Houston Fire Department
Life Safety Bureau (LSB)

LSB Standard No. 02, Rev. 05

Inspection and Testing of Fire Protection and Life-Safety Equipment

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LSB Standards are established in accordance with provisions of the City of Houston *Fire Code*. They are subject to the administrative sections covering alternative materials and methods, modifications, and the Board of Appeals.

Table of Contents

Inspection and Testing of Fire Protection and Life-Safety Equipment

Section 2.1 – General

2.1.1 Scope.

Fire protection and life-safety equipment and systems shall be inspected, tested, and maintained in all occupancies and locations where required or installed, as set forth in the City of Houston *Fire Code*, applicable NFPA standards, and as required by the Fire Code Official.

The provisions of this standard apply to the inspection, maintenance, and testing of both fire protection and life-safety systems and equipment. The requirements presented in this standard are to be considered ~~as~~ minimum requirements.

2.1.2 Purpose.

This standard is for the use and guidance of persons charged with installing, servicing, and maintaining fire protection and life-safety equipment in a state of operational readiness and reliability. The fire protection and life-safety requirements of this standard are general in nature and are not intended to override the specific requirements of manufacturers, or standards of other City of Houston, state, or federal regulatory agencies for specific occupancies. Where there is a conflict between a general requirement of this standard and a specific requirement of a nationally recognized standard that has been adopted in the *Fire Code*, the adopted standard shall prevail.

This standard is subject to periodic review and updates to accommodate changes in local need or requirement, changes in nationally recognized standards, or changes in related technology, or to comply with state or federal regulation.

2.1.3 Responsibility.

It shall be the responsibility of the owner or owner's agent of occupancies that contain fire protection and life-safety equipment and systems to have such inspected, tested, and maintained. It shall be the owner or occupant's responsibility to provide ready accessibility to components of the fire protection and life-safety equipment and systems that require inspection, testing, and maintenance in accordance with this standard.

Section 2.2 – Definitions

2.2.1 Fire Protection Equipment and Systems.

Specially designed equipment, either alone or as a system, provided to assist in the extinguishment of fire and to limit the spread of fire and smoke, by automatic, semi-automatic, or manual means. This includes, but is not limited to: portable fire extinguishers, fire hoses, fire pumps, wet and dry standpipe systems, automatic sprinkler systems, clean agent fire extinguishing systems and other special extinguishing systems, fire doors and dampers, and other fire-protection systems and appurtenances.

2.2.2 Life Safety Equipment and Systems.

Specially designed equipment that either alone or as a system, provided to assist in the preservation of human life in exiting from an emergency event or to assist in the location, confinement, and successful conclusion of an event, through automatic, semi-automatic, or manual means. This includes, but is not limited to: fire alarm systems, stairway pressurization and smoke-removal systems, smoke and heat ventilators, and emergency power supply and lighting systems.

2.2.3 Inspection.

A “quick check” that fire protection or life-safety systems and equipment are available and will operate, intended to give reasonable assurance that the equipment will be operable in the proper manner that it was designed or installed for and done by visual verification that a system is in its designated place and has not been removed or tampered with, and that there is no obvious physical damage or condition to prevent its operation.

2.2.4 Maintenance.

A thorough examination of the fire protection or life-safety systems equipment, intended to give maximum assurance that the equipment will operate effectively and safely. Maintenance includes any necessary repair or replacement and will normally reveal if other testing, repair, or modification is required.

2.2.5 Servicing.

Means and includes one or more of the following: 1) maintenance; 2) repair; and 3) routine on-site testing of fire protection or life-safety equipment.

2.2.6 Service Tags.

Tags, either hang-type tags or adhesive stickers, approved for such use by the State of Texas Fire Marshal’s Office, affixed to fire protection and life-safety equipment or systems to indicate (1) that service has been performed thereon and (2) the results of the servicing.

Section 2.3 – General Requirements

2.3.1 Servicing, Testing, and Maintenance.

Qualified personnel approved by the Fire Marshal shall conduct all servicing testing, and tagging of fire protection and life-safety equipment. Approved automatic fire sprinkler, fire alarm, and fire extinguisher service companies are those licensed by the State of Texas. Personnel not licensed, certified, or approved by City of Houston or State of Texas may be required to provide documentation of licensing or certification by similar approved agencies or authorities or identification as a manufacturer’s representative or authorized service personnel. All servicing or testing, of equipment that involves live electrical circuits, currents, or equipment shall be done in compliance with the City of Houston *Electrical Code*.

2.3.2 Tags and Labels.

2.3.2.1 Inspection/Test Labels.

a. After the inspection and testing of a fire alarm system, the licensed contractor or fire protection contractor must complete in detail a fire alarm inspection/test label and affix it to either the inside or outside of the control panel cover; or, if the system has no panel, in a permanent location. The signature of the licensee on the inspection/test label certifies that the inspection and tests performed comply with requirements of the adopted standards.
b. If any service or maintenance is performed under the inspection of test, a service label, in addition to the inspection/test label, must be completed and attached according to the procedures in this section.
c. For new installation, an inspection/test label may only be applied after the system has been accepted by the Fire Code Official.
d. If, during any inspection or test, the system does not comply with applicable standards adopted at the time the system was installed, has a fault condition, or is impaired from normal operation, the owner or the owner's representative and the Fire Code Official must be notified of the condition and the licensee must attach the appropriate yellow or red label, in addition to the inspection/test label, in accordance with the procedures of this section.
e. The Fire Code Official must be notified when the fault or impairment has been corrected.
f. Inspection/test labels must remain in place for at least five years, after which they may be removed by a licensed employee or agent of a registered firm. An employee of the State Fire Marshal's Office or an authorized representative of the Houston Fire Marshal's Office may remove excess labels at any time.

