



CLARK COUNTY DEPARTMENT OF BUILDING & FIRE PREVENTION

4701 W. Russell Road • Las Vegas, NV 89118
(702) 455-3000 • Fax (702) 221-0630

Ronald L. Lynn, Director/Building & Fire Official
Samuel D. Palmer, P.E., Assistant Director • Girard W. Page, Fire Marshal

SUBJECT: TG-30: LIFE SAFETY SYSTEMS TESTING

1.0 PURPOSE:

This technical guideline establishes responsibilities and requirements for submittals, document reviews, testing, reports, and permits for life safety systems testing mandated by Section 22.02.055(A) of the Clark County Building Administrative Code (CCBAC). The purpose of the life safety systems testing required by CCBAC Section 22.02.055(A) is to confirm that the existing life safety systems provided in a high-rise building with a residential (Group R) occupancy have been maintained in working order and still function as originally intended.

It is not the intent of this program to supplant the maintenance, inspection, and testing of building fire protection and life safety systems otherwise required by other applicable codes, standards, and ordinances. Compliance with CCBAC Section 22.02.055(a) does not relieve the Owner from compliance with the maintenance, inspection, and testing required by other applicable codes, standards, and ordinances.

2.0 SCOPE:

The life safety systems testing required by CCBAC Section 22.02.055(A) applies to all high-rise buildings with a Group R occupancy, including the podium and attached low-rise structures. Testing of life safety systems shall not be required for detached low-rise buildings with smoke control systems, including malls, parking garages, arenas, underground buildings, and atriums.

The primary intent of this technical guideline is to outline the requirements for biennial retesting of existing smoke control systems, including any interrelated systems (e.g., fire alarm initiating devices, passive construction). It is not the intent to require all interrelated fire protection and life safety systems to be retested in their entirety; rather, the intent of this program is to test those components of other fire protection and life safety systems that directly function as an integral part of the sequence of operations for the smoke control systems to the extent necessary to confirm proper operation of the smoke control systems. As such, provisions outlined within CCDB Technical Guideline 60 (TG-60) are also applicable under the scope of TG-30.

The life safety systems addressed in this guideline are required to be tested in their entirety every two (2) years, and the testing must be completed under normal and secondary power conditions. Failure to maintain the life safety systems in a fully operational condition or failure to test the system within the required time frame may result in revocation of the Certificate of Occupancy.

3.0 ABBREVIATIONS & ACRONYMS:

BOD: Basis of Design

CCBAC: Clark County Building Administrative Code

Prepared By:	Concurred By:	Approved By:
<i>James C. Gerren</i>	<i>Neil A. Burning</i>	<i>Gregory J. Franklin</i>
James C. Gerren, P.E., C.B.O. Fire Protection Engineer	Neil A. Burning, C.B.O. Manager of Plans Examination	Gregory J. Franklin, C.B.O. Assistant Director

CCDB:	Clark County Department of Building
CCFC:	Clark County Fire Code
CCFD:	Clark County Fire Department
FPR:	Fire Protection Report
IBC:	International Building Code
MQAA:	Mechanical Quality Assurance Agency
NCR:	Non-Compliance Report
NFPA:	National Fire Protection Association
NRS:	Nevada Revised Statutes
PTA:	Prime Testing Agent
QAA:	Quality Assurance Agency
TG:	Technical Guideline
TRG:	Technical Reporting Guideline

4.0 DEFINITIONS:

For the purposes of this technical guideline, the definitions included herein are either those established as generally accepted engineering practice or those specific to a program for testing existing life safety systems within the scope of CCBAC Section 22.02.055(A).

Basis of Design (BOD): A narrative report that describes the design concepts and principals incorporated to meet the owner's project requirements and applicable codes and standards of record for a facility. This is to include existing fire protection and life safety systems in the facility, including the original design intent of such systems based on the code(s)-of-record, the original fire protection report(s), and/or any additional agreements or approvals (e.g., code modifications, alternate methods of construction).

Certificate of Satisfactory Performance: A certificate issued by CCDB attesting to the satisfactory completion of the testing required by this Technical Guide and the submittal of all documentation required verifying the successful functional testing of the life safety systems in accordance with the approved Basis of Design and life safety systems test plan.

