sampler deployment
- EventCode – “WQ”
- CollectionDepth – use “-88”
- Unit Collection Depth – use “m”
- LabCollectionComments – Use this comment field for both the number of days the passive sampler was deployed and the mass of the sorbent in the sample (i.e. being extracted together); Example: “21 days; 400 mg of sorbent”
- CollectionMethodCode – “PassiveSampler”
- SampleTypeCode – “Integrated³” for environmental sample. Other SampleTypes may be appropriate for QC samples. For example, if a device using spiked sorbents is also deployed, use “FieldSp” as the SampleTypeCode for the row representing the analysis of the spiked sorbent.
- Replicate –
 - If there is one sorbent exposed within a housing, the replicate number should be “1.”

¹ Similar devices that do have moving parts, such as CLAM devices, are considered “active” samplers and will be addressed in separate guidance.

² One housing may include multiple sorbents that can be extracted together or separately for the same or different analytes. These business rules specify that the results be reported as mass of analyte per sample. What constitutes a sample depends on what sorbents are being extracted and analyzed together.

³ Update the description of integrated to better address passive samplers as well as depth integrated.

- If multiple sorbents are exposed to the sample medium at the same time, within the same housing, and
 - Each sorbent was extracted and analyzed for the same analyte separately, there should be a corresponding number of rows, each with a sequential replicate number, starting with “1;”
 - Each sorbent was analyzed for a different analyte, the replicate should be “1;” or
 - The same type of sorbents were extracted together and analyzed for one analyte, the replicate number should be “1.”
- CollectionDeviceName – Describes the passive sampler and sorbent used; request new values consistent with the following.
 - CollectionDeviceName: “[Type of device]_[sorbent]_[sorbent size without units]_[DLM⁴ status, if applicable]_[membrane pore size without units, if applicable]”
 - Example: Chemcatcher_SDB-RPS-empore_47_PES DLM_0.1
 - CollectionDeviceDescription: “Sample passively collected by [Device type] Sampler. Extraction sorbent – [sorbent material and size with units]. Diffusion limiting membrane: [DLM substance/none], [membrane pore size with units, if applicable]”
 - Example: Sample passively collected by Chemcatcher Sampler. Extraction sorbent - Styrene-divinyl benzene - reversed phase sulfonate (SDB-RPS) Empore 47 mm disk. Diffusion limiting membrane: Polyethersulfone (PES), 0.1 um
- Matrix – “Extract_Samplewater” or “Extract_PoreWater” with description: “Pore Water Extraction from sorbent media or solid phase extraction that has been exposed to sediment.”⁵
- MethodName – Method used to analyze filter extract
- FractionName – “Dissolved”
- UnitName – mass of analyte per sample (ex. ug/sample)
- MDL – Record the method detection limit of the analysis
- RL – Record the reporting limit of the analysis
- LabReplicate – Enter according to lab analysis of extract
- PrepPreservationName – At a minimum, use “FieldFiltered.” If pre-conditioning was done, include that as well. Associated lookup values would be:
 - FieldFiltered
 - FieldPreconditioned, FieldFiltered,
 - LabPreconditioned, FieldFiltered,
 - FieldPreconditioned
 - LabPreconditioned, LabFiltered,
 - LabPreconditioned
- PrepPreservationDate – End date/time of deployment
- DigestExtractMethod – Method for extracting analyte from sorbent
- DigestExtractDate – date/time that extraction from sorbent material was performed in the laboratory

⁴ Diffusion Limiting Membrane: used to reduce biofouling

⁵ As of the writing of these business rules, the matrix-controlled vocabulary list contains “Extract_Sediment” that will need to be end dated.



Figure 1 Polar Organic Chemical Integrative Sampler (POIS) housing with four sorbents.
Source: <https://www.cerc.usgs.gov/pubs/center/pdffdocs/pocis.pdf>, 3/16/2022



Figure 2. Chemcatcher Passive Sampler showing three sorbent disk housings.
Source: <https://chemcatcher.ie/system-requirements/>, 3/16/2022

Aqueous Concentration Entry

The mass per sample water volume can be entered if calculated using the [SPMD USGS Calculator](#).

- Station Code – Monitoring location where passive sampler was deployed.
- SampleDate – End date of passive sampler deployment
- EventCode – “WQ”
- LabCollectionComments – number of days passive sampler was deployed. Example: “21 days”
- CollectionMethodCode – “PassiveSampler”
- SampleTypeCode – “Integrated⁶” for environmental sample. Other SampleTypes may be appropriate for QC samples. For example, if a device using spiked sorbents is also deployed, use “FieldSp” as the SampleTypeCode for the row representing the analysis of the spiked sorbent.
- Replicate –
 - If there is one sorbent exposed within a housing, the replicate number should be “1.”
 - If multiple sorbents are exposed to the sample medium at the same time, within the same housing, and
 - Each sorbent was extracted and analyzed for the same analyte separately, there should be a corresponding number of rows, each with a sequential replicate number, starting with “1;”
 - Each sorbent was analyzed for a different analyte, the replicate should be “1;”
or
 - The sorbents were extracted together and analyzed for one analyte, the replicate number should be “1.”
- CollectionDeviceName – Passive sampler and sorbent used; request new values consistent with the following.
 - CollectionDeviceName: “[Type of device]_[sorbent]_[sorbent size without units]_[DLM⁷ status, if applicable]_[membrane pore size without units, if applicable]”
 - Example: Chemcatcher_SDB-RPS-empore_47_PES DLM_0.1
 - CollectionDeviceDescription: “Sample passively collected by [Device type] Sampler. Extraction sorbent – [sorbent material and size with units]. Diffusion limiting membrane: [DLM substance/none], [membrane pore size with units, if applicable]”
 - Example: Sample passively collected by Chemcatcher Sampler. Extraction sorbent - Styrene-divinyl benzene - reversed phase sulfonate (SDB-RPS) Empore 47 mm disk. Diffusion limiting membrane: Polyethersulfone (PES), 0.1 um
- *Matrix – effluent, porewater or samplewater⁸*
- *MethodName – SPMD Water Concentration Estimator v[x-y] (ex. v5-2)*
- FractionName – “Dissolved”
- *UnitName – mass of analyte per volume of water (ex. ug/L)*
- LabReplicate – Enter according to lab analysis of extract
- PrepPreservationName – At a minimum, use “FieldFiltered.” If pre-conditioning was done, include that as well. Associated lookup values would be:

⁶ Update the description of integrated to better address passive samplers as well as depth integrated.

⁷ Diffusion Limiting Membrane: used to reduce biofouling

⁸ Italicized text denotes departures from Mass Per Sample Entry

- FieldFiltered
- FieldPreconditioned, FieldFiltered,
- LabPreconditioned, FieldFiltered,
- FieldPreconditioned
- LabPreconditioned, LabFiltered,
- LabPreconditioned
- PrepPreservationDate – End date/time of deployment
- DigestExtractMethod – Method for extracting analyte from filter
- DigestExtractDate – date/time that extraction from sorbent material was performed in the laboratory