2.3.2.2 Red Labels.

a. If, after any service, inspection or test, a system or any part thereof is inoperable, has a fault condition, or is impaired from normal operation, excluding the area(s) of a building under construction, the licensed contractor or fire protection contractor must attach a completed red label to the outside of the control panel cover; or, if the system has no panel, in a permanent location to indicate that corrective action is necessary.
b. The signature of the licensee on a red label certifies that the conditions listed on the label have caused the system to be inoperable, have a fault condition, or be impaired from normal operation.
c. If the system is inoperable, immediately after attaching a red label, the licensee or the registered firm must orally notify the property owner, occupant or their representative, and the Fire Code Official, when available, of all impairments and provide a written notification, emailed, faxed, or hand delivered within the next business day of the attachment of a red label. If the system has a fault condition or is impaired from normal operation, after attaching a red label, the licensee or the registered firm must notify the

property owner, occupant or their representative, and the Fire Code Official in writing indicating the condition(s). The written notification must be postmarked, emailed, faxed, or hand delivered within three (3) business days of the attachment of the red label.

d. Red labels must remain in place until the conditions are corrected and a service label is attached certifying that the corrections were made. The red label may be removed by a licensed employee or agent of a registered firm, an employee of the State Fire Marshal's Office, or an authorized representative of the Houston Fire Marshal's Office. The Fire Code Official must be notified when corrections are made and a red label is removed or revised. The notification must be postmarked, emailed, faxed, or hand delivered within five (5) business days of the removal of the red label.

2.3.2.3 Yellow Labels.

a. If, after any service, inspection, or test, a system does not comply with applicable codes and adopted standards, or is not being tested or maintained according to those standards, the licensed contractor or fire protection contractor must attach a completed yellow label to the outside of the control panel cover; or, if the system has no panel, in a permanent location to indicate that corrective action is necessary.

b. The signature of the licensee on a yellow label certifies that the conditions listed on the label cause the system to be out of compliance with applicable codes and standards.

c. After the licensed contractor or fire protection contractor has attached a yellow label, the licensee or the registered firm must notify the property owner, occupant or their representative, and the Fire Code Official in writing indicating the conditions with which the system does not comply with the applicable codes and standards. The notification must be postmarked, emailed, faxed, or hand delivered within five (5) business days of the attachment of the yellow label.

d. Yellow labels must remain in place until the conditions are corrected and a service label is attached certifying that the corrections were made. The yellow label may be removed by a licensed employee or agent of a registered firm, and employee of the State Fire Marshal's Office, or an authorized representative from the Houston Fire Marshal's Office. The Fire Code Official must be notified when corrections are made and a yellow label is removed or revised. The notification must be postmarked, emailed, faxed, or hand delivered within five (5) business days of the removal of the yellow label.

2.3.3 New Installation.

After installation of a system or equipment has been completed, an installation label shall be affixed to the system or equipment and a completed installation certificate form shall be sent to the state fire marshal's office. Labels shall not be red in color.

2.3.4 Upgrade of Equipment.

All fire protection and life-safety equipment shall be maintained in accordance with requirements of the manufacturer and local, state, federal, or nationally recognized standards in effect at the time of original installation and acceptance, unless upgrade is

otherwise required by the City of Houston *Construction Code* or *City Code*, or by the Fire Marshal or other regulatory agency.

2.3.5 Inspection and Maintenance Records.

The property owner or the owner's agent shall maintain logs or records of installation, inspection, testing, maintenance and repairs of fire protection and life-safety equipment systems for not less than **3 years**. The property owner or the owner's agent shall make available Logs and records to the Fire Code Official upon request.

Logs or records of inspection and testing for equipment or systems that are allowed to be completed on cycles longer than every 3 years shall be maintained on file until the next inspection and testing cycle has been completed and the appropriate tags or documentation provided. It is recommended that these logs or records be maintained for several cycles to establish a history of equipment or systems maintenance and repairs.

2.3.6 Notification of Systems Out of Service.

Houston Fire Department Office of Emergency Communications shall be immediately notified by telephone, at **713-884-3143**, whenever a required fire protection or life-safety system is placed out of service for emergency or non-scheduled repairs, replacement, or service. The Fire Department shall again be notified when the system is restored to normal operational status.

The Fire Code Official's Office shall be notified, in writing, by e-mail or fax, not less than 7 business days prior to any lengthy routine or scheduled repairs, or replacement time period. Notification shall be made prior to, when possible, placing the system out of service. Certification and documentation of repairs and operational readiness of the system shall be provided to the Fire Code Official upon request. No fire protection or life-safety equipment system prescribed by the City of Houston *Construction Code* shall be placed permanently out of service unless prior written approval is obtained from the Fire Code Official.

Section 2.4 – Life-Safety Systems

2.4.1 Fire Alarm Systems.

2.4.1.1 General.

Fire alarm systems shall be tested, and service tagged at the main alarm panel, not less than **annually**. Testing shall include all smoke detectors, manual pull devices, annunciators, visual indicators and strobes, control units, voice/alarm communications systems, and other devices that may be part of the fire alarm system.

