

HOUSTON FIRE DEPARTMENT LIFE SAFETY BUREAU (LSB)

LSB STANDARD 02, REV 03

INSPECTION AND TESTING OF FIRE PROTECTION AND LIFE-SAFETY EQUIPMENT

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Approved:

Richard W. Galvan, Fire Marshal

LIFE SAFETY BUREAU (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 BOARD OF APPEALS.

**LSB STANDARD 02, Rev 03
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AND LIFE-SAFETY EQUIPMENT**

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LSB STANDARD 02, Rev 03
INSPECTION AND TESTING OF FIRE PROTECTION
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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*, and as may be required by the Fire Marshal.

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 a **minimum**.

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, other City of Houston, state or federal regulatory agencies standards 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 apply.

This standard is subject to periodic review and updates, to accommodate changes in local need or requirement, or change in nationally recognized standards, in related technology, or where required by 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, which either alone or as a system, provided to assist in the extinguishment of fire, and to limit the spread of fire and smoke, either 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.

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, either 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 a fire protection or life-safety system is available and will operate. It is intended to give reasonable assurance that the equipment will be operable in the proper manner that it was designed or installed for. This is done by seeing that it is in its designated place, that it 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 system’s equipment. It is intended to give maximum assurance that the equipment will operate effectively and safely. It includes a thorough examination and any necessary repair or replacement. It will normally reveal if other testing, repair or modification is required.

2.2.5 Servicing

Includes one or more of the following: (1) maintenance, (2) repair, and (3) routine on-site testing.

2.2.6 Service Tags

Tags, either hang-type tags or adhesive stickers, approved for such use by State of Texas Fire Marshal’s Office, shall be affixed to fire protection and life-safety equipment or systems in such a position as to permit convenient inspection and not hamper its actuation or operation. The tag/sticker shall provide date service performed; name & State issued Certificate of registration number of the service/inspection company; the name, license number and signature of the person who performed the service/inspection,; if not in proper operational condition, list the emergency impairment or impairments NOT IN COMPLIANCE with NFPA Standards.

SECTION 2.3 ----- GENERAL REQUIREMENTS

2.3.1 Servicing, testing, and maintenance

Qualified personnel approved by the Fire Marshal shall conduct all servicing, testing, repair, maintenance 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 manufacturer's representative or authorized service personnel. All reference to the servicing, testing or maintenance 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

After any service, a service tag must be completed in detail, indicating all work that has been done, and then attached to the portable or fixed system in such a position as to permit convenient inspection and not hamper its actuation or operation. The signature of the licensee on the service tag certifies that the service performed complies with requirements of law. A new service tag, yellow tag or red tag, as applicable, must be attached each time service is performed.

2.3.2.1 Red Tags

If impairments are found which make a portable extinguisher or fixed system unsafe or inoperable, the owner or his representative must be notified in writing of all impairments. The registered firm shall notify the owner or his representative immediately and must also notify the Fire Marshal's Office within 24 hours by phone, fax, or e-mail describing the impairments or deficiencies. A copy of the written notice to the owner shall be submitted to the Fire Marshal's Office within 3 business days.

A completed red tag must be attached to indicate that corrective action or replacement is necessary. The signature of the licensee on the tag certifies that the impairments listed indicate that the equipment is unsafe or inoperable. A service tag must not be attached until the impairments have been corrected or the portable extinguisher or fixed system replaced and the extinguisher or fire extinguisher system reinspected and found to be in good operating condition.

Red tags must be the same size as service tags. A red tag may be removed only by an authorized employee of a registered firm who has corrected the impairments and certified the service, an employee of the state fire marshal's office, or the Houston Fire Marshal's Office.

