

WHAT DO WE DO WHEN THERE IS NO RELIABLE BASELINE?

Guía Diagnóstica
GD-021

Technical guidance for reconstructing or establishing a defensible reference condition when historical evidence is incomplete, contradictory, or no longer represents the current facility

DO NOT START BY CHOOSING A NUMBER. START BY ASKING WHAT CONDITION CAN BE JUSTIFIED.

When a reliable baseline is missing, the institution loses something more important than a historical value: it loses the ability to explain what condition was accepted, under what configuration, and why that condition remained valid.

Why we developed it

Existing facilities commonly have design data treated as field results, current setpoints with no documented origin, incomplete commissioning records, unresolved modifications, discontinuous BMS trends, and technical knowledge concentrated in the memory of only a few individuals.

In that context, a “correct” pressure, stable airflow, or absence of alarms may be difficult to interpret because it is unclear what condition they should be compared against.

What this guide is intended to do

Help distinguish design intent, installed condition, verified evidence, formal acceptance, current configuration, and uncertainty.

The goal is not to reconstruct the past with artificial precision. It is to determine how far the evidence goes, what part of the reference can be defended, what requires verification, and when it is better to stop reconstructing and establish a new reference condition.

PRACTICAL USE

Proceed in sequence: define what needs to be interpreted → identify what historical evidence exists → separate what was demonstrated from what is assumed → reconstruct the last coherent condition → identify subsequent changes → compare with the current system → determine whether the reference remains applicable → verify what is necessary → document the reference and its limits.

Not having a baseline does not demonstrate that the laboratory is operating incorrectly. It demonstrates uncertainty that should be made explicit before the current condition is used as a substitute for a technical reference.

01

SEPARATE

02

RECONSTRUCT

03

VERIFY

04

ESTABLISH

HOW THIS GUIDE MAY BE USED – AND WHAT IT DOES NOT AUTHORIZE

This guide is a general diagnostic-orientation tool. It is designed to help structure technical questions, organize evidence, and define what requires more specific evaluation.

Acceptable use

It may be used to:

- review continuity of historical evidence;
- identify possible reference conditions;
- separate nominal values from verified results;
- document uncertainty and discrepancies;
- prepare a multidisciplinary technical review;
- define the scope of later verification.

It does not constitute

This guide does not constitute design, a commissioning protocol, test plan, acceptance criterion, certification, compliance determination, authorization to operate, or a facility-specific recommendation.

Applicable technical basis

The content should be interpreted together with the risk assessment, Basis of Design, commissioning and TAB documentation, as-builts, O&M manuals, maintenance records, change control, regulatory requirements, and the actual physical configuration.

Competent personnel

Reconstruction or establishment of a reference condition should involve personnel capable of interpreting system function, data quality, and the consequences of subsequent changes.

Responsibility

BioLab Solutions assumes no responsibility for decisions made solely on the basis of this guide without site-specific evaluation and review by competent personnel.

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01

Separate the concepts before looking for a reference

Many errors begin when different types of information are treated as if they describe the same thing.

Concept	What it demonstrates — and what it does not
Design intent	Describes what the project intended to achieve. By itself, it does not demonstrate what was installed or what condition was finally accepted.
Installed condition	Describes the physical and functional configuration that exists. It does not automatically demonstrate that the configuration was verified.
Verified condition	Describes a state subjected to measurement or testing under identifiable conditions. It does not necessarily equal institutional acceptance.
Accepted condition	Describes the state that a defined authority approved for operation, including known criteria, limitations, and open items.
Current condition	Describes how the facility operates today after maintenance, adjustment, changes, and possible deviations.
Reference state	The most recent condition that can be defensibly connected to configuration, performance, evidence, and sufficient acceptance to interpret later change.

The useful baseline is not “the original number.” It is a technically explainable condition. It may postdate original commissioning if the facility was legitimately modified, recommissioned, or requalified.

A defensible reference may contain uncertainty. What it should not contain is certainty that the evidence does not support.

THE REFERENCE IS A DEMONSTRABLE CONDITION, NOT AN ISOLATED VALUE.

Ask what each source actually demonstrates

Reconstruction improves when each document is used for the question it can genuinely answer.