Exceptions:

1. Heat and flame detection devices shall be tested in accordance with manufacturer's guidelines.
2. Hazardous vapors release detection alarm systems shall be tested in accordance with manufacturer's guidelines.

3. When an approved electronic exit egress locking device is installed on an exit egress door, in accordance with the City of Houston *Construction Code*, the fire alarm system, relay devices to locking device, and all egress controls at the door shall be tested at least **semi-annually** to ensure fail-safe operation of the relay and locking device.

2.4.1.2 Test of Systems.

A licensed fire alarm service company shall test the fire alarm system. Testing and maintenance shall be in accordance with NFPA 72. Test of the system shall include operation of all auxiliary functions of the alarm system, including, but not limited to: electronic exit egress control devices, automatic fire and smoke door closing, fire and smoke damper function, elevator recall, stair pressurization operation, and HVAC shutdown. Written documentation shall be provided that all equipment functioned in accordance with NFPA 72 or in an approved fail-safe mode.

2.4.1.3 Audibility Testing.

A licensed fire alarm service company shall test all annunciating devices not less than **every 3 years**. The licensed fire alarm service company shall provide written documentation that audibility meets sound pressure requirements as set forth in NFPA 72 and the International Fire Code.

Exception: Voice evacuation alarms systems where the tone generator is not separate from the recorded message generator.

2.4.1.4 Intelligibility Testing.

On fire alarms systems with voice evacuation capability, a licensed fire alarm company shall conduct intelligibility testing on the system not less than ever three (3) years.

2.4.2 Emergency Lighting Systems.

2.4.2.1 General.

The owner or owner's agent shall provide for the annual testing of interior and exterior emergency lighting systems, which include but are not limited to exit signs and egress lighting (including stairways).

2.4.2.2 Generator Systems.

"Run Check" of the generator unit shall be performed at least **monthly**, for a period of at least **30 minutes**, under load conditions. System shall be checked for proper fuel, oil, and coolant levels prior to starting test. Authorized building or contract personnel may perform "Run Checks" and maintenance. All testing should be done in accordance with manufacturer's recommendations and instruction manuals, and NFPA 110. A written record of monthly tests shall be maintained.

2.4.2.3 Battery Systems.

Battery units shall be inspected **quarterly**. Authorized building or contract personnel may perform inspections, using procedures in accordance with

manufacturer's guidelines, City of Houston *Electrical Code*, and NFPA 110. A written record of inspections shall be maintained.

2.4.2.4 Test of Systems.

An approved licensed master electrician or licensed electrical service company shall test all emergency lighting systems **annually**. The battery units, whether of the acid or alkali type, shall be tested continuously for a minimum of **90 minutes**. Generator units shall be tested in accordance with Section 2.4.3.2 of this standard. Any failures shall be corrected by repair or replacement as soon as possible. Written documentation of testing and results, and repairs/replacements, shall be provided on all equipment.

2.4.3 Emergency Power Supply Systems (EPSS).

2.4.3.1 General.

Owner or management shall provide for the testing of required emergency power supply systems. EPSS shall be maintained to ensure to a reasonable degree that the system is capable of supplying service within the time specified for the type and for the time duration specified for its class. EPSS provide emergency power for continuous operation of systems such as, but not limited to: exit egress lighting systems, fire detection and alarm systems, public safety communications systems, fire pumps, stair pressurization and smoke removal systems, designated elevators, and associated electrical transfer switch gear.

2.4.3.2 Engine Driven Generator Systems.

An authorized generator service company shall conduct an **annual "Load Test"** with the available EPSS load and supplemental loads at **25 percent** of nameplate rating for **30 minutes**, followed by **50 percent** of nameplate rating for **30 minutes**, followed by **75 percent** of nameplate rating for **60 minutes** for a **total of 2 continuous hours**. Load test shall include complete "cold starts."

Elevator recall and firefighter control operations, shall be checked but need not be continuous for the test period. Fire pump starting loads shall be checked, but pumps need not run continuously for the test period.

Where the EPSS is a paralleled multi-unit system, each unit shall be permitted to be tested individually at its rating.

Routine monthly testing and maintenance shall be performed in accordance with manufacturer's guidelines and NFPA 110.

2.4.3.3 Automatic Transfer Switch Test.

A test that simulates failure of the primary electrical power source and the transfer of the load to the EPSS shall be performed on each automatic transfer switch. An approved independent licensed master electrician or licensed electrical service company shall check proper operation of all automatic switches and required devices on emergency circuits. Written documentation of test results shall be provided, including any repairs required and not completed.

2.4.3.4 Manual Operation of Transfer Switch.

The property owner or the owner's agent shall engage an appropriately licensed contractor/installer to provide instruction and equipment to appropriate personnel for safe manual non-electric transfer in the event of automatic transfer switch malfunction. Manual transfer shall be exercised only by properly instructed personnel and in accordance with the *Electrical Code* and NFPA 110.

2.4.3.5 Lead-Acid Battery Systems.

An approved independent licensed master electrician or licensed electrical service company qualified to test lead-acid battery systems shall perform an **annual "Load Test"** of the complete EPSS. Load tests shall be performed for a continuous period of not less than **90 minutes** or the documented time period recommended by the system's manufacturer. All required switches and equipment on the emergency circuits should be operational for the duration of the test.