2.3.2.2 Yellow Tags

After any service of a pre-engineered fixed fire extinguishing system installed in accordance with NFPA 17, NFPA 17A or NFPA 96 of the adopted standards for the protection of commercial cooking areas, if it is determined that the system is not in compliance with the minimum requirements of Underwriters Laboratories, Inc., Standard 300, "Fire Testing of Fire Extinguishing Systems for Protection of Restaurant Cooking Area" (UL 300), a yellow tag must be completed in detail indicating all work that has been done, and then attached to the system in such a position as to permit convenient inspection and to not hamper its actuation or operation. The owner or the owner's representative must be notified in writing that the system does not comply with UL Standard 300 and that the system may not extinguish a typical fire, that a red tag shall be attached to the system after January 1, 2008, and that the owner should consider replacing or upgrading the system before that time. A copy of the written notice to the owner shall be postmarked, e-mailed, faxed, or hand delivered to the Fire Marshal's Office within 5 business days.

The signature of the licensee on the tag certifies that the service performed complies with requirements of law.

The yellow tag shall be attached instead of a service tag. Yellow tags must be yellow in color. A yellow tag may be removed only by an authorized employee of a registered firm who has corrected the impairments and certified the service, an employee of the state fire marshal's office, or the Houston Fire Marshal's Office.

2.3.3 New Installation

After an installation has been completed, an installation label must be affixed to the control head or panel of the fixed fire extinguisher system and an installation certificate form shall be sent to the state fire marshal's office. The signature of the licensee on the label certifies that the system has been installed according to law. Labels shall be five inches in height and four inches in width and shall be of the gum label type. They 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 otherwise required by the *Fire Code*, *Construction Codes* or *City Ordinance*, or by the Fire Marshal or other regulatory agencies.

2.3.5 Inspection and maintenance records

All logs or records of inspection, testing, maintenance and major repairs of fire protection and life-safety equipment and systems shall be maintained on file for not less than **3 years**, and made available to fire department 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 completion of the next inspection and testing cycle 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 Marshal'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 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 Marshal upon request. No fire protection or life-safety equipment or system prescribed by the *Fire Code* or *Construction Codes* shall be placed permanently out of service unless prior written approval is obtained from the Fire Marshal.

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. Where an approved electronic exit egress locking device is installed on an exit egress door, in accordance with the *Construction Codes*, the fire alarm system, relay devices to locking device and 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 do test of all of the fire alarm system annunciator devices not less than **every 3 years**. Written documentation shall be provided that audibility meets requirements as set forth in NFPA 72.

2.4.2 Emergency Lighting Systems

2.4.2.1 General

Provide for the testing of emergency lighting systems that are part of an approved exit system and shall include, but is not limited to: lighted exit signs, stairway lighting, and egress lighting, where required both inside and outside of a building or structure.

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 test 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, *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 repaired or replaced 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

Provide for the testing of required emergency power supply systems. EPSS shall be maintained to ensue 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. These systems provide emergency power for continuous operation of, but are 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 shall be provided on each automatic transfer switch that simulates failure of the primary electrical power source and the transfer of the load to the EPSS. An approved independent licensed master electrician or licensed electrical service company shall check proper operation of all automatic transfer switches and required devices on

emergency circuit(s). Written documentation of test results shall be provided, including any repairs required and not completed.

2.4.3.4 Manual operation of Transfer Switch

Instruction and equipment shall be provided for safe manual non-electric transfer in 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 test 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 circuit(s) 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 City of Houston *Construction Codes* specifications in effect at time of system's installation and acceptance. Operational testing shall include all equipment such as initiating devices, fans, controls, doors and windows. System shall also be tested under standby power conditions. An approved licensed mechanical or HVAC contractor shall perform and document the test. (See Appendix B, Table 4-1)

2.4.4.2 Test of automatic fans and dampers

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

SECTION 2.5 ---- WATER BASED FIRE PROTECTION SYSTEMS

2.5.1 Automatic Wet-Pipe Sprinkler Systems

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.

Special attention shall be given to the complete exercising of each control valve 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. Reset and relocked as appropriate. Documentation of annual testing results and repairs of control valves shall be maintained and provided to the Fire Marshal 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.