Dedicated Systems: Smoke control systems that are installed for the sole purpose of providing smoke control. They are separate systems of air-moving and distribution equipment that do not function under normal building operating conditions. Upon activation, these systems operate specifically to perform the smoke control function.

Final Report: A report to the Building Official that documents special inspection activities and compliance with the approved Basis of Design report and life safety systems test plan.

Fire Protection Report: A document that describes the fire protection features of a facility.

Integrated System: A combination of fire protection and life safety systems that are required to operate collectively in order to achieve a specific fire protection and/or life safety objective.

Life Safety System: As defined in NFPA 1301, “A system that is intended to enhance occupant tenability and facilitate evacuation, smoke control, compartmentalization, and/or isolation.” For purposes of this Technical Guideline, “life safety system” shall refer to smoke control systems and any fire protection and building safety systems/features that are integrated with the smoke control systems.

Life Safety Systems Testing: Functional testing to verify the performance of the life safety systems in accordance with the established Basis of Design.

Life Safety Systems Test Plan: Proposed detailed procedures and methods that are to be used for the testing of the smoke control systems, including all the items/equipment subject to such tests. At a minimum, the life safety systems test plan shall include test scenarios (listing all smoke control equipment) and a detailed narrative explaining how the smoke control system testing will be accomplished.

Mechanical Quality Assurance Agency (MQAA): An agency approved by the CCDB to conduct special inspections and/or testing on mechanical smoke control systems.

Non-dedicated Systems: Systems that share components with some other system(s) such as the building HVAC system. Activation causes the system to change its mode of operation in order to achieve the smoke control objectives.

Prime Testing Agent (PTA): A person or entity identified by the owner, who leads, plans, schedules, documents, coordinates the life safety testing team, and implements the life safety systems testing plan. The Prime Testing Agent shall be a Nevada-licensed Fire Protection Engineer or Mechanical Engineer.

Quality Assurance Agency: An agency approved by the Building Official to conduct special inspections and/or testing as required by CCBAC Section 22.02.530.

Responsible Registered Design Professional: An architect registered pursuant to NRS Chapter 623 or a professional engineer licensed pursuant to NRS Chapter 625, who is responsible for the coordination of each aspect of the construction documents that are submitted to the CCDB for permit.

Sequence of Operations (Matrix): A document that identifies the input/output configuration of integrated life safety systems.

Smoke Barrier: A continuous membrane, either vertical or horizontal, such as a wall, floor, or ceiling assembly that is designed and constructed to restrict the movement of smoke in conjunction with a smoke control system.

Smoke Control Diagram: A construction document that depicts device locations and function, equipment performance, systems integration and sequencing of smoke control measures necessary to verify compliance to the design approach for smoke control outlined in the approved fire protection report. At a minimum, these diagrams shall include an equipment/device input/output matrix, smoke control zone layouts, control wiring details, and activation zone layouts.

Smoke Control Mode: A predefined operational configuration of a system or device for the purpose of smoke control.

Smoke Control System, Mechanical: An engineered system that uses mechanical fans to produce pressure differences across smoke barriers or establish airflows to limit and direct smoke movement. For purposes of this guideline, mechanical smoke control systems include smoke control zones, pressurized stairways, pressurized exit passageways, pressurized elevator machine rooms, and pressurized elevator hoistways.

Smoke Control System, Passive: A system of smoke barriers arranged to limit the migration of smoke.

Smoke Control Zone: A space within a building enclosed by smoke barriers, including the top and bottom, which is part of a zoned smoke control system.

Special Inspector: An individual qualified under a specific technical discipline and approved by CCDB under the provisions of TG-17 possessing the licensure required for the practice of that technical discipline within the jurisdiction.

Subzone: A smoke control zone that shares activation with the surrounding smoke control zone(s).

Testing Team: Those individuals who through coordinated actions are responsible for implementing the Life Safety Systems Test Plan. These individuals shall be licensed, certified and qualified as required by the regulations of the State of Nevada and Clark County and the policies of CCDB.

5.0 REFERENCES:

The codes and standards listed below are presented only as a compilation of references that may be used to assess existing life safety systems within a building. Compliance for any existing building will be assessed against the Code of Record applicable at the time of construction or major systems renovation as may be appropriate.