2.4.4 Smoke Control Systems.

2.4.4.1 Test of Systems.

Smoke control systems (stair pressurization and smoke removal systems) shall be inspected and tested not less than **every 5 years** in accordance with the City of Houston *Construction Code* specifications in effect at the time of the system's installation and acceptance. Operational testing shall include all equipment such as initiating devices, fans, controls, doors, and windows. Systems shall also be tested under standby power conditions. An approved licensed mechanical or HVAC contractor shall perform and document the test.

2.4.4.2 Test of Automatic Fans and Dampers.

Operation of all automatic fans and dampers connected to building fire alarm systems shall be tested **annually** in conjunction with fire alarm system tests. Results shall be included with the fire alarm system and test reports.

Section 2.5 – Water Based Fire Protection Systems

2.5.1 Automatic Wet-Pipe Sprinkler system.

2.5.1.1 Routine Inspection.

Approved contract personnel or building personnel, fully trained to perform such inspections or checks, may perform routine **monthly** and **quarterly** visual inspections and equipment checks in accordance with NFPA 25. A written record of **monthly** and **quarterly** inspections of system components shall be maintained.

2.5.1.2 Test of Systems.

All automatic wet-pipe sprinkler systems shall be inspected and tested **annually** in accordance with NFPA 25 and state requirements, and service tagged by a licensed automatic fire sprinkler service company.

Documentation of annual testing results and repairs of control valves shall be maintained and provided to the Fire Code Official upon request.

2.5.2 Automatic Dry-Pipe Sprinkler Systems.

2.5.2.1 Routine Inspection.

Contract personnel or approved building personnel, fully trained to perform such inspections or checks, may perform routine visual inspections and equipment checks in accordance with NFPA 25. A written record of **quarterly** inspections of system components shall be maintained.

2.5.2.2 Test of Systems.

All automatic dry-pipe sprinkler systems shall be inspected and tested **annually** in accordance with NFPA 25 and state requirements and service tagged by a licensed automatic fire sprinkler service company.

Documentation of annual testing results and repairs of control valves shall be maintained and provided to the Fire Code Official upon request.

2.5.2.3 Trip Tests.

"Trip test" of all dry-pipe valves shall be performed in accordance with NFPA 25.

1. **Partial "trip test"** – shall be performed **annually**.
2. **Full "trip test"** – shall be conducted at least **every 3 years**.

2.5.3 Standpipe Systems.

2.5.3.1 General.

The owner or owner's agent shall provide for the inspection, testing, and maintenance of wet and dry standpipe systems, hose connections pressure reducing valves and hose connection pressure reducing devices.

2.5.3.2 Wet Standpipe Systems.

Wet Standpipe Systems shall be subjected to a flow test for each zone of the wet standpipe system **every 5 years**. The 5-year system test requirement shall include wet standpipe systems drained to prevent freeze damage in buildings or structures that are not being occupied. An approved service company shall conduct flow tests in accordance with NFPA 25.

2.5.3.3 Dry Standpipe Systems.

Dry Standpipe Systems shall be subjected to a hydrostatic test **every 5 years** by an approved service company. Dry Standpipe systems shall be tested in accordance with NFPA 25. Required service tags will be placed at the main control valves and risers. Testing shall be conducted in accordance with NFPA 25. The 5-year system test requirement shall include wet standpipe systems drained to prevent freeze damage in buildings or structure that are not being occupied.

2.5.3.4 Hose Connection Valves.

Each hose connection valve shall be completely exercised through its full range and returned to its normal position at least **every 5 years**, to check for valve seizure, broken stems, leakage, or other conditions that might impair proper operation of the valves. Valves that are not pressure regulated and have water

pressure at greater than 150 psig shall have approved signs on, or adjacent to, the valves identifying them as **HIGH-PRESSURE** valves. Testing shall be conducted in accordance with NFPA 25. Documentation of testing results and repairs of hose valves shall be maintained and provided to the Fire Marshal upon request.

> **Exception:** Pressure Reducing Devices and Pressure Regulating Valves in accordance with this standard.

2.5.3.5 Hose Connection Pressure Regulating Valves.

Flow tests and service tagging shall be conducted by an approved service company on all hose connection pressure regulating valves (PRV) **every 5 years** in accordance with the manufacturer's guidelines and NFPA 25. Flow pressures should be maintained according to the City of Houston *Building Code* in effect during construction.

Special attention shall be given to the complete exercising of each PRV through its full range, and return to its normal position, to check for valve seizure, broken stems, leakage, or other conditions that might impair proper operation of the valves. PRV shall be reset and relocked as appropriate by an approved service company.

2.5.3.6 Hose Connection Pressure Reducing Devices.

Hose connections valves and hose rack assembly pressure valves having pressure reducing devices (PRD), such as washer-type flow restrictors, shall be inspected **annually** by an approved service company to verify that the devices are in place. This inspection may be in conjunction with annual fire hose servicing and tagging. Flow tests shall be conducted **every 5 years** to verify correct flow and pressures are provided **at each valve**. Testing shall be conducted in accordance with NFPA 25.

2.5.3.7 Hose Rack Assembly Pressure Regulating Valves.

Flow tests and service tagging shall be conducted by an approved service company on all hose rack assembly pressure-regulating valves (PRV) **every 5 years** in accordance with the manufacturer's guidelines and NFPA 25.