Special attention shall be given to the complete exercising of each control valve 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. Reset and relocked as appropriate. Documentation of annual testing results and repairs of control valves shall be maintained and provided to the Fire Marshal 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

Provide for the inspection, testing, and service tagging of wet and dry standpipe systems, hose connections pressure reducing valves and hose connection pressure reducing devices.

2.5.3.2 Wet Standpipe system

Standpipe systems that contain water in the piping at all times. A flow test shall be conducted for each zone of the standpipe system **every 5 years**. An approved service company shall conduct flow tests with required volume of water at the system's design pressure and provide required service tagging of the system at the main control valves and risers. Testing shall be conducted in accordance with NFPA 25.

2.5.3.3 Dry Standpipe system

Standpipe systems that do not normally contain water in the piping and have to be supplied with water from an outside source. An approved service company performing such testing shall conduct hydrostatic test on the standpipe system **every 5 years**. System shall be tested with a pressure of not less than 200 psig for 2 hours or at 50

psig over the maximum designed working pressure of the system. Required service tagging of the system at the main control valves and risers shall be provided. Testing shall be conducted in accordance with NFPA 25. The 5-year system test requirement shall include wet standpipes system drained to prevent freeze damage in buildings or structures that are not being occupied.

2.5.3.4 Hose Connection Valves

Each hose connection valve completely exercised through its full range and return 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**, and shall be in accordance with the manufacturer's guidelines and NFPA 25. Flow pressures should be maintained according to the Building Code in affect during construction.

Exception: In buildings that are 100 percent sprinkled, test **10 percent** of all valves on the system **annually**; if any failures, all remaining untested valves on system shall be tested. A written record shall be maintained on which devices have been tested and approved.

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. Reset and relocked as appropriate.

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**, and shall be 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 steams, leakage or other conditions that might impair proper operation of the valves. Reset and relocked as appropriate.

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 could 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** (Testing shall be conducted in conjunction with the standpipe system 5-year test). In accordance with this standard, private fire main piping system from the FDC up to the sprinkler system riser control valves, shall be hydrostatically tested with a pressure of not less than 200 psig for two hours, or at 50 psig over maximum designed working pressure of the system. Where FDC's serve a standpipe system **ONLY**, testing shall be conducted in accordance with the requirements for standpipe systems as set forth in Section 2.5.3 of this standard.

2.5.4.3 Signs

Approved signs 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 what portion, zone, and floors of the building or structure the FDC serve.
 - i. 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 pressures shall also be indicated on all wet standpipe and combination standpipe/sprinkler systems.

Examples: 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 the pump shall be run a minimum of **30 minutes**. Run test may be performed by authorized building or contract personnel and shall be 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 the pump shall run a minimum of **10 minutes**. This test may be performed by authorized building or contract personnel and shall be 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 should be conducted in accordance with NFPA 25. A written record of inspections should 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 should be conducted in accordance with NFPA 25. The tank shall be maintained full or at the designed water level. Sediment shall be drained or flushed from the tank **semiannually**.

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 insure 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 inspected - for presence, tight fit and lack of deterioration, hose connection valves checked – for thread damage, operating handle presence or damage, and the hoses 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 Standard No. 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 bearing 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. Ropes, other non-approved chain, or cable replacements shall not be installed or used on fire doors.

5. Fusible links shall be checked for paint or other non-approved coating materials. Replace any painted or coated links.
6. Door rollers shall be checked for paint, dirt or grime buildup. Remove paint or buildup 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 and shall be 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 make sure 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 in mechanical, electrical or air handler rooms and spaces, in firewalls or rated occupancy separation walls, or in floors, or part of a smoke evacuation system, shall be visually inspected at least **annually** to verify that their 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, manufacture's guidelines and NFPA 90A and 92A. Testing shall include removal of fusible links (where applicable) to check that damper vanes, blades or shutters fully close and that latch mechanism (if provided) operate properly. Dampers should (where possible) 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 part of a fire rated ceiling assembly, a minimum of **10 percent** of the total number of

dampers per floor in multi-story, 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 area shall be tested that cycle. Testing shall be performed by approved HVAC company. Documentation of test results shall be maintained, including identification of which dampers have been tested in each cycle.

