

Building Science Institute, Ltd. Co. Process 008-2023 Sampling

This process applies to Verification Organization Verifiers and Software Analysts.

Related policies:

- Building Science Institute, Ltd. Co. Policy 08-2022 Terminology

Referenced Documents:

BSI Policy 08 Terminology

BSI Policy 14 Referenced Standards, Codes, and Programs

BSI Process 009 Root Cause Analysis

Terminology:

- *Multiple sampling plans* require a decision to accept or reject the members of a given sample set based on the results of the on-site observations and performance testing on a single random sample dwelling unit or multiple random sample dwelling units (if failing units are identified) within the sample set.
- The collection of all dwelling units under consideration is the *population*. The population must be within the same building (multifamily), have the same construction type, and have the same envelope systems.
- A *sample set* is a population subgroup whose performance will be represented by inspecting and testing as few as one member of that subgroup. The sample set must be no larger than 7 dwelling units having projected closing dates within a 30 calendar day period.
- Each dwelling unit in the population has an equal chance of inclusion in the sample, which creates a *random sample*, selected by the verification organization and NOT the homebuilder.
- The *expected values* are the threshold specifications from the Worst-Case Analysis for the minimum rated features for the dwelling units.
- On-site observation and performance testing in conformance with ENERGY STAR® Certification Protocols and referenced standards must be performed on a portion of the sample set to make a decision on the conformance of the entire sample set to the expected values. This is called *acceptance sampling by attribute*.

Sampling Process

Sampling is permitted only for multifamily dwelling units, and NOT allowed for single family homes (detached single family, duplexes, townhouses).

The verification organization must use a *multiple sampling plan*, if sampling is chosen. Energy simulation files for each dwelling unit must be based on Worst-Case Analysis using *expected values*.

If a verification organization fails to conform with the Building Science Institute Process 008-2023 Sampling protocols, that verification organization's eligibility to perform sampling must be revoked.

Before a sampling plan may be implemented, an initial group of 7 dwelling units must consecutively and successfully undergo 100% observation and performance testing without failure, in conformance with ENERGY STAR®, Indoor airPLUS, Zero Energy Ready Home Certification Protocols and referenced standards.

If there are any non-conforming items in a single *random sample* dwelling unit, the *sample set* may be rejected OR another 2 *random sample* dwelling units are selected from the remaining dwelling units in the *sample set* for on-site observations and performance testing in conformance with ENERGY STAR, Indoor airPLUS, Zero Energy Ready Home Certification Protocols and referenced standards. The non-conforming dwelling unit is rejected from the *sample set*, must be brought into conformance with ENERGY STAR, Indoor airPLUS, Zero Energy Ready Home Certification Protocols, and is ineligible for inclusion in future *sample sets*.

If there are any nonconforming items in these 2 dwelling units, the *sample set* must be rejected as non-conforming. Non-conforming dwelling units are rejected from the *sample set*, must be brought into conformance with ENERGY STAR®, Indoor airPLUS, Zero Energy Ready Home Certification Protocols, and are ineligible for inclusion in future *sample sets*.

When multiple nonconforming dwelling units are discovered, a root cause analysis per the BSI Process 009 Root Cause Analysis must be performed by the verification organization's internal quality function or the Building Science Institute's True North Quality Management Services. The non-conforming element(s) must be corrected and re-verified for conformance prior to certification.

If two out of three consecutive *sample sets* have any nonconforming items, then sampling must be suspended, and that builder is no longer eligible to participate in sampling until the verification organization has conducted a root cause analysis in conformance with BSI Process 009 Root Cause Analysis.

Before a sampling plan may be re-implemented, another 7 consecutive dwelling units must successfully undergo 100% observation and performance testing in conformance with ENERGY STAR®, Indoor airPLUS, Zero Energy Ready Home Certification Protocols and referenced standards.

Nonconforming dwelling units must undergo 100% on-site observations and performance testing. Nonconforming dwelling units are units that do not meet all the *expected values* of the threshold specifications, and are ineligible for inclusion in future *sample sets*.

Approved by Building Science Institute Quality Council on April 24, 2023

Not Voting: Brett Dillon, Chair; Wes Davis

Approve: Amber Wood, Brian Christensen, Erik Straite, Kevin Burk

Reject: None

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