Source	Useful question
Basis of Design / criteria	What behavior was intended and what assumptions supported it?
Commissioning / recommissioning	What functions were tested, under what condition, and with what result?
TAB	What airflow and conditions were measured at that time and configuration?
As-builts / redlines	What configuration was documented as installed and what later changes appear?
BMS trends	How did the system behave over time and how much control effort was required to maintain its variables?
Maintenance records	What equipment, filters, sensors, controls, or components were serviced or replaced?
Change control	What changed, why, and what evidence of closure remains?
Staff recollection	What sequence of events or changes can guide the documentary or technical search?

Evidence can be valid and still be insufficient

A complete TAB report may demonstrate airflow, but not necessarily integrated acceptance. A BMS graphic may show a sequence, but not demonstrate that a sensor was calibrated. An as-built may document a configuration, but not confirm that the configuration remains current.

Convergence matters

A reference becomes more defensible when several independent sources describe a coherent condition: configuration, measurement, control logic, acceptance, and operation.

Do not turn the present into the baseline for convenience

The current condition should be observed and preserved, but not automatically assumed to be the reference.

“These are the current setpoints.”

They describe a control instruction, not its origin or the evidence that justified it.

“It has always worked this way.”

Familiarity may reflect gradual normalization of adjustment, repair, or loss of margin.

“There are no alarms.”

This may indicate stability, but it may also reflect changed limits, compensation, or reduced sensitivity.

“The pressure still complies.”

The same result may now require higher fan speed, greater damper opening, or lower reserve.

“The laboratory is still operating.”

Continued operation does not demonstrate that the current condition was verified or remains appropriate for current work.

“There has never been an incident.”

The absence of incidents does not substitute for evidence of performance, acceptance, or margin.

Preserve the current condition before changing it. If adjustment, repair, or reprogramming is necessary, first retain relevant data such as pressure, airflow, states, alarms, setpoints, fan speed, damper position, redundancy status, and operating context.

The current condition may not be the reference, but it can be important evidence in reconstructing how the system arrived here.

04

Reconstruct a coherent condition, not a collection of documents

The goal is to identify a technical point in time that can be described as a system.

A reference is not reconstructed by combining values from different dates. The information used should correspond to a configuration, operating mode, and period that can reasonably be related to one another.

Configuration

- installed equipment;
- active services;
- control logic;
- filters and boundaries;
- available redundancy.

Operation

- space use;
- occupancy;
- working hours;
- agents and procedures;
- work scale.

Performance

- pressure and airflow;
- response to disturbance;
- alarms;
- control effort;
- available capacity.

Acceptance

- criteria applied;
- deficiencies;
- open items;
- restrictions;
- acceptance authority.

Coherence test: ask whether that condition could be described to a future reviewer without mixing data from different configurations. If airflow is from 2018, setpoints from 2021, and filter configuration from 2024, the combination may not represent any state that actually existed.

A REFERENCE SHOULD HAVE EXISTED AS A CONDITION, NOT ONLY AS A COMBINATION OF RECORDS.

ORDER THE HISTORY BY CONFIGURATION, NOT ONLY BY DATE

A facility may have several technically valid data sets because it went through modifications, rebalancing, control changes, or requalification. The problem is not that several references exist; it is not knowing which reference belongs to which system.

Before comparing two periods, confirm

- whether the physical configuration was the same;
- whether the same equipment was in service;
- whether the control strategy was equivalent;
- whether points and instruments were comparable;
- whether load and occupancy were similar;
- whether acceptance criteria were the same;
- whether a deliberate change occurred between the two.

A defensible transition should be able to explain

- what changed;
- why it changed;
- what functions could be affected;
- what was retested;
- what results were accepted;
- what new condition was documented.

An earlier reference can remain historically correct while no longer being the applicable reference.

TECHNICAL HISTORY IS A SEQUENCE OF CONFIGURATIONS AND DECISIONS, NOT A SINGLE COLUMN OF NUMBERS.

Reconstruct the chain of subsequent changes

A historical reference is useful only if it can be related to the facility that exists today.