SECTION 2.8 ---- PORTABLE FIRE EXTINGUISHERS

2.8.1 Installation

Portable fire extinguishers shall be provided and installed in accordance with LSB Standard 01, 'Installation and Maintenance of Portable Fire Extinguishers', and NFPA 10, 'Portable Fire Extinguishers'.

2.8.2 Fire Extinguisher Inspections

Fire extinguishers shall be inspected and service tagged **annually** by a licensed fire protection equipment service company, or by facility personnel where approved by the Fire Marshal. Inspection and tagging of fire extinguishers shall be in accordance with the manufacturer's guidelines and NFPA 10, 'Portable Fire Extinguishers'.

Exception: Where Occupancy Group-R 'Garden-style' apartment units are provided with a 1-A, 10-B:C fire extinguisher in accordance with LSB Standard 01, the fire extinguishers in each unit need not be inspected nor tagged by a service company. These fire extinguishers should be periodically checked by the tenant to see that the gauge on the fire extinguisher shows it to be charged. Any tenant unit fire extinguisher that shows a loss of pressure should be returned to property management and exchanged for one that indicates proper pressures.

2.8.3 Hydrostatic Testing

Fire extinguishers shall have hydrostatic tests in accordance with the manufacturer's guidelines and NFPA 10, 'Portable Fire Extinguishers'. (See Appendix B, Table 8-1)

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 guideline, as often as necessary to insure against 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 extinguishing systems

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

2.9.5 Water Mist extinguishing systems

Water Mist extinguishing systems should be inspected and tested and service tags affixed **annually** by an 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 (CO₂) extinguishing systems

Carbon Dioxide (CO₂) extinguishing systems shall be inspected and tested, and service tags affixed **annually** by an 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 and tested, and service tags affixed **semi annually** by a licensed fire protection equipment company, in accordance with manufacturer's guidelines and NFPA 12 A.

2.9.6.3 Clean Agent extinguishing systems

Clean Agent extinguishing systems shall be inspected and tested, and service tags affixed at least **every 6 months** by an 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 *Building Code*, current edition, International Building Code as amended) shall have a test of the building's natural gas system(s), to check for leakage, at least **every 5 years**.

Exceptions: 1. Facilities where **annual** tests are required by state or other regulatory agencies.

2. Gas tests may be required by the Fire Marshal 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 Codes*. '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 City of Houston Building Inspection Division, Plumbing Section.

SECTION 2.2 ---- BOILER INSPECTIONS

2.2.1 Inspections

Inspection of building's boiler systems shall be in accordance with 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 elevators, man-lifts and hoistway lifts 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 City of Houston Public Works & Engineering Department 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 insuring 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 elevator in fire service using the firefighter keys provided, in the positions indicated.

Special attention shall be paid to the Elevator Operating Permits, which are required, by City of Houston *Construction Codes*, to be posted in each car or within 10 feet of the elevator Call Buttons. Where an elevator operating permit is not posted or available, then an “elevator upgrade” compliance extension granted by the City of Houston must be provided. A copy of the extension permission letters issued by the City of Houston, and the most current elevator inspection reports shall be made available to the Fire Marshal upon request. Documentation of the monthly elevator testing and the verification of firefighter keys and firefighters key switch operation shall be made available to the Fire Marshal.

Elevator Inspection permit information may be obtained from the City of Houston Public Works & Engineering Department, Building Inspection Division, Elevator 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 HFD LSB #6, “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 2 “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 jam 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 provide at least one (1) lock-out/tag-out set;
- For 4 to 6 elevators, a minimum of two (2) lock-out/tag-out sets;
- For 7 or more elevators, at least three (3) lock-out/tag-out sets:

2.3.7 Emergency Fire Service Car Door Open/Close features

Special attention shall be paid where “Emergency Fire service Car Door Open/Close” features are found in a building, the building management should contact the building’s authorized elevator service company to request a copy of the law, A.S.M.E 17.3, as adopted by the State of Texas, documenting that this function is no longer legal, and shall have the “Emergency Fire service Car Door Open/Close” features disconnected, and the switches either removed or covered over.