Special attention shall be given to the complete exercising of each hose rack PRV through its full range, and return to its normal position, to check for valve seizure, broken stems, leakage, or other conditions that might impair proper operation of the valves. PRV shall be reset and relocked as appropriate by an approved service company.

2.5.4 Fire Department Connections.

2.5.4.1 Inspection.

Fire department connections (FDC) shall be inspected **quarterly** by building personnel in accordance with this standard and NFPA 25. Inspections should check for: missing protective caps or covers, damaged hose couplings, couplings not operating freely, missing or deteriorated coupling thread gaskets, the presence of foreign material that might interfere with operation of system, water in the piping

that might indicate possible check valve leaks, and missing standpipe or sprinkler connection identification signs. A written record of all quarterly inspections should be maintained.

2.5.4.2 Tests.

A licensed service company shall conduct hydrostatic and flow tests of all fire department connections, piping and check valve assemblies, not less than **every 5 years** in accordance with NFPA 25. Upon request, the licensed service company shall make available records to the Fire Code Official or designee.

2.5.4.3 Signs.

Approved signs constructed of weather-resistant materials, with not less than one-inch high legible block lettering on a highly contrasting background, shall be placed on or immediately adjacent to all fire department connections and provide the following information:

1. Type of system – STANDPIPE, SPRINKLER, STANDPIPE / SPRINKLER, DRY PIPE SPRINKLER, etc.
2. Which building or structure, or which portion, zone, and floors of the building or structure the FDC serve.

   Ex: Floors B1-12; Levels 1-8; High Zone Flr 21-40; etc.
3. On standpipe and combination standpipe/sprinkler systems – whether there are pressure regulating valves (PRV) or pressure reducing devices (PRD) on the system. System pressure shall also be indicated on all wet standpipe and combination standpipe/sprinkler systems.

   Ex.

NO PRV/PRD	(System Pres. 100 PSI)
PRD Levels 1-7	(System Pres. 150 PSI)
PRV Floors 1-10	(System Pres. 175 PSI)

2.5.5 Fire Pumps.

2.5.5.1 Diesel Engine Driven Pumps.

Operating test of diesel engine driven fire pumps shall be conducted **weekly** without water flowing. This test shall be conducted by allowing automatic starting of the pump to occur and allowing the pump to run a minimum of **30 minutes**. This test may be performed by authorized building or contract personnel in accordance with the manufacturer's guidelines and NFPA 25. A written record of all weekly tests shall be maintained.

2.5.5.2 Electrically Driven Pumps.

Operating test of electrical motor driven fire pumps shall be conducted **weekly** without water flowing. This test shall be conducted by allowing automatic starting of the pump to occur and allowing the pump to run a minimum of **10 minutes**. This test may be performed by authorized building or contract personnel in accordance

with the manufacturer's guidelines and NFPA 25. A written record of all weekly tests shall be maintained.

2.5.5.3 Fire Pump Tests.

A flow test at pressure shall be conducted on fire pumps **annually**, recording churn, pump rated flow and 150 percent rated flow. Flow tests shall be performed by an approved service company in accordance with manufacturer's guidelines and NFPA 25, and service tags shall be provided in accordance with this standard. Fire pumps not meeting pump nameplate data shall be reported to the property management and facility owner.

2.5.6 Water Supplies.

2.5.6.1 Gravity Tanks.

Periodic inspections by approved building personnel shall be conducted in accordance with NFPA 25. A written record of inspections shall be maintained.

An approved service company shall flow test gravity tank and piping systems and perform an interior inspection at least **every 5 years** in accordance with NFPA 25 and provide a written report of the inspection findings.

2.5.6.2 Water Storage Tanks.

Periodic inspections by approved building personnel shall be conducted in accordance with NFPA 25. The tank shall be maintained full or at the designed water level. A written record of inspections shall be maintained and made available upon request.

An approved service company shall flow test water tanks and piping systems and perform an interior inspection at least **every 5 years** in accordance with NFPA 25 and provide a written report of the inspection findings.

> **Exception:** Pressure tanks shall have interior inspection performed at least **every 3 years**.

Suction inlets and piping supplied from surface or subsurface sources other than approved gravity and water supply tanks should be inspected periodically by authorized building or contract personnel to ensure that inlet screens and piping are not obstructed or restricted so as to reduce required fire flows.

2.5.6.3 Private Fire Hydrants.

Private dry barrel and wet barrel fire hydrants and wall hydrants installed for fire department use shall be inspected and flow tested by an approved service company **annually**. Testing shall be conducted in accordance with NFPA 25, and a written report of the test findings and deficiencies shall be provided.

Section 2.6 – Standpipe Fire Hose

2.6.1 Hose Inspection.

Standpipe hose shall be inspected and service tagged **annually** by a licensed service company. Hoses shall be removed from their racks or reels, hose gaskets shall be inspected for presence, tight fit, and lack of deterioration, hose connection valves shall be checked for thread damage, operating handle presence or damage, and the hoses shall be re-racked, in accordance with NFPA 1962.

2.6.2 Pressure Testing.

A licensed service company shall pressure test standpipe hose not less than **every 3 years** in accordance with manufacturer's guidelines and NFPA 1962.

Exceptions:

1. New hose shall be pressure tested after the 5th year of installation, then every 3 years thereafter.
2. Unlined fire hose shall be replaced with an approved lined fire hose when pressure testing is required.