- Clark County Building Administrative Code, latest edition
- International Building Code
- Uniform Mechanical Code
- Southern Nevada Amendments to the International Building Code
- Southern Nevada Amendments to the Uniform Mechanical Code
- Southern Nevada Amendments to the National Electrical Code
- Clark County Fire Code
- Southern Nevada Fire Chief's Association, Uniform Guideline for Smoke Control Testing & Recertification

- Clark County Retroactive Life and Fire Safety Standards for Existing Buildings, 1981
- National Fire Protection Association (NFPA):
 - NFPA 12, *Standard on Carbon Dioxide Extinguishing Systems.*
 - NFPA 13, *Standard for the Installation of Sprinkler Systems.*
 - NFPA 15, *Standard for Water Spray Fixed Systems for Fire Protection.*
 - NFPA 16, *Standard for the Installation of Foam-Water Sprinkler and Foam-Water Spray Systems.*
 - NFPA 17, *Standard for Dry Chemical Extinguishing Systems.*
 - NFPA 17A, *Standard for Wet Chemical Extinguishing Systems.*
 - NFPA 70, *National Electrical Code®.*
 - NFPA 72®, *National Fire Alarm Code®.*
 - NFPA 80, *Standard for Fire Doors and Fire Windows.*
 - NFPA 92A, *Standard for Smoke Control Systems Utilizing Barriers and Pressure Differences.*
 - NFPA 92B, *Standard for Smoke Management Systems in Malls, Atria, and Large Spaces.*
 - NFPA 96, *Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations.*
 - NFPA 110, *Standard for Emergency and Standby Power Systems.*
 - NFPA 111, *Standard on Stored Electrical Energy Emergency and Standby Power Systems.*
 - NFPA 2001, *Standard on Clean Agent Fire Extinguishing Systems.*

6.0 RESPONSIBILITIES:

6.1 Owner:

- 6.1.1 The Owner shall designate and contract with the Prime Testing Agent and, when applicable, the Responsible Registered Design Professional.
- 6.1.2 The Owner shall authorize peer reviews, when applicable.
- 6.1.3 The Owner shall maintain existing as-built smoke control diagrams and coordinate updates of the smoke control diagrams, as necessary. Where such smoke control diagrams do not exist, the requirements of Section 7.2.1.7 shall be met.
- 6.1.4 The Owner shall coordinate document submittals, including:
 - 6.1.4.1 Basis of Design (BOD) report.
 - 6.1.4.2 Life safety systems test plan.
 - 6.1.4.3 Final report.
- 6.1.5 The Owner or an authorized representative of the Owner shall submit a permit application for Life Safety Systems Testing (Form #1017) at the time the BOD report is submitted to CCDB (Plans Examination).
- 6.1.5.1 Form #1017 (Hourly Plan Review Worksheet) is available in PDF format on the CCDB web-site at the following address:
http://www.clarkcountynv.gov/Depts/development_services/Forms/Form_1017.pdf
- 6.1.6 The Owner shall execute a Quality Assurance Agency Special Inspection Agreement. The Special Inspection Agreement shall be issued at the time the BOD report is submitted to CCDB.
- 6.1.7 The Owner shall provide access for all due diligence surveys, testing, and observations/inspections.

- 6.1.8 The Owner shall assign operations and maintenance personnel to participate in the life safety systems testing.
- 6.1.9 The Owner shall coordinate the activities of all required testing companies associated with the life safety systems.
- 6.1.10 The Owner shall pay all required permit fees.
 - 6.1.10.1 The Owner shall pay for all CCDB reviews of BOD reports, life safety systems test plans, and final reports, as well as any CCDB observations/inspections, based on the hourly rates indicated in CCBAC Table 3-I.
 - 6.1.10.2 The Owner shall pay an administrative fee of \$750 at the time the final report is submitted to CCDB, as mandated by CCBAC Section 22.02.055(A)(3).

