

CANULC S1001 INTEGRATED SYSTEMS TESTING

Definitions

CAN/ULC-S1001 is the Canadian standard that provides the methodology for verifying and documenting that **interconnections** between fire protection and life safety systems are functioning as required. In summary, the testing shall show that these systems are “talking” to each other properly. It is required by the National Building Code 2015 (NBC 2015) and CAN/ULC-S1001. Integrated systems testing is required when integrated fire protection and/or life safety systems are constructed or impacted by work.

Integrated systems testing is also an ongoing operational requirement under the National Fire Code 2015 (NFC 2015). CAN/ULC-S1001 provides the timelines for this ongoing testing.

The building owner is responsible to ensure that satisfactory Integrated Testing Reports are kept on file, provided on the building site, and provided to the Fire Department as requested.

Integrated Testing Coordinator

- Must have all licenses and certifications required by contractual obligations, as well as those required by federal, provincial, and other regulations
- Must have the competencies listed in the Standard
- Must prepare an Integrated Testing Plan
- Must provide the Integrated Testing Plan to the professional designers for review/acceptance prior to the test
- Collect the required pre-test documentation (eg. Confirmation from designers/installers/verifiers that systems are ready for testing, confirmation that building occupants have been notified and that safety measures are in place, etc.)
- Determine what previous testing of the systems can be accepted to avoid duplication of testing
- Determine which parties are required to participate in the Integrated Systems Test
- Implement the Integrated Testing Plan (perform the tests) and record the results to show proper integration (ensure re-testing is performed as needed)
- Compile all the documentation into an Integrated Testing Report and provide it to the building owner, authority having jurisdiction (as required), and keep a copy on the building site.

Performing the Integrated Systems Testing the Integrated Testing Coordinator must have all licenses and certifications required by contractual obligations, federal, provincial, and other regulations (e.g. Municipal regulations). The Integrated Testing Coordinator is required to have the competencies required by CAN/ULC-S1001, along with other licenses or certifications as mentioned above. Fire & Protective Services does provide licenses to technicians for certain systems (e.g. Sprinkler & standpipe systems, fire alarm systems, commercial cooking equipment, etc.). The licensing requirements for those systems remain. As per CAN/ULC-S1001, an Integrated Testing Coordinator is responsible to develop and implement the Integrated Testing Plan. This person must have knowledge of:

1. Codes and Standards for the various systems
2. How the systems operate (normal & emergency operation)
3. Testing the functionality of the systems

Integrated Testing Report shall include all documentation described in Subsection 7.3 of CAN/ULC-S1001. This includes:

1. The Integrated Testing Plan*
2. Integrated Testing Forms
3. Integrated Testing Forms for Re-tests
4. Documentation required by Section 5.3

Satisfactory Integrated Testing Report must be submitted prior to occupancy being granted or prior to the building permit being closed.

Code References

Where there are fire protection systems and life safety systems that are to be integrated with each other, both NBC 2015 and NFC 2015 call for testing in accordance with CAN/ULC-S1001, “Integrated Systems Testing of Fire Protection and Life Safety Systems”. This is to ensure all systems are tested “as a whole” and are functioning together properly. The references in NBC 2015 and NFC 2015 are given below:

- **NBC 2015, Division B, Sentences 3.2.9.1.(1) & 9.10.1.2.(1):**
Where fire protection and life safety systems and systems with fire protection and life safety functions are integrated with each other, they shall be tested as a whole in accordance with CAN/ULC-S1001, “Integrated Systems Testing of Fire Protection and Life Safety Systems,” to verify that they have been properly integrated.
- **NFC 2015, Division B, Sentence 6.8.1.1.(1):**
Interconnections between fire protection and life safety systems shall be tested and maintained in conformance with CAN/ULC-S1001, “Integrated Systems Testing of Fire Protections and Life Safety Systems.”

Types of Integrated Systems Testing

The types of testing are summarized below. Refer to CAN/ULC-S1001 for more details.

