

Bellevue Fire Department Development Standards

*Access to Buildings
Address Standards
Water Supply
Fire Hydrants
Sprinkler Systems
Alarm Systems
Smoke Control*



Working together for a safer city



City of Bellevue Fire Department Development Standards



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INTRODUCTION

Pursuant to Section 104.1 of the International Fire Code, 2003 Edition, and Chapter 23.11 of the Bellevue City Code, the following specifications and standards pertain to the design, construction, and installation of built-in fire protection and life safety features required for buildings or property improvements. These supplemental rules, regulations, and interpretations include specifications based on requirements in the International Fire Code, 2003 Edition, the International Building Code, 2003 Edition, National Fire Protection Association (NFPA) standards and Bellevue City Code, and are intended to reduce ambiguities and confusion due to code interpretations.

Appendices 7, 8, and 11 are located directly after their respective chapters. Appendices A and B will be found at the end of this document.

Effective Date: July 1, 2004

1

ADMINISTRATIVE RULES

The following rules, regulations, and standards shall be observed in connection with all property within the City of Bellevue where fire protection facilities are required.

Applicable sections of the International Fire Code, 2003 Edition, are referenced at each section by the designation "Ref.:".

1.01 Definitions

1.01-1. The following definitions shall apply to these rules, regulations, and standards:

- a. "As-built plans" or "records documents" shall mean drawings, blueprints, sketches or similar renditions that accurately reflect the configurations of equipment or a system as it is installed on the premises. It shall also include dimensions.
- b. "Building Official or his/her designate" shall mean the City of Bellevue Building Official or any other employee he designates, including a building inspector, combination inspector, electrical inspector, or plans examiner.
- c. "Fire Chief or his/her designate" shall mean the City of Bellevue Fire Chief or any other officer he designates, including the Fire Marshal or Fire Prevention Officer.
- d. "Fire flow, Available" shall mean the quantity and duration of water supply available for fire protection in addition to the normal average consumption in the same area per City of Bellevue Utilities and Washington Administrative Code.
- e. "Fire flow, Required" shall mean the quantity and duration of water in gallons per minute measured at 20 psi needed to control an anticipated fire in a building or group of buildings, and shall consider the risk caused by the contents of the building or building and its proximity to adjacent structures or property lines.
- f. "Hazardous materials information vault" shall mean an approved, secure container, cabinet or vault for use only by the Fire Department that contains hazardous materials reference information for a specific property.
- g. "NFPA" shall mean the National Fire Protection Association.
- h. "UL" shall mean Underwriters Laboratories.

1.02 ***Submission of Plans***

1.02-1. Plans for property improvements shall be submitted in accordance with the rules and regulations and policies of the City of Bellevue Department of Community Development and the Bellevue Permit Center.

Plans for built-in fire protection systems shall be submitted to the City of Bellevue Permit Center in accordance with policies and procedures as developed and adopted by the Bellevue Permit Center. These systems include automatic fire sprinklers, standpipes, fire detection and alarm systems, fire-extinguishing systems, smoke control and similar equipment designed to detect, control or prevent the spread of fire.

1.02-2. Site plans for Fire Department review shall include the following information:

- a. Location and configuration of the property improvement, showing its relationship to the property lines and nearest streets, roadways, alleys or fire department access routes;
- b. Location of existing underground water mains, the diameter of those water mains, fire hydrant locations;
- c. Location, width, overhead obstructions and construction of all streets, roadways, alleys, bridges, fire lanes or fire department access routes on the site to be improved;
- d. Location of any temporary and/or permanent fences, walls, gates, arches, beams or any other security or ornamental features that may affect Fire Department access to and on the site during construction and occupancy;
- e. Location of any unusual or remarkable topographic features, landscaping, vegetation, or other features that may affect Fire Department access to and on the site during construction and occupancy.

EXCEPTION: When a project developer has submitted a preliminary site plan for review by the Fire Chief or his/her designate, the Fire Chief or his/her designate may waive any or all of the above requirements.

1.02-3. When a site plan is not required for a building permit, the Fire Chief or his/her designate shall be consulted regarding specifications for built-in fire protection facilities.

1.02-4. Plans and specifications (shop drawings and product data) for fixed fire protection systems, including but not limited to automatic fire sprinkler systems, fire extinguishing systems, fire detection and alarm systems, and fire standpipe systems, shall be submitted to the Fire Chief or his/her designate for review prior to installation.