6.2 CCDB:

- 6.2.1 CCDB shall notify the Owner in writing the date by which the life safety systems testing must be completed. The testing must be completed within two (2) years after six (6) months from the date that CCDB notifies the Owner.
- 6.2.2 CCDB shall assign a staff Fire Protection Engineer to the project.
- 6.2.3 CCDB shall issue a permit application number for each property.
- 6.2.4 CCDB shall review the BOD report and the life safety systems test plan.
 - 6.2.4.1 CCDB will make every effort to complete its review and approval process within 30 working days of the submittals excepting any requests for correction or revision that may be necessary.
 - 6.2.4.2 CCDB may require peer review.
- 6.2.5 CCDB shall observe the life safety systems tests at their discretion or when requested by the Owner or the Prime Testing Agent.
- 6.2.6 CCDB shall review and approve the life safety systems testing final report.
- 6.2.7 CCDB shall issue an invoice to the Owner for all services provided upon approval of the final report.
 - 6.2.7.1 All reviews of BOD reports, life safety systems test plans, and final reports, as well as any observations/inspections, performed by CCDBS- BD shall be charged at the hourly rates noted in CCBAC Table 3-I.
 - 6.2.7.2 CCDB shall collect an administrative fee of \$750 at the time the final report is submitted, as mandated by CCBAC Section 22.02.055(A)(3).
- 6.2.8 CCDB shall issue a Certificate of Satisfactory Performance to the Owner upon approval of the final report and payment of all required fees.

6.3 Prime Testing Agent/Designated MQAA:

- 6.3.1 The Prime Testing Agent shall prepare the BOD report. The Prime Testing Agent shall perform all necessary due diligence and research to develop an accurate BOD.
- 6.3.2 The Prime Testing Agent shall prepare and submit the life safety systems test plan.
- 6.3.3 The Prime Testing Agent/designated MQAA shall coordinate all required life safety systems testing.
 - 6.3.3.1 The Prime Testing Agent/designated MQAA shall advise CCDB in advance of significant tests (e.g., full shunt trip of primary power), so that CCDB can arrange to observe the tests, as necessary.

- 6.3.3.2 The Prime Testing Agent/designated MQAA shall be responsible for all notifications to and coordination with CCFD.
- 6.3.4 The Prime Testing Agent/designated MQAA shall assign personnel to the project who are approved by CCDB as Special Inspectors.
- 6.3.5 The Prime Testing Agent/designated MQAA shall document the results of all life safety systems tests covered under the approved BOD and life safety systems test plan.
 - 6.3.5.1 All testing activities shall be documented as specified herein, in TG-50, TG-60, and TRG-K.
- 6.3.6 The Prime Testing Agent/designated MQAA shall issue Non-Compliance Reports (NCRs) as necessary.
- 6.3.7 The Prime Testing Agent/designated MQAA shall witness all life safety systems testing covered under the approved life safety systems test plan.
- 6.3.8 The Prime Testing Agent/designated MQAA shall prepare and submit the final report.

7.0 PROCEDURE:

7.1 PROGRAM INITIATION:

- 7.1.1 Upon notification from CCDB, the Owner shall establish a life safety systems test team and contract with a Prime Testing Agent to initiate the life safety system testing program at the facility. The life safety systems testing team shall be comprised of the following entities:
 - 7.1.1.1 Owner.
 - 7.1.1.2 Prime Testing Agent.
 - 7.1.1.3 Mechanical Quality Assurance Agency (MQAA).
 - 7.1.1.4 Registered Design Professional(s), as necessary.
 - 7.1.1.5 Licensed maintenance contractors:
 - 7.1.1.5.1 Automatic fire sprinkler systems.
 - 7.1.1.5.2 Alternative extinguishing systems, including kitchen hood systems.
 - 7.1.1.5.3 Fire alarm system.
 - 7.1.1.5.4 HVAC/smoke control.
 - 7.1.1.5.5 Elevator systems and automated people movers.
 - 7.1.1.5.6 Emergency and standby power supply systems.
 - 7.1.1.6 Facility manager and/or operations personnel (e.g., Chief Engineer).

7.2 BASIS OF DESIGN (BOD):

- 7.2.1 Prior to conducting any testing, the Prime Testing Agent shall prepare a Basis of Design (BOD) report. The Prime Testing Agent shall conduct all necessary research and due diligence surveys to determine if existing documentation is sufficient to identify the BOD for the existing life safety systems. The BOD report may be a compilation of approved Fire Protection Reports, Sequence of Operations (Matrices), and Smoke Control Diagrams for the property if such documents are up-to-date and accurately reflect the designs of the property's existing life safety systems. At a minimum, the BOD report shall include the following information:
 - 7.2.1.1 A list of documents that were reviewed as part of the preparation of the BOD.

