



UNDERSTANDING ISO 17025 CLAUSE 7.3 – SAMPLING

Sampling Plans – Designing Representativeness from the Start

Sampling is the first technical step in the testing process, and Clause 7.3 reminds us that **a result is only as reliable as the sample it comes from**. A well-designed sampling plan ensures that the material collected truly represents the population or batch being evaluated. Without representativeness, even the most accurate analytical method cannot produce meaningful results.

A strong sampling plan includes:

- **Clear objectives** – What is the purpose of the test, and what decisions will be made from the results?
- **Defined sampling locations** – Where samples must be taken to ensure representativeness.
- **Sampling frequency and quantity** – How many samples are needed to reduce uncertainty.
- **Statistical considerations** – Ensuring the plan supports defensible conclusions.
- **Environmental and logistical factors** – Conditions that may influence sample integrity.
- **Personnel competence** – Ensuring trained staff follow the plan consistently.

Sampling plans must be documented, controlled, and reviewed periodically. They must also be aligned with regulatory requirements, client expectations, and method limitations. A sampling plan is not a suggestion — it is a technical blueprint that ensures the sample collected is fit for purpose.

When laboratories design sampling plans with intention and scientific discipline, they strengthen the entire testing process. Representativeness is not achieved by chance; it is achieved by planning.

Field Sampling – Controlling Variables in Real-World Conditions

Field sampling introduces complexities that laboratories cannot ignore. Unlike controlled laboratory environments, field conditions are unpredictable — weather, access, contamination risks, equipment handling, and human factors all influence the integrity of the sample. Clause 7.3 requires laboratories to manage these variables through competence, planning, and documented procedures.

Effective field sampling requires:

- **Trained and authorised personnel** who understand both the method and the environment.
- **Controlled equipment** that is calibrated, maintained, and suitable for field use.
- **Environmental awareness** to prevent contamination or degradation.
- **Adherence to sampling plans** to ensure consistency and impartiality.
- **Real-time documentation** of conditions, deviations, and observations.



Field sampling is not simply “collecting material”. It is a technical activity that demands precision, judgement, and discipline. A single lapse — an unclean container, a mislabelled bottle, a deviation not recorded — can compromise the entire testing process.

Clause 7.3 reinforces that laboratories must treat field sampling with the same scientific rigour as any analytical method. When field teams operate with competence and control, they protect the validity of every downstream result.

Sample Identification and Chain-of-Custody – Protecting Integrity from Start to Finish

A sample is only trustworthy if its identity and history are fully traceable. Clause 7.3 requires laboratories to implement robust systems for **sample identification, labelling, and chain-of-custody**, ensuring that every sample can be tracked from collection to analysis.

Strong identification and custody systems include:

- **Unique sample identifiers** that prevent confusion or duplication.
- **Durable labels** that withstand transport, moisture, and handling.
- **Chain-of-custody forms** documenting every transfer, location, and responsible person.
- **Secure storage conditions** that preserve sample integrity.
- **Documentation of anomalies**, such as damaged containers or temperature deviations.

Chain-of-custody is not just paperwork — it is a legal and scientific safeguard.

It ensures that:

- Results can be defended in audits, disputes, or regulatory reviews.
- No unauthorised person has access to the sample.
- The sample analysed is unquestionably the sample collected.

A broken chain-of-custody breaks confidence. Laboratories that maintain strict identification and custody controls demonstrate professionalism, impartiality, and respect for the scientific process.

Sub-Sampling and Sample Preparation – Maintaining Representativeness Inside the Lab

Once samples arrive at the laboratory, the work is far from over. Sub-sampling and preparation are critical steps that determine whether the portion analysed still represents the original material. Clause 7.3 requires laboratories to perform these activities in a controlled, documented, and technically sound manner.



Key considerations include:

- **Avoiding bias** during splitting, mixing, or dividing samples.
- **Using appropriate equipment** such as riffle splitters, homogenisers, or clean tools.
- **Preventing contamination** through proper handling and environmental controls.
- **Documenting all preparation steps**, including deviations or anomalies.
- **Ensuring personnel competence** in handling complex or sensitive materials.

Sub-sampling errors can introduce significant uncertainty. A poorly mixed sample, an uneven split, or an unclean tool can distort results — even when the analytical method is flawless.

Clause 7.3 reinforces that representativeness must be preserved from collection to preparation. Laboratories that treat sub-sampling with scientific discipline protect the integrity of their results and uphold the confidence of their clients.

Documentation and Reporting – Recording the Story Behind Every Sample

Sampling is not complete until it is documented. Clause 7.3 requires laboratories to record every detail that may influence the validity of the sample or the interpretation of results. Documentation is the narrative that explains how, where, when, and under what conditions the sample was collected.

Comprehensive sampling documentation includes:

- **Sampling plan reference** and purpose of sampling.
- **Date, time, location, and environmental conditions.**
- **Personnel involved** and their authorisation.
- **Equipment used**, including calibration or verification status.
- **Deviations from procedures** and corrective actions taken.
- **Chain-of-custody records** and sample identifiers.
- **Observations** that may influence interpretation (e.g., contamination risks, unusual conditions).

Good documentation ensures:

- Results are **traceable and defensible**.
- Auditors can verify compliance with procedures.
- Clients understand the context behind the results.
- The laboratory maintains consistency and transparency.

Sampling documentation is not an administrative burden — it is a scientific necessity. It protects the laboratory, supports the validity of results, and ensures that every sample tells a complete and accurate story.



Sampling Sets the Stage for Valid Results

With Clause 7.3 – Sampling, one truth stands out clearly: the quality of any laboratory result begins long before analysis — it begins with the sample itself. Sampling is often underestimated, yet it is one of the most influential steps in the entire testing process. A perfectly executed method cannot correct a poorly collected or poorly documented sample.

Five essential themes:

Sampling Plans – Representativeness by Design

A sampling plan is not a formality; it is a technical blueprint. It defines where, how and how often samples are taken to ensure they truly represent the material being tested. Without representativeness, results lose meaning.

Field Sampling – Managing Real-World Variables

Field sampling demands discipline. Weather, contamination risks, access challenges and equipment handling all influence sample integrity. Clause 7.3 requires trained personnel, controlled equipment and real-time documentation to protect validity under unpredictable conditions.

Identification and Chain-of-Custody – Protecting Trust

Traceability is non-negotiable. Unique identifiers, durable labels and complete chain-of-custody records ensure that the sample analysed is unquestionably the sample collected. A broken chain-of-custody breaks confidence.

Sub-Sampling and Preparation – Preserving Integrity Inside the Lab

Representativeness must continue once the sample arrives at the laboratory. Sub-sampling, mixing and preparation must be controlled, unbiased and fully documented. A single handling error can distort results.

Documentation – Recording the Story Behind Every Sample

Sampling is only complete when it is documented. Conditions, deviations, personnel, equipment and observations must all be recorded. Documentation transforms a sample into defensible evidence.

Sampling is not a routine task — it is a scientific discipline. Laboratories that master Clause 7.3 protect the credibility of every downstream result and strengthen the entire quality system.

Accurate results begin with accurate sampling.