

Catalog of PARTICLEVER services

August 2017

LEASING A SAMPLER

PARTICLEVER sampling devices are leased for a one-time campaign (maximum of one month between the start and return to the PARTICLEVER laboratory) or long-term (with a minimum of six months).

The lease price includes calibration, preparing the device before shipping, and verification upon its return. In the event of a long-term lease, the price includes periodic metrological verifications defined based on usage.

SAMPLING CASSETTE

Each sampling requires the use of a cassette to be connected to the Sampler to collect particles. Multiple cassettes can be used one after another on the same Sampler.

The cassettes are consumables, and some of their parts are recycled. Their price includes preparing blank cassettes that are ready to use and accessories that enable transportation in both directions.

LEASING A PARTECTOR

Real-time measurement PARTECTOR devices are leased for a one-week campaign and can be extended by one or more weeks.

PARTICLEVER has a fleet of equipment for lease and manages a booking schedule for these devices. Their availability is therefore limited.

METAL DETECTION (XRF)

This service corresponds to analyzing the sample contained in a sampling cassette using X-ray spectrometry (XRF) in order to detect whether metallic elements are present that make up the particles.

This detection is done based on a list of metals set based on the situation. The technique is highly sensitive, and gives detection limits below $0.1 \mu\text{g}/\text{m}^3$ for eight hours of sampling.

If the investigated elements are detected, their air concentration is then estimated (generally expressed in a range of factor 10, e.g. between $1 \mu\text{g}/\text{m}^3$ and $10 \mu\text{g}/\text{m}^3$).

QUANTIFICATION OF A METAL (XRF)

This service corresponds to analyzing the sample contained in a sampling cassette using X-ray spectrometry (XRF) in order to quantify the mass of a metallic element that makes up the particles.

This mass is then expressed in the form of a concentration in the air. The measured range of concentrations is wide: from less than $0.3 \mu\text{g}/\text{m}^3$ to more than $20 \text{mg}/\text{m}^3$.

Multiple metallic elements may be quantified for each sample, with an added cost for each additional element.

Quantification may be obtained as a supplement to the raw data sent out during a metal detection service (XRF), in which case the difference in price compared to detection should be added.

NOTE ON THE TYPES OF METALS ANALYZED:

X-ray spectrometry techniques are routinely used on a selection of common elements between aluminum and uranium.

Analyzing uncommon elements is possible for an added cost. The list of uncommon elements is: scandium, gallium, germanium, selenium, bromine, rubidium, strontium, yttrium, niobium, and all metals heavier than molybdenum other than silver, cadmium, tin, antimony, barium, cerium, tungsten, platinum, gold, mercury, and lead (all of which are common).

CARBON QUANTIFICATION (OC/EC)

This service corresponds to analyzing the sample contained in a sampling cassette using the thermal-optical analyzer (OC/EC) in order to quantify the mass of elemental carbon and the mass of organic carbon. This mass is then expressed in the form of a concentration in the air. The technique gives detection limits of 0.73 µg/m³ for eight hours of sampling.

MICROSCOPE DETECTION (level 1 SEM)

During this service, the sample contained in a sampling cassette is analyzed using a high-resolution scanning electron microscope (SEM). The goal is to detect the presence of particles that contain a chemical composition and/or morphological nature that matches the studied risk.

The detection limit (otherwise known as analytical sensitivity) is from 1 to 0.01 particles/cm³, depending on the sampling time and the size of the particles.

This analysis may be done directly or following a metal detection (XRF) or metal quantification (XRF). It may be done in combination with a carbon quantification using a thermal-optical analyzer (OC/EC) under certain conditions.

A representative selection of images of the observed particles is provided in .tiff format.