Technical changes

- fans or motors;
- filters and housings;
- dampers;
- sensors;
- setpoints;
- software or firmware;
- sequences;
- power or redundancy.

Operational changes

- occupancy;
- heat load;
- new equipment;
- process scale;
- new agents;
- working hours;
- waste;
- decontamination.

Institutional changes

- loss of personnel;
- new contractors;
- deferred maintenance;
- responsibilities;
- open actions;
- temporary measures;
- loss of records;
- mission changes.

Look for accumulation, not only major events

A facility may move away from its reference through small modifications that each appear benign: a setpoint adjustment, sensor replacement, new piece of equipment, higher filter resistance, changed work schedule, or temporary measure that was never removed.

The diagnostic question is whether those changes still resolve into a coherent operating condition or whether they have altered the assumptions that supported the reference.

Compare performance and control effort

The final result may remain stable while the system progressively consumes more margin to maintain it.

If you observe	Also ask
Stable pressure	Did fan speed, damper position, airflow, or frequency of adjustment change?
Stable airflow	Did filter resistance increase or available reserve decrease?
No alarms	Are thresholds, delays, logic, and sensors the same as before?
Good recovery	Is the response still comparable under similar loads and disturbances?
Installed redundancy	Is backup capacity still available and has it been functionally demonstrated?
Stable BMS values	Are the data still reliable, traceable, and comparable with independent measurements?

Result ≠ condition

Two periods may show the same differential pressure and represent very different states if one requires more control authority, lower margin, or a modified configuration.

Plausible data ≠ correct data

Agreement between instruments does not demonstrate accuracy if they share an error in reference, configuration, scaling, location, or data acquisition.

THE REFERENCE SHOULD HELP EXPLAIN NOT ONLY WHAT RESULT WAS ACHIEVED, BUT HOW THE SYSTEM PRODUCED IT.

THE SAME LACK OF BASELINE MAY REQUIRE DIFFERENT RESPONSES

Scenario A · Design + partial commissioning

Drawings, TAB, and component tests exist, but there is no clear evidence of integrated acceptance. The reference may be partially reconstructed, but some functions require targeted verification before the reference is considered sufficient.

Scenario B · Good history, modified facility

A strong 2022 reference exists, but fans, control logic, and occupancy have since changed. The historical reference remains useful for context but may no longer be applicable as the current reference state.

Scenario C · Abundant current data, no history

The BMS contains recent trends and the laboratory operates stably, but no reliable acceptance records exist. The current condition should be documented and evaluated; it should not automatically be declared the baseline.

Scenario D · Contradictory records

Two reports show different values and it is unclear whether they correspond to the same configuration. The discrepancy should be investigated or retained as uncertainty; averaging does not create a reference.

The objective is not to force every case toward historical reconstruction. The evidence should determine whether the correct next step is reconstruction, verification, limitation of the reference, or establishment of a new one.

HOW MUCH CAN THE EVIDENCE ACTUALLY SUPPORT?

Evidence condition	Implication
Known configuration + traceable testing + acceptance	A strong reference may exist for that condition, subject to confirmation of later changes.
Known configuration + partial but converging data	A limited reference may be reconstructed, with explicit uncertainty and targeted verification.
Valid data from different configurations	They should not be combined as if they represented a single state.
Design values without verification	Useful as intent or criteria, not evidence of an operating condition.
Current setpoints without provenance	Describe the present instruction, not the technical basis that produced it.
Institutional memory without records	Can guide the search and establish sequence, but requires corroboration.
History too incomplete or contradictory	Reconstruction may stop being efficient or defensible; a new reference should be considered.

A defensible reference does not need to be perfect. It should be clear enough to show what condition it represents, what evidence supports it, what uncertainty it contains, and what comparisons it can legitimately support.

Determine whether the historical reference is still applicable

A reference can be historically correct and still stop answering the current question.

It may remain applicable when

- the configuration is substantially equivalent;
- later changes are known;
- the work remains within the original assumptions;
- the acceptance criteria remain relevant;
- functional relationships remain comparable;
- available margin has not changed materially.

It may no longer be sufficient when

- the mission or work type changed;
- process scale increased materially;
- the HVAC or control strategy changed;
- capacity or redundancy was lost;
- the current configuration cannot be reconciled with the documented condition;
- current risk requires controls not previously considered.