- 7.2.1.2 A code analysis that clearly identifies all codes, standards, and local regulations of record governing the facility's construction, and the application, installation, and maintenance of the existing fire protection and life safety systems, including:
 - 7.2.1.2.1 The code of record for the initial construction of the property.
 - 7.2.1.2.2 The code of record for each major renovation and expansion of the property.
- 7.2.1.3 A complete building description identifying the following:
 - 7.2.1.3.1 Types of construction by location.
 - 7.2.1.3.2 Total building/complex gross floor area.
 - 7.2.1.3.3 Approximate gross area per floor for tower levels.
 - 7.2.1.3.4 Building height of each major portion of the facility.
 - 7.2.1.3.5 Number of floors above and below grade.
 - 7.2.1.3.6 Building occupancy classification by areas (summary).
 - 7.2.1.3.7 Common and generally accepted names identifying different areas or locations within the building/complex.
 - 7.2.1.3.8 Unique building features that impact the life safety systems.
- 7.2.1.4 A site plan that identifies the relative locations of all major portions of the facility and the following specific features:
 - 7.2.1.4.1 Fire Command Center.
 - 7.2.1.4.2 Secondary Response Point(s).
 - 7.2.1.4.3 Emergency generators.
 - 7.2.1.4.4 Fire walls that delineate separate buildings/properties and/or represent the division between high-rise and low-rise buildings on the same property.
- 7.2.1.5 A complete description of the existing integrated life safety systems.

The performance objectives of the smoke control system and integrated life safety system components shall be described in detail. This section shall also identify whether each system is required by code or installed voluntarily, and shall also identify whether each system is a complete or partial installation. The following systems and features shall be described:

 - 7.2.1.5.1 Smoke control systems.
 - 7.2.1.5.2 Fixed fire suppression and control systems that are part of the integrated life safety systems.
 - 7.2.1.5.3 Fire alarm systems.
 - 7.2.1.5.4 Emergency voice/alarm communication systems.
 - 7.2.1.5.5 Elevator systems.
 - 7.2.1.5.6 Normal and secondary power systems.
 - 7.2.1.5.7 Passive fire protection features, including rated separations and opening protection within smoke zone boundaries and rated enclosures.
 - 7.2.1.5.8 Fire Command Center.
- 7.2.1.6 A summary of all Alternate Materials and Methods of Construction that affect the design requirements for any of the life safety systems.
- 7.2.1.7 Where smoke control diagrams are available for the property, the most up-to-date smoke control diagrams shall be included with the BOD report. Where smoke control diagrams are not available, the BOD report shall include floor plans that, at a minimum, identify the following:

- 7.2.1.7.1 Smoke zone boundaries, including the associated hourly fire-resistance ratings for all smoke control zone boundaries.
- 7.2.1.7.2 Smoke control method used for each smoke zone.
- 7.2.1.7.3 Smoke zone identifiers that match the names identified on the fire-fighter's smoke control panel.
- 7.2.1.7.4 Location of passive sub-zones (e.g., elevator lobbies) relative to active smoke control zones.
- 7.2.1.7.5 Location of all smoke proof egress enclosures.
- 7.2.1.8 A comprehensive **Sequence of Operations (Matrix)** for all integrated life safety systems. The Sequence of Operations Matrix shall be formatted as follows:
 - 7.2.1.8.1 Rows are to list the system inputs.
 - 7.2.1.8.1.1 Each unique type of device/equipment shall be listed separately.
 - 7.2.1.8.1.2 System inputs shall include manual controls and loss of primary power.
 - 7.2.1.8.2 Columns are to list the system outputs.
- 7.2.2 The Owner shall complete an Hourly Plan Review Worksheet (Form #1017) at the time the Basis of Design (BOD) report is submitted to CCDB. Three (3) copies of the BOD report shall be submitted to CCDB (Plans Examination) for review and approval.