Plans and specifications shall include at least the information specified in the tables of Appendix A, and shall include specifications manuals and manufacturers catalog displays of all components of the fixed fire protection system. Note that the Appendix contains “Checklists” that are to be completed and submitted with the appropriate drawings for certain types of systems.

1.03 *Action for Approval by the Fire Chief*

Ref.:
IFC 104.2.1

- 1.03-1 All plans submitted to the Fire Chief or his/her designate shall be reviewed and routed in accordance with city policy and procedure and approved, conditionally approved, or denied approval.

1.04 *Inspections and Occupancy*

Ref.: IFC 106

- 1.04-1. The developer shall be responsible for notifying the Fire Department for inspection of all fire protection facilities.

The Bellevue Fire Department is committed to providing next day service for all inspection requests. Generally, this means a 24-hour advance notice. However, during periods of unusually high workload, it is advisable to provide at least forty-eight (48) hours notice to the Fire Department to arrange an inspection.

In special cases, such as large or unusually complicated fire protection systems, the Fire Chief or his/her designate may require more than forty-eight (48) hours notice to arrange an inspection.

- 1.04-2. If, when inspecting or witnessing a test of a fire protection system the Fire Chief or his/her designate observes a violation of the building code or construction standards, he shall promptly notify the Building Official or his/her designate.

- 1.04-3. The Fire Chief or his/her designate shall not endorse the occupancy until he is satisfied the requirements for fire protection facilities have been met, and actual construction of all fire protection equipment has been completed in accordance with the approved plan, accepted standards or nationally recognized good practice.

If, at the time of this inspection, requirements specified during the plan review are not completed or other fire safety hazards are identified, the Fire Chief or his/her designate shall issue a correction notice to the person responsible for the premises. This correction notice shall specify the necessary corrections, and shall set forth a deadline for compliance. Upon completion of these corrections, the Fire Chief or his/her designate will endorse the occupancy and notify the Building Official.

- 1.04-4. Where a Certificate of Occupancy is not required, but fire protection requirements have been attached to a set of plans, the developer shall be responsible for notifying the Fire Department.

1.05 *Record Documents*

- 1.05-1. One copy of the approved site plan that has been reduced to 8 1/2 x 11 inches or 11 x 17 inches shall be provided to the Fire Department. The drawing shall include fire hydrant locations, the placement of fire department hose connections to supply sprinkler and standpipe systems, the location of area separation walls, mechanical rooms, smoke removal switches, key boxes, sprinkler and standpipe risers and emergency power generators. Drawings shall bear an accurate scale of 1:30 or 1:50. Copies shall be provided for Operations personnel.

2

BUILDINGS UNDER CONSTRUCTION

2.01 *Approved Plans*

Ref.: IFC 105.4.7

A complete set of approved plans, including plans for fire protection systems, shall be available at the job site for review by the Fire Chief or his/her designate.

2.02 *Water Supply*

Ref.: IFC 1412.1

- 2.02-1. An approved water supply capable of supplying the required fire flow, either temporary or permanent, shall be made available as soon as combustible material accumulates at the site.

Temporary water supply arrangements shall have prior approval of the Fire Chief or his/her designate. If the municipal water service is used, all connections shall have the approval of the City of Bellevue Utility or the water authority having jurisdiction.

There shall be no delay in the installation of fire protection equipment to meet requirements set forth in the plan review by the Fire Department.

Hydrants shall be maintained clear and accessible for fire protection during construction.

Fire hydrants shall be placed into service as soon as practical at the building site.

- 2.02-2. Water shall not be taken from hydrants for construction purposes without the permission of the City of Bellevue Utility or the water authority having jurisdiction.

Valves, wrenches and other attachments used for operating hydrants shall be of a type approved by the City of Bellevue Utility or the water authority having jurisdiction.

2.03 Access Roads

Ref.: IFC 1410

- 2.03-1. Access for use of heavy fire fighting apparatus shall be provided to the immediate job site at the start of construction.

The temporary fire access route shall be at least twenty (20) feet in width, shall have an unobstructed vertical clearance of at least thirteen feet, six inches (13' 6") and shall be capable of supporting the imposed load of fire apparatus weighing at least sixty-four thousand (64,000) pounds in all weather conditions.

- 2.03-2. All temporary fire access, where required, shall be maintained and remain unobstructed until all construction is completed. The permanent fire apparatus access route shall be completed prior to occupancy.