- **Initial Integrated Systems Testing (CAN/ULC-S1001, Section 5):**
 - Scope: Initial testing for new installations of systems
- **Periodic Integrated Systems Testing (CAN/ULC-S1001, Section 8):**
 - Scope: On-going operational testing of integrated systems that had their initial testing performed under Section 5
 - Standard timeline: One (1) year after the initial test (Section 5 test), conduct another integrated systems test. Perform subsequent integrated tests at intervals of not more than five (5) years.
- **Retro-Integrated Systems Testing (CAN/ULC-S1001, Section 9):**
 - Scope: testing for existing systems that did not have an initial Section 5 test
 - Standard timeline: after the initial Retro-Integrated Systems Test, conduct subsequent integrated systems tests at intervals of not more than five (5) years.
- **Integrated Systems Testing for Modifications (CAN/ULC-S1001, Section 10):**
 - Scope: testing for when integrated systems are modified, or when integrated systems are affected by modification to the building
 - Work to the systems or the building will be performed under a Building Permit. Therefore, this testing falls under the jurisdiction of the Building Standards Branch. A satisfactory Integrated Testing Report must be submitted to the Building Inspector and must be accepted prior to an occupancy permit being issued or permit completion letter being issued.
- **Previously Tested Systems:** As per CAN/ULC-S1001, if the modified system was tested under CAN/ULC-S1001 in the past (initial test or reintegrated test), then only the portions affected by the alteration require testing.
- **Systems Not Previously Tested:** As per CAN/ULC-S1001, if the modified system has not been tested under CAN/ULC-S1001 in the past (initial test or retro-integrated test), then the modified systems are to be tested as per Section 5.

Examples from CAN/ULC-S1001 of Systems that Require Integrated Testing

- Transmissions with fire signal receiving center (e.g. receipt of signals)
- Mass notification systems
- Elevators (e.g. proper recall)
- Emergency generators (e.g. Startup test, loss of power simulations)
- A/V and lighting control systems
- Notification systems
- Sprinkler systems
- Standpipe systems
- Fire pumps
- Water supplies (test responses to pressure sensors, level sensors, etc.)
- Water supply control valves
- Freeze Protection Systems
- Fixed fire suppression systems (release of suppression agent not required)
- Cooking equipment fire suppression systems (release of agent not required)
- Hold open devices (each door tested to ensure returns to closed and latched position)
- Electromagnetic locks (each must de-energize)
- Smoke control systems
- Emergency pressurization systems
- Smoke exhaust systems
- Hazardous Protection monitoring
- Smoke alarms

Role of Design Professionals, Installing Contractors & Verifying Parties

- Design professionals for each system must provide details to the Integrated Testing Coordinator about the interconnection between systems (these are used to develop the Integrated Testing Plan).
- Design professionals to provide feedback and acceptance of the Integrated Testing Plan prepared by the Integrated Testing Coordinator
- All parties to provide written confirmation to the Integrated Testing Coordinator that the systems are ready for testing, along with supporting documentation required.
- All parties to participate in the testing on site, as detailed in the Integrated Testing Plan (determined by the Integrated Testing Coordinator).
- Design professionals shall ensure concerns with their system(s) are resolved.
Note: The Integrated Testing Coordinator is not intended to validate the design of individual systems (the Integrated Testing Coordinator is focused on the interconnection of the systems). When there are concerns with individual systems, they shall be forwarded to the design professional responsible for that system. The design professional must resolve.

Role of PBI

- Enforce the NBC and NFC requirements for Integrated System Testing to be performed
- PBI reviews the Integrated Testing Report and accept prior to occupancy being granted or prior to the building permit being closed.
- Fire & Protective Services: request documentation from building owners to show that Periodic Integrating Systems Testing (Section 8) and Retro-Integrated Systems Testing (Section 9) are occurring as required. Review reports as needed for compliance.

Notes

ULC does offer a voluntary program to certify Integrated Testing Coordinators. It is recommended that Integrated Testing Coordinators contact ULC regarding this certification program. ULC will also be working with AHJs who are interested in requiring this certification in regards to the timing and implementation of this requirement.

A sample Integrated Testing Plan is provided in Appendix C of “CAN/ULC-S1001-11-REV1”, which is available for free viewing on www.shopulstandards.com (user account required).

A sample checklist has been provided as an Appendix to this advisory to assist in identifying documentation required in the Integrated Testing Report.

This advisory has no legal status and cannot be used as an official interpretation of the various codes and regulations currently in effect. Users are advised to contact the Saskatchewan Building & Technical Standards Branch for assistance as PBI Inc. accepts no responsibility to persons relying solely on this information.