TDE-C05 – Moss Sampling

Operating protocol | Revision 1.1, supersedes version 1.0 | 10 November 2026

1. Purpose and fundamental rule

Define representative, repeatable and non-destructive moss sampling for environmental biomonitoring in the Lands of Excellence. Parameters and thresholds remain those approved in the TDE moss analytical protocol; no new determinations are introduced. PFAS are excluded.

OPERATING RULE: the sample-preparation facility delivers selected moss to the appointed laboratory while it is still fresh, unwashed and undried. Any drying, freeze-drying or moisture determination is the responsibility of the laboratory performing the specific analysis, using a validated method.

2. Station and species

• Permanent, georeferenced and photographed station; preferably identifiable ground-dwelling pleurocarpous mosses. Do not mix different species in one composite.

• Where practicable, use a homogeneous area of approximately 50 × 50 m; avoid runoff areas, large debris and evident localized contamination.

• In a clearing, preferably sample at least 3 m beyond the edge of the tree-crown ground projection, not measured from the trunk. Document exceptions.

• Where only moss growing on trunks or rocks is available, document substrate/species and treat the result as a distinct sampling type, not automatically comparable with terrestrial mosses.

3. Field collection

1. Photograph the station; record GPS, exposure, substrate, species (if identified), weather conditions and station code.

2. Wear suitable clean gloves and use clean tools. Avoid smoking, creams and contamination sources while sampling.

3. Collect at least 10 portions of the same species distributed across the station; do not strip an entire colony.

4. Gently detach portions from the substrate without deliberately including soil or bark. Fine removal of the dark basal material will take place at the sample-preparation facility.

5. Preliminary target: approximately 2 L total fresh moss in the field, increasing cautiously to 2.5–3 L where much material is likely to be discarded. This volume is not equivalent to the delivered dry mass.

6. Keep the material fresh and away from sunlight; minimize delay between collection and processing. Use transport containers consistent with subsequent determinations and agreed with the appointed laboratory.

4. Preparation at the sample-preparation facility: selection only, no drying

Clean manually without water. Retain recent green or greenish-brown growth (approximately the last 2–3 years where distinguishable); remove the dark basal part, dead material, leaves, needles, soil and foreign matter. Do not wash, rinse, oven-dry or freeze-dry.



Figure 1. Retain the recent green and greenish-brown sections; discard the dark basal section. Operational illustration.

Following selection, gently distribute the composite sample into equivalent, traceable portions. Do not use the same container for every analysis without verifying material compatibility.

5. Portions, containers and storage

Portion	Indicative container	Preparation and storage
Metals	Clean container approved by the appointed laboratory.	Selected fresh moss; no drying at the sample-preparation facility. The laboratory may dry its portion, measure moisture and report the results on the required basis.
PCDD/F, PCB and PAHs	Clean glass suitable for organics, with a compatible closure; prevent contact with gaskets.	Selected fresh moss; protect from light and heat. Freeze at approximately −20 °C if not analysed promptly, following the laboratory's instructions.
Multi-residue pesticides	Container approved for the method, preferably glass if compatible.	Selected fresh moss; avoid drying. Freeze or deliver refrigerated according to the appointed laboratory's method and holding-time instructions.

Note: the initial volume (approximately 2 L) is indicative. The appointed laboratory must confirm the minimum fresh mass required for all portions, replicates and controls. Document the reporting basis (fresh weight/dry weight) of each result so that the TDE thresholds are

applied correctly.

6. Station surveillance

• Sample approximately once per year in the same phenological/seasonal period, unless further checks are justified.

• Repeat sampling at the same station across years, but take different portions and leave a large share of each colony intact for regeneration.

• Photograph each campaign and record changes in substrate, agricultural management, cutting, fires or other factors affecting comparability.

7. Minimum accompanying record

Station/sample code; GPS coordinates; locality and elevation; date/time; operators; species and substrate; number of subsamples; collected fresh volume; photographs; weather; cleaning/discarded parts; number of portions; containers; storage temperatures and times; delivery to the appointed laboratory; anomalies.

Methodological references

ICP Vegetation – Moss Survey Monitoring Manual, 2020 Survey, sections on collection, cleaning and sample treatment: https://icpvegetation.ceh.ac.uk/sites/default/files/ICP%20Vegetation%20moss%20monitoring%20manual%202020.pdf

ICP Vegetation – Moss survey protocol: https://icpvegetation.ceh.ac.uk/get-involved/manuals/moss-survey

Separately approved TDE analytical and decision documents for mosses (parameters, limits and interpretation unchanged).