1. GENERAL

1.01 SECTION INCLUDES

.1 Procedures for preparation of integrated systems testing and coordination of all sub-trades in the execution of this testing to ensure life safety systems meet code requirements.

1.02 RELATED REQUIREMENTS

.1 Division 08 – Openings.

.2 Division 14 – Conveying Equipment.

.3 Division 21 – Fire Suppression.

.4 Division 23 – Heating, Ventilating, and Air Conditioning.

.5 Division 26 – Electrical.

.6 Section 28 46 13 – Fire-Alarm Systems.

.7 This section describes requirements applicable to all Sections within Division 02 to Division 49.

1.03 REFERENCES

.1 CAN/ULC-S1001-11, Integrated Systems Testing of Fire Protection and Life Safety Systems.

.2 2012 Ontario Building Code.

1.04 SUBMITTALS

.1 The 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 of CAN/ULC-S1001.

1.05 CLOSEOUT SUBMITTALS

.1 The Integrated Testing Report shall be provided to the following:

.1 The Consultant.

.2 The Owner.

.3 Municipal fire inspector as requested.

.2 Maintain a copy of the CAN/ULC-S1001 functional test report on site.

1.06 QUALIFICATIONS

.1 Integrated Testing Coordinator:

.1 Must have all licenses and certifications required by contractual obligations, as well as those required by federal, provincial, and other regulations.

.2 Must have the competencies listed in CAN/ULC-S1001.

.3 Must prepare an Integrated Testing Plan.

.4 Must provide the Integrated Testing Plan to the professional designers for review/acceptance prior to the test.

.5 Collect the required pre-test documentation (e.g. 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.).

.6 Determine what previous testing of the systems can be accepted to avoid duplication of testing.

.7 Determine which parties are required to participate in the Integrated Systems Test.

.8 Implement the Integrated Testing Plan (perform the tests) and record the results to show proper integration (ensure re-testing is performed as needed).

.9 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.

2. PRODUCTS – NOT USED

3. EXECUTION

3.01 RESPONSIBILITY

.1 The General Contractor is responsible for coordinating integrated systems testing to meet the requirements of CAN/ULC-S1001. Time is to be

allocated in the construction schedule for these tests, and the General Contractor is to ensure that the key sub-trades are a part of this testing.

.2 Pre-requisites for integrated systems testing are individual verification reports such as fire alarm verification report, sprinkler sign off, elevator sign off, fire/smoke/life safety fan balancing reports, and others.

.3 The intent is not to replicate the tests of each device, but to test the operation of the life safety system as a whole. Examples include but are not limited to the following:

.1 Fan shutdown on duct smoke detector.

.2 Activation of fans (stair pressurization, vestibule pressurization, smoke evacuation) on fire alarm.

.3 Successful integration of sprinkler devices, pre-action systems, etc.

.4 Proper operation of door hold-open devices, mag locks, fire shutters, etc.

.5 Elevators recall to home and alternate home floors.

.6 Operation of life safety systems upon loss of power or on generator power.

.4 Based on the level of 3rd party commissioning hired by the Owner required for the project, the Commissioning Authority may require to witness these tests.

3.02 EXAMPLES FROM CAN/ULC-S1001 OF SYSTEMS THAT REQUIRE INTEGRATED TESTING

.1 Door Hardware:

.1 Electromagnetic hold-opens:

.1 Each door tested to ensure returns to closed and latched position upon signal from fire alarm or from actuation of local smoke detectors.

.2 Electromagnetic locks:

.1 Each must de-energize upon activation of the fire alarm system or from actuation of the local manual pull station.

.3 Fire shutter doors close upon activation of the fire alarm system.

.4 Power door operators on doors located on fire separations deactivate when fire alarm system is activated.

.2 Foodservice Equipment (Commercial Kitchens):

.1 Cooking equipment fire suppression systems (release of agent not required).

.3 Elevators:

.1 Automatic elevator recall: detection of smoke on the main level of a structure will result in the elevator recalling to the second (or alternate) level to ensure potential evacuees are not delivered into an active fire.

.4 Fire Suppression:

.1 Freeze Protection Systems: annunciates on fire alarm annunciator panel upon loss of power to heat tracing for sprinkler piping.

.2 Sprinkler systems:

.1 Flow switches and other water flow indicating devices annunciate as alarm on fire alarm control panel when water flow is detected.

.2 Supervised valves annunciate as supervisory on fire alarm control panel when valves are closed.

.3 Standpipe systems: Supervised valves annunciate as supervisory on fire alarm control panel when valves are closed.

.4 Fire pumps: Operate as required.

.5 Water supplies (test responses to pressure sensors, level sensors, etc.):

.1 Loss of pressure in sprinkler piping will trigger the fire alarm. This pressure loss indicates that either an active fire has started, or the integrity of the sprinkler piping has been compromised.

.6 Water supply control valves.

.7 Fixed fire suppression systems (release of suppression agent not required).

.5 HVAC:

.1 Smoke control systems.

.2 Emergency pressurization systems.

.3 Smoke exhaust systems.

.4 HVLS fans shut down on sprinkler flow.

.5 Parking garage ventilation system and controls.

.6 Confirm and document that the air handling unit disengages when fire or smoke is detected. Preventing the conveyance of smoke, ash, particulates, or the fire itself through the air system substantially strengthens a building resilience in an emergency, and protects personnel.

.7 Confirm and document that areas requiring pressurization (such as stairwells and other emergency routes) are functioning as designed during emergency conditions.

.6 Electrical:

.1 Emergency generators (e.g. startup test, loss of power simulations)

.1 Confirm and document that emergency generators engage, and alarm is announced during a fire or low-fuel conditions. It is critical to the functioning of all life safety systems that the backup power generation be capable of indicating when its operability has been compromised, including low-fuel alarms for diesel or propane fuelled generator sets, and supervision of valves for natural gas fuelled generator sets.

.2 Confirm and document that when primary power is interrupted the emergency generators engage and powers critical life saving systems such as alarms, sprinkler pumps, elevators, and air handling units. Ensuring backup power generation is timely, of sufficient strength and properly functioning can be the difference between an incident and a disaster.

.2 Automatic Transfer Switches: Operate as required.

.3 A/V and lighting control systems: Systems deactivate upon fire alarm signal.

.7 Public Address and Paging Systems: de-activate system upon actuation of the fire alarm system.

.8 Sound Masking System: de-active system upon actuation of the fire alarm system.

.9 Fire Alarm System:

.1 Transmissions with fire signal receiving centre (e.g. receipt of signals).

.1 Confirm and document that the fire alarm monitoring centre is receiving these various alarms in a timely fashion. With legacy buildings, a risk exists that physical lines may have been cut and/or subscriptions have elapsed.

.2 Confirm and document that manual pull fire stations are functioning as designed. Quick action from the first person to notice a fire will minimize the impact to people and structures.

.10 Smoke and carbon monoxide alarms.

.11 Hazardous protection monitoring.

3.03 SITE TESTS AND INSPECTIONS

.1 In accordance with CAN/ULC-S1001.

End of Section