Section 2.7 – Fire/Smoke Doors and Dampers

2.7.1 Inspection of Listed Fire Doors, Smoke Partition Doors, Fire Shutters, Fire Windows, and Horizontal Sliding Fire/Smoke Doors.

Fire doors, smoke partition doors, fire shutters, fire windows, and horizontal sliding fire/smoke doors shall be inspected at least **quarterly**. Inspections should include the following:

1. Guides and bearings should be well lubricated.
2. Doors normally held open by automatic closing devices shall be operated to assure their proper operation. Closing devices and coordinators shall be adjusted to assure that the doors close and latch properly. (Smoke control doors are generally not required to latch.) All power operated horizontal sliding fire/smoke doors shall be cycled fully with all door devices tested to ensure proper operation.
3. Tinclad and Kalamein doors should be inspected for dry rot.
4. Chains and cables shall be regularly inspected for excessive wear and stretching. Track guides shall be checked for obstruction, distortion, or damage. Rope, non-approved chain, or cable shall not be installed or used on fire doors.
5. Fusible links shall be checked for paint or other non-approved coating materials. The owner or building management shall have any painted or coated links replaced.
6. Door rollers shall be checked for paint, dirt, or grime buildup. Paint or buildup of foreign material on rollers shall be removed as necessary to assure that rollers will not bind.

7. Doors shall be checked for holes, modifications, or other damage that would violate their listing or fire rating.
8. Doors, windows, or shutters shall be checked to see that they are free of any obstruction that could interfere with proper operations.

Inspections may be performed by authorized building or contract personnel in accordance with the manufacturer's guidelines and NFPA 80. A written record of all inspections shall be maintained.

2.7.2 Fire Door Testing.

At least **annually**, all sliding and rolling fire doors, shutters, and windows shall be allowed to close completely to check operations of the guides and rollers, and to ensure the doors have adequate clearance to close completely. Chains and cables should be adjusted as needed. An approved service company shall perform any required repairs of fire doors or assemblies. A written record of all inspections and repairs shall be maintained. Horizontal sliding doors that are power operated and permitted as components of means of egress, shall have their integral standby supply inspected and tested at least **annually** using manufacturer's guidelines.

2.7.3 Fire and Smoke Damper Inspections.

Each fire and smoke damper assembly located in mechanical, electrical, or air handler rooms or spaces, in firewalls or rated occupancy separation walls, or in floors, or constituting part of a smoke evacuation system, shall be visually inspected at least **annually** to verify that its operations are not obstructed or impaired. Authorized building or contract personnel may perform visual inspections. A written record of inspections shall be maintained. Any dampers that are not accessible for inspection shall be noted in the inspection report.

2.7.4 Damper Testing.

An approved HVAC company shall conduct a full-function test and maintenance on all fire dampers at least **every 4 years**. All testing and maintenance shall be conducted in accordance with this standard, manufacturer's guidelines, and NFPA 90A and 92A. Testing shall include removal of fusible links, where applicable, to check that damper vanes, blades, or shutters full close and that latch mechanisms, if provided, operate properly. Where possible dampers shall be operated with normal system airflow to ensure that they close and are not held open by the airstreams.

Exceptions:

1. Electrical and/or pneumatic operated fire smoke dampers shall be maintained, cycled, and tested not less than **every 6 months**.
2. Ceiling (radiation) dampers. (See Section 2.7.5)

2.7.5 Ceiling (Radiation) Dampers.

Where large numbers of ceiling (radiation) dampers have been installed as integral parts of a fire rated ceiling assembly, a minimum of **10 percent** of the total number of dampers per floor in multi-story occupancies, or per fire zone in single story occupancies, shall be performed **annually**. If any of the dampers tested fail, then all remaining dampers on that

floor or fire zone shall be tested that cycle. Testing shall be performed by an approved HVAC company. Documentation of test results shall be maintained, including identification of which dampers have been tested in each cycle.

Section 2.8 – RESERVED.

Section 2.9 – Special Fire Suppression Systems

2.9.1 Commercial Kitchen Hood Systems.

All vent hood fire suppression systems installed in commercial kitchens shall be inspected and service tagged not less than **every 6 months**, and after any activation of the system, by an approved fire protection equipment company. Inspections shall be in accordance with manufacturer's guidelines and NFPA 17 and 17A. Effective January 01, 2008, per State regulation, all commercial kitchen hood fire protection systems must meet UL 300 standards.

Additionally, all commercial kitchen vent hoods, exhaust ducts, exhaust fans, and appurtenances shall be cleaned and inspected by approved personnel and in accordance with manufacturer's guidelines, as often as necessary to prevent excess grease accumulations.

2.9.2 Class "K" Portable Fire Extinguishers.

Class "K" portable fire extinguishers, installed for use in the protection of cooking areas within commercial kitchens, shall be inspected, tested, service tagged **annually** and maintained in accordance with manufacturer's guidelines and NFPA 10 and 17.

2.9.3 Fixed Dry Chemical Extinguishers Systems.

Fixed dry chemical extinguishing systems ~~where~~ installed for protection of process hazards such as, but not limited to, dip tanks, spray booths, chemical hood systems or laboratory hood systems shall be subjected to an actuating test of the system (discharge of the agent is not required) and service tagged **every 6 months** by a licensed fire protection equipment service company. Inspection and testing shall be in accordance with manufacturer's guidelines and NFPA 17.