7.3 LIFE SAFETY SYSTEMS TEST PLAN:

- 7.3.1 The test plan shall identify the processes, protocols, and procedures necessary to successfully complete the required life safety systems testing. The test plan shall be coordinated with the BOD report.
- 7.3.2 The test plan shall be sufficient to clearly demonstrate that the fire and life safety systems incorporated within the facility perform in accordance with the intended design objectives identified in the approved BOD report and the applicable codes and standards of record.
- 7.3.3 The test plan shall verify the functional interconnection and appropriate integration of the facility fire and life safety systems.
- 7.3.4 The test plan schedule shall be based on completion of testing for the entire facility within two (2) years and six (6) months from the date the Owner is first notified by CCDB.
- 7.3.5 The test plan shall clearly describe all proposed test scenarios required to completely test the smoke control and integrated life safety systems.
- 7.3.6 The test plan may be based on the assumption that installed components were compliant at the time of original installation.
- 7.3.7 A list of names and contact information for members of the life safety testing team shall be provided with the test plan.
- 7.3.8 Three (3) copies of the life safety systems test plan shall be submitted to CCDB (Plans Examination) for review and approval.

7.4 INTEGRATED LIFE SAFETY SYSTEMS TESTING:

- 7.4.1 Integrated life safety systems testing may begin only after CCDB has approved the Basis of Design (BOD) Report and the Life Safety Systems Test Plan.

- 7.4.2 Extent of functional testing:
 - 7.4.2.1 Within each active smoke control zone, a minimum of 20 percent of each type of input device shall be initiated, including duct detectors and special suppression systems, as applicable.
 - 7.4.2.1.1 An additional ten (10) percent of the same type of input device shall be functionally tested for each device failure up to a maximum of two (2) failures (i.e., a total of 30 percent of devices if one failure occurs or a total of 40 percent of devices if two failures occur).
 - 7.4.2.1.2 If three (3) failures occur in the same device type, then 100 percent of that device type shall be functionally tested in that zone.
 - 7.4.2.1.3 If functional testing of any device identifies a need to reprogram the system to correct output functions, then 100 percent of that type of device shall be tested to confirm the proper revised output function.
 - 7.4.2.1.4 One-hundred (100) percent of the sprinkler waterflow switches within a test zone shall be functionally tested when the BOD indicates that activation of sprinkler waterflow initiates that smoke zone.
 - 7.4.2.1.5 For each input device that is initiated, 100 percent of the required output functions shall be confirmed.
- 7.4.3 Fire alarm notification:
 - 7.4.3.1 Audible and visual alarm notification outputs shall be permitted to be disabled during testing of the smoke control systems.
 - 7.4.3.1.1 Fire alarm notification appliances shall only be permitted to be disabled by a licensed fire alarm contractor that is certified by the equipment manufacturer.
 - 7.4.3.1.2 Audible and visual alarm notification outputs shall be restored at the conclusion of each testing event.
- 7.4.4 Testing on secondary power:
 - 7.4.4.1 The life safety systems testing shall be conducted under both normal and secondary power conditions.
 - 7.4.4.2 A full shunt trip of the normal power source shall be conducted at least once during each two-year testing cycle.
 - 7.4.4.3 Simulated shunt tests, where the secondary power source is brought on-line prior to power transfer from normal power to the secondary power source, may be used when a full “hard” shunt trip is not required or initiated.
- 7.4.5 Passive barriers:
 - 7.4.5.1 The integrity of passive barriers shall be verified by visual inspection or leakage (door fan) testing.
 - 7.4.5.2 Where visual inspections determine that the integrity of passive barriers has been compromised (e.g., unprotected openings or improperly sealed penetrations), leakage testing shall be required after the passive barrier has been repaired.
 - 7.4.5.3 Leakage testing of passive barriers shall be addressed in the BOD report and/or the life safety systems test plan.
 - 7.4.5.3.1 Refer to Section 7.4.7 regarding elevator lobbies.