SECTION 2.4 ---- FIRE ESCAPE STAIRWAYS AND LADDERS

2.4.1 Inspection

Fire escape stairway systems and ladders installed in accordance with the *Construction Codes*, shall be inspected **quarterly** by approved building or contract personnel, 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 conditions that would effect safe usage of the escape stairway or ladder.

2.4.2 Service and maintenance

When more thorough inspection, servicing or repairs are required for fire escapes, an approved mechanical engineering company shall perform it or company authorized to install and service fire escape systems. The Fire Marshal is authorized to require 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 *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.

APPENDIX B - TABLES

Table 4-1 - Stairwell pressurization requirements:

NOTE: Beginning with the Building Code, 2006 edition, stairwell pressurization shall meet stated requirements.

Stairwell Pressurization Codes for the City of Houston				
		Prior to 12/23/81	12/23/81 to 3/23/83	3/23/83 And after
1.	Number of Doors Open	1	3	4
2.	Static Pressure Across Doors	0.05	0.05	----
3.	Ave. Velocity Across Doors (ft/min)	----	----	300
4.	Stair Pressure – Doors closed	----	----	0.15
5.	Maximum Force to Open Doors	25 lb.	25 lb.	35 lb.
6.	Maximum Door Closure Pressure	----	----	10 lb.
7.	Number Fans per Stairwell	1	1 or 2	2
8.	Fan Capacity	100%	50 or 100%	50%
9.	Fan Drive	----	Direct	Direct
10.	Fans on Emergency Power	Yes	Yes	Yes
11.	Supply Air Source	Outside Air	Outside Air	Outside Air
12.	Supply Air Inlets	1	2	2
13.	Supply Air Distribution	Stairwell	Chase	Chase
14.	Supply Air Outlet Spacing	----	3 Floors	3 Floors
15.	Supply Air Inlet Separation	----	50 ft Vertical	50 ft Vertical
16.	Fire Floor Exhaust	No	No	Yes
17.	Separation - Intake & Exhaust	----	----	20 ft
18.	Number of Exhaust Air Changes	---	---	6
19.	Stairwell leakage Rate	----	----	300 CFM/Floor at 0.3" S. P.
20.	Smoke Trap	No	No	Yes
21.	Doors Fully Open During Test	No	Yes	Yes

Table 8-1 - Fire extinguisher testing:

Fire Extinguisher Inspection, Test and Maintenance Summary

Extinguisher Type	Visual Inspection	Hydrostatic Test Interval - Years	Maintenance
Stored Pressure	Monthly	5	Annual
Wetting Agent	Monthly	5	Annual
Foam	Monthly	5	Annual
AFFF (aqueous film-forming foam)	Monthly	5	Annual
Dry Chemical	Monthly	5	Annual *
Carbon Dioxide	Monthly	5	Annual
Dry Chemical (stored pressure)	Monthly	12	Annual *
Dry Chemical (cartridge operated)	Monthly	12	Annual
Clean Agent	Monthly	12	Annual
Halon 1211	Monthly	12	Annual

* - Internal examinations not required for stored pressure dry chemical fire extinguishers

REFERENCES

1. Life Safety Bureau (LSB) Standard 01, "Installation and Maintenance of Fire Extinguishers", current version.
2. Life Safety Bureau (LSB) Standard 06, "Fire Depository Boxes", current version.
3. City of Houston *Codes*, all editions.
4. Texas Insurance Code Chapter 6001(formerly Article 5.43-1) Fire Extinguisher Service and Installation & 28 TAC §§ 34.500 the Fire Extinguisher Rules Published by State Fire Marshal's Office, Fall 2009
5. National Fire Protection Association (NFPA) Publication, "Fire Protection Systems – Inspection, Test & 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 Protections 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 shall be the most current published editions, unless otherwise indicated.