2.9.4 Fixed Wet Chemical Extinguishing Systems.

Fixed wet chemical extinguishing systems ~~where~~ installed for protection of process hazards such as, but not limited to dip tanks, spray booths, chemical hood systems or laboratory hood systems shall be subjected to an actuating test of the system (discharge of the agent is not required) and service tagged **every 6 months** by a licensed fire protection equipment service company. Inspection and testing shall be in accordance with manufacturer's guidelines and NFPA 17.

2.9.5 Water Mist Extinguishing Systems.

Water mist extinguishing systems shall be inspected, tested, and service tagged **annually** by a licensed fire protection equipment company in accordance with manufacturer's guidelines and NFPA 750.

2.9.6 Total Flooding Systems.

Enclosure integrity for total flooding systems shall be verified **annually** by a licensed fire protection equipment company, using approved blower fan pressurization units, to locate and seal any significant air leaks that could cause failure to hold specific agent concentrations levels. Documentation of enclosure integrity testing and results shall be maintained.

2.9.6.1 Carbon Dioxide (CO_2) Extinguishing Systems.

Carbon dioxide (CO_2) extinguishing systems shall be inspected, tested, and service tagged **annually** by a licensed fire protection equipment company in accordance with manufacturer's guidelines and NFPA 12.

2.9.6.2 Halon 1301 Extinguishing Systems.

Halon 1301 extinguishing systems shall be inspected, tested, and service tagged **annually** by a licensed fire protection equipment company in accordance with manufacturer's guidelines and NFPA 12A.

2.9.6.3 Clean Agent Extinguishing Systems.

Clean agent extinguishing systems shall be inspected, tested, and service tagged **annually** by a licensed fire protection equipment company in accordance with manufacturer's guidelines and NFPA 2001.

Appendix A – Additional Requirements

Section 2.1 – Natural Gas Piping Leakage Test

2.1.1 Where Required.

All Assembly, Educational, Institutional, and Residential R-1, R-2, and R-4 occupancies (as defined in the City of Houston *Building Code*) shall be subjected to a test of the building's natural gas systems to check for leakage at least **every 5 years**.

Exceptions:

1. Facilities where **annual** tests are required by state or other regulatory agencies.
2. The Fire Code Official may require a gas test in **any** occupancy where it is suspected or believed that a gas leak or related hazard exists.

2.1.2 Permits.

All gas pressure tests require permitting by the City of Houston *Construction Code*. "Gas Test" permits shall be obtained, and gas pressure tests conducted, by a licensed plumber or approved gas equipment service company. Copies of the City of Houston "Gas Test" permit and final approval form shall be obtained from the plumber or service company and maintained on the premises. Permitting and testing information may be obtained from the Houston Public Works Code Enforcement Branch Plumbing Section.

Section 2.2 – Boiler Inspections

2.2.1 Inspections.

Inspection of a building's boiler systems shall be conducted in accordance with regulation and standards of City of Houston and state regulatory agencies as to requirements and frequencies. Approved boiler permits shall be maintained on premises.

2.2.2 Gas System Leakage Test.

Gas supply systems for boilers within any occupancy shall be subject to periodic inspections and tests in accordance with Section 2.1 of this appendix.

Section 2.3 – Elevator Inspection, Permits, Keys

2.3.1 Inspection and Permits.

All egress elevators, man-lifts, and hoistway lifts, as defined by the Houston *Building Code,* shall be inspected at least **annually** and maintained in safe operating condition by approved elevator maintenance companies in accordance with requirements set forth by the Houston Public Works and state regulatory agencies. All elevators equipped with Emergency Fire Service and/or Independent Service shall have such functions tested **monthly**. The monthly elevator inspection reports should certify the proper operation of automatic recall, firefighter control, and elevator car emergency phone or address system.

Care should be given to ensuring the legibility of lettering on or around the required **RED** bevel ring around each car's firefighter key switch. Firefighter key operation positions for the firefighter key switch shall be correctly indicated on or around the bevel ring and verified by operation of the elevator in fire service using the firefighter keys provided, in the positions indicated.

Special attention shall be paid to the Elevator Operating Permits or current Inspection Report, which are required by the City of Houston *Building Code* to be posted in each car or within 10 feet of the elevator call buttons. Documentation of the monthly elevator testing and the verification of firefighter keys and firefighter key switch operation shall be made available to the Fire Marshal.

Elevator inspection permit information may be obtained from the Houston Public Works Code Enforcement Branch Elevator Inspections Section.

2.3.2 Elevator Fire Service Keys/Tools.

Elevator keys and tools for fire department emergency use shall be provided, labeled, and maintained at all times in accordance with LSB Standard No. 06, "Fire Depository Boxes."

> **Exception:** "Independent Service" keys shall not be placed in the Fire Depository Box but shall be made available for fire department use during medical emergencies and/or elevator entrapment rescues.

2.3.3 "Independent Service" Elevator Keys.

"Independent Service" keys shall not be placed in the Fire Depository Box. In buildings where 24-hour on-site building engineering/security is provided, "Independent Service" keys may be kept readily available for Fire Department use upon request. Buildings without 24-hour on-site building engineering/security shall provide a separate key box near the Fire Depository Box location, with the key box labeled "EMS Elevator Keys" and secured in an approved manner.