When to stop chasing the past

Reconstruction stops adding value when each conclusion requires another assumption, the current configuration is materially different, or available evidence cannot distinguish between incompatible historical states.

At that point, the question changes from “What was the reference?” to “What current condition must we justify and verify to create a new reference?”

Establish a new reference when the previous one can no longer be supported

A new reference should describe the system that actually exists and the work it actually performs.

Establishing a new reference does not mean automatically accepting the current condition. It first requires determining whether that condition is technically justifiable and what functions require verification.

Define the configuration

- equipment and services;
- control logic;
- redundancy;
- boundaries;
- operating modes.

Define current use

- agents and procedures;
- occupancy;
- heat load;
- scale;
- working hours.

Define what must be demonstrated

- critical functions;
- normal conditions;
- relevant transitions;
- credible failures;
- alarms and recovery.

Define what will be surveilled afterward

- key variables;
- trends;
- margin;
- control effort;
- escalation conditions.

The new reference begins on an identifiable date. It should be clear what part of the history was recovered, what part remained uncertain, and from what point the institution again has a technically defensible basis for future comparison.

A NEW REFERENCE DOES NOT ERASE HISTORICAL UNCERTAINTY. IT CREATES A NEW POINT OF CONTROL.

THE REFERENCE SHOULD INCLUDE ITS LIMITS, NOT ONLY ITS VALUES

Describe the reference

- date or period;
- physical configuration;
- operating mode;
- activity and load;
- criteria applied;
- verified data;
- sources used;
- acceptance authority.

Identify surveillance parameters

- relevant pressure and airflow;
- control effort;
- alarms;
- recovery;
- redundancy status;
- margin or capacity where possible.

Retain the limits

- missing data;
- conflicting sources;
- inferred elements;
- pending tests;
- restrictions;
- temporary conditions;
- scope of applicability.

Traceability principle

A future reviewer should be able to distinguish what part of the reference was measured, what part was documented, what part was reconstructed by inference, and what part remained unknown.

A reference without documented limits can acquire a degree of certainty over time that it never actually had.

CAN WE RECONSTRUCT A DEFENSIBLE REFERENCE?

01

Is there enough evidence to describe a coherent historical condition?

No → broaden the search or consider a new reference.

Yes → continue.

02

Can the evidence be linked to an identifiable configuration, operating mode, and acceptance?

No → retain the uncertainty and define what is missing.

Yes → continue.

03

Can the chain of subsequent changes be explained?

No → limit the applicability of the reference.

Yes → continue.

04

Does the reference remain relevant to current work and configuration?

No → establish a new basis for evaluation.

Yes → continue.

05

Do the remaining uncertainties allow future comparison with reasonable confidence?

No → verify what is necessary or establish a new reference.

Yes → document the reference and its limits.

The outcome may be a reconstructed reference, a limited reference, a need for additional verification, or a decision to establish a new reference. Not every case should end in the same way.

IS THE REFERENCE WE ARE USING DEFENSIBLE?

- ☐ Separate design, installed condition, verification, acceptance, and current condition.
- ☐ Identify the last coherent historical condition.
- ☐ Confirm that compared data belong to the same configuration and operating mode.
- ☐ Identify later technical, operational, and institutional changes.
- ☐ Compare results and control effort.
- ☐ Keep unresolved discrepancies as explicit uncertainty.
- ☐ Determine whether the reference remains applicable to current work.
- ☐ Define what requires additional verification.
- ☐ Establish a new reference when the previous one can no longer be supported.
- ☐ Document scope, limits, and acceptance authority.

Technical-use note: this checklist does not establish site-specific acceptance criteria, replace risk assessment or professional judgment, or constitute authorization to operate.

Technical Notes

Consult the current BioLab Technical Notes collection for material on commissioning, documentation, maintenance, change control, and system performance.

[Explore Technical Notes](#)

Related resources

Containment Performance Surveillance explains how to recognize change and interpret signals once a defensible reference exists.

[Explore BioLab resources](#)

EVIDENCE → CONTEXT → REFERENCE → SURVEILLANCE