- 7.4.6 Fan performance:
 - 7.4.6.1 Stair pressurization systems shall be verified to provide the required pressure differentials within the maximum allowable door operating forces.
 - 7.4.6.2 When provided, the discharge flow rates through dampered relief openings (e.g., barometric dampers) serving pressurized exit enclosures shall be verified at the design pressure difference.
 - 7.4.6.3 Differential pressures between smoke control zones and/or rate of air- change-per-hour shall be verified to confirm design criteria performance levels. Sufficient tests shall be undertaken to qualify the design criteria performance considering building and climatic conditions at the time of testing.
 - 7.4.6.4 Fan measurements shall be taken when the fan performance must be confirmed as part of the performance criteria for a smoke control zone (e.g., areas with smoke control based on the exhaust method or the airflow method).
 - 7.4.6.5 Where Variable Frequency Drives (VFDs) are incorporated with fans provided for smoke control functions, these drive devices are to be confirmed as providing the required responses for each design service level.
 - 7.4.6.6 Fan motor horsepower shall be determined by measurement of actual operating voltage and current draw.
 - 7.4.6.6.1 Actual fan performance curves shall not be required.
 - 7.4.6.7 Where the design requirements specified a safety factor for the number of fan drive belts, the actual number of installed and serviceable belts shall be verified.
 - 7.4.6.8 If required by the applicable code-of-record, a minimum service factor of 1.15 shall be confirmed for motors driving smoke control fans.
- 7.4.7 Elevators:
 - 7.4.7.1 Functional testing of elevators shall confirm proper Phase I automatic recall upon activation of smoke detectors in an associated elevator lobby or elevator machine room, upon loss of power, or as otherwise specified in the BOD report and/or the corresponding Sequence of Operations Matrix.
 - 7.4.7.2 Functional testing of Phase I manual operation and Phase II firefighter's service operation shall not be required.
 - 7.4.7.3 Where applicable, automatic and manual activation of elevator hoistway vents shall be confirmed through testing.
 - 7.4.7.4 All elevator lobbies that serve as passive smoke zones or passive sub- zones shall be tested to confirm the minimum required pressure differential between the lobby and adjacent zones, when applicable.
 - 7.4.7.4.1 Where applicable, smoke detectors in elevator lobbies shall be activated to confirm proper closure of the lobby doors on hold-open devices.
- 7.4.8 Emergency lighting:
 - 7.4.8.1 Visual observation shall be made to confirm proper functioning of the emergency lighting system.
 - 7.4.8.2 Measurements of illumination levels shall not be required unless minimum emergency lighting levels cannot be confirmed through visual observation.

7.5 FINAL REPORT:

- 7.5.1 Upon completion of the life safety systems testing, the Prime Testing Agent/designated MQAA shall submit a minimum of five (5) copies of the Final Report and associated test documentation. The Final Report shall summarize the results of all testing and include a copy of all NCRs with written disposition.
- 7.5.2 The final report shall be in accordance with TG-50 and TG-60.

8.0 QUALIFICATIONS:

- 8.1 Prime Testing Agent:
 - 8.1.1 The Prime Testing Agent shall be a Nevada-licensed Fire Protection Engineer or Mechanical Engineer.
 - 8.1.2 The Prime Testing Agent shall be permitted to be an employee of the property, a Clark County-approved MQAA, or other qualified firm (i.e., independent consultant).
 - 8.1.3 The Prime Testing Agent should have a comprehensive knowledge of the design, installation, function, and maintenance of the types of fire and life safety systems installed within the project facility.
 - 8.1.4 The Prime Testing Agent may be required to provide verification or demonstrate his or her comprehension and experience in the testing of complex fire and life safety systems.
- 8.2 Subcontracted Agencies (Test Companies):
 - 8.2.1 All testing of life safety systems shall be conducted by Clark County-approved Quality Assurance Agencies (QAA) operating in their specific area of expertise (i.e., Clark County-approved MQAA).
 - 8.2.2 All Quality Assurance Agencies and Special Inspectors shall be approved by Clark County in accordance with TG-17.

9.0 RECORDS:

- 9.1 The following documents are official records and maintained as such by the CCDB- Records Division:
 - 9.1.1 Basis of Design (BOD) report.
 - 9.1.2 Life Safety Systems Test Plan.
 - 9.1.3 Final Report.
 - 9.1.4 Certificate of Satisfactory Performance.

10.0 REVISION HISTORY:

Title	Revision/Approved Date	Effective Date
TG-30	August 11, 2011	Draft for Public Comment
TG-30	November 1, 2011	November 1, 2011