- 2.03-3. Arrangements shall be made to assure immediate fire Department access to the site when called.

- 2.03-5. The premise address shall be clearly visible from the street. The address shall be posted at the start of construction on a sign adjacent to the curb cut or driveway for the main entrance to the job site.

Numbers on the sign shall be not less than six (6) inches high and shall contrast to their background.

2.04 Flammable Liquids

Ref: IFC 3406.2

- 2.04-1. Bulk flammable or combustible liquid storage at construction sites shall be in accordance with the International Fire Code and shall be done only by permit from the Bellevue Fire Department.

3

FIRE DEPARTMENT ACCESS TO BUILDINGS

3.01 General Requirements

Ref.: IFC 503.1.1

3.01-1 Every building hereafter constructed shall be accessible to fire department apparatus by way of an approved access roadway with an asphalt or concrete driving surface capable of supporting the imposed load of fire apparatus weighing at least sixty-four thousand (64,000) pounds.

EXCEPTION: Where there are not more than two (2) Group R, Division 3 or Group U Occupancies, the requirements of this chapter may be modified, provided, in the opinion of the Fire Chief or his/her designate, fire fighting or rescue operations would not be impaired.

3.01-2. Approved fire apparatus access roads shall be provided when any portion of the facility or any portion of an exterior wall of the first story is located more than one hundred fifty (150) feet from fire department vehicle access on a public street as measured by an unobstructed route around the exterior of the building.

3.01-3. Private fire apparatus access roads are permissible provided they are on the same property as the project or, if on adjacent property, permanent access easements are recorded on each site plan.

3.01-4. Access roadway standards may be reduced if the building is protected by a complete automatic sprinkler system designed and installed in compliance with NFPA Standard No. 13. Single family dwellings less than 3,600 sq. ft. in total area, designed in accordance with NFPA-13D, are considered to satisfy the intent of this mitigation. Sprinkler design requirements shall be based upon the occupancy type and IFC regulations.

3.02 Multiple Fire Apparatus Access Roads

Ref.: IFC 503.1.2

3.02-1. Commercial and industrial projects having a gross building or structural area of more than sixty thousand (60,000) square feet shall be provided with two (2) separate and approved fire apparatus access routes or connections from adjacent public streets or private ways, with permanent access easements recorded on each site plan.

EXCEPTION: Projects having a gross building area of up to one hundred twenty thousand (120,000) square feet may have a single

approved fire apparatus access route when all buildings are provided with approved automatic sprinkler systems designed and installed in compliance with NFPA Standard No. 13.

- 3.02-2. Multi-family residential projects having more than one hundred (100) dwelling units shall be provided with two (2) separate and approved fire apparatus access routes or connections from adjacent public streets or private ways, with permanent access easements recorded on each site plan.

EXCEPTION: Projects having up to two hundred (200) dwelling units may have a single approved fire apparatus access route when all buildings, including non-residential occupancies, are provided with approved automatic sprinkler systems designed and installed in compliance with NFPA Standard No. 13.

Multi-family residential projects having more than two hundred (200) dwelling units shall be provided with two (2) separate and approved fire apparatus access routes or connections regardless of built-in fire protection features.

- 3.02-3. Sub-divisions for one-and two-family dwelling units shall be designed and constructed so fire apparatus may drive within two hundred fifty (250) feet of all dwelling units from two (2) directions.

EXCEPTION No.1: Approved cul-de-sacs not exceeding six hundred (600) feet in length.

EXCEPTION No.2: Where there are thirty (30) or fewer dwelling units on a single public way, and all dwelling units are protected by approved residential sprinkler systems designed and installed in compliance with NFPA Standard No. 13-D.

- 3.02-4. More than one fire apparatus access road may be required when it is determined by the Fire Chief or his/her designate that access by a single road may be impaired by vehicle congestion, condition or terrain, climatic conditions, topography, grade or other factors that could limit access.

3.03 *Minimum Specifications*

Ref.: IFC 503.1

- 3.03-1. Permanent fire apparatus access routes shall be paved to meet the standards of the City of Bellevue, and shall be paved to their full width. Temporary roads installed during building construction shall comply with the requirements of Section 2.02 of these Standards.

- 3.03-2. Fire apparatus access roads shall be a minimum of twenty (20) feet in width, except as modified in Chapters 3.04, 3.05 and 3.06 and shall have a minimum vertical clearance