At least two "Independent Service" keys shall be available to the Fire Department for elevator entrapment and/or EMS events:

1. Each key will have a 7/8-inch (13 mm) split key ring through it attaching the key to the appropriate black colored plastic laminate identification tag.
2. If the "Independent Service" function is located behind a locked elevator car panel, Panel Access keys, with orange colored plastic laminate identification tags shall be provided along with the "Independent Service" keys.

2.3.4 Elevator Car Numbers Posted.

The elevator car number shall be posted conspicuously at the designated recall floor, on the outside wall or upper lobby door jamb of each car, no more than two inches below the top of the door frame (header), and in block font not less than **2** inches (50 mm) in height, to facilitate elevator rescue.

2.3.5 Elevator Car Motor Mainline Disconnect Switches Accessible and Labeled.

Each car motor mainline disconnect switch in all building elevator equipment rooms shall be readily accessible and clearly labeled with the corresponding elevator car number.

2.3.6 Elevator Motor "Lock-out and Tag-out" Equipment.

Lock-out/Tag-out equipment appropriate to all building elevator mainline disconnect switches shall be provided in all building elevator mechanical rooms to lock-out elevator car motor mainline disconnect switches in the event of emergency elevator entrapment rescue operations. The lock-out/tag-out sets shall be readily recognizable, accessible, and properly labeled.

- For 1 to 3 elevators, there shall be provided at least one (1) lock-out/tag-out set.
- For 4 to 6 elevators, there shall be provided a minimum of two (2) lock-out/tag-out sets.
- For 7 or more elevators, there shall be provided at least three (3) lock-out/tag-out sets.

Section 2.4 – Fire Escape Stairways and Ladders

2.4.1 Inspection.

Approved building or contract personnel shall **quarterly** inspect fire escape stairway systems and ladders installed in accordance with the City of Houston *Construction Codes* for signs of: severe rust damage; damaged or missing parts; loose anchorage; inoperative or damaged counterbalanced stairs; balcony, railing, or step damage; obstructed access to and exiting from the escape stairway or ladder; and any hazardous condition that would affect safe usage of the fire escape stairway or ladder.

2.4.2 Service and Maintenance.

When more thorough inspection or servicing are required for fire escapes, an approved mechanical engineering company or company authorized to install and service fire escape systems shall perform the required inspection or servicing. The Fire ~~Marshal~~ Code Official is authorized to required inspection and repair of, and/or a technical report on, any fire escape stairway or ladder that presents, or appears to present, a hazard as a component of a building's or structure's required exiting system. A written record of all quarterly inspections and repairs to the system shall be maintained.

In accordance with the City of Houston *Construction Codes* fire escape stairways and balconies shall support the dead load plus a live load of not less than 100 pounds per square foot. All stair and balcony railing shall support a horizontal force of not less than 50 pounds per linear foot of railing. Fire escape ladders shall be designed and connected to the building to withstand a horizontal force of 100 pounds per linear foot, and each rung shall support a concentrated weight load of 500 pounds placed anywhere on the rung.

References

1. City of Houston *Construction Code*.
2. Life Safety Bureau (LSB) Standard No. 01, “Installation and Maintenance of Portable Fire Extinguishers.”
3. Life Safety Bureau (LSB) Standard No. 06, “Fire Depository Boxes.”
4. Texas Insurance Code, Chapter 6001 (formerly Article 5.43-1), Fire Extinguisher Service and Installation; 28 TAC Subchapter E (2009) (Fire Extinguisher Rules) .
5. National Fire Protection Association (NFPA) Publication, “Fire Protection Systems – Inspection, Texas and Maintenance Manual.”
6. National Fire Protection Association (NFPA) Standard No. 10, “Portable Fire Extinguishers.”
7. National Fire Protection Association (NFPA) Standard No. 12, “Carbon Dioxide Extinguishing Systems.”
8. National Fire Protection Association (NFPA) Standard No. 12A, “Halon 1301 Fire Extinguishing Systems.”
9. National Fire Protection Association (NFPA) Standard No. 17, “Dry Chemical Extinguishing Systems.”
10. National Fire Protection Association (NFPA) Standard No. 17A, “Wet Chemical Extinguishing Systems.”
11. National Fire Protection Association (NFPA) Standard No. 25, “Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems.”
12. National Fire Protection Association (NFPA) Standard No. 70, “National Electrical Code.”
13. National Fire Protection Association (NFPA) Standard No. 72, “National Fire Alarm Code.”
14. National Fire Protection Association (NFPA) Standard No. 80, “Fire Doors and Windows.”
15. National Fire Protection Association (NFPA) Standard No. 90A, “Installation of Air-Conditioning and Ventilating Systems.”
16. National Fire Protection Association (NFPA) Standard No. 92A, “Smoke-Control Systems.”
17. National Fire Protection Association (NFPA) Standard No. 110, “Emergency Power Supply Systems.”
18. National Fire Protection Association (NFPA) Standard No. 750, “Water Mist Fire Protection Systems.”
19. National Fire Protection Association (NFPA) Standard No. 1962, “Care, Use, and Service Testing of Fire Hose, Including Couplings and Nozzles.”
20. National Fire Protection Association (NFPA) Standard No. 2001, “Standard on Clean Agent Fire Extinguishing Systems.”
21. American Society of Mechanical Engineers (ASME) Standard No. A17.3, “Safety Code for Elevators and Escalators.”

All reference materials used under this Life Safety Bureau standard shall be in accordance with the most current adopted City of Houston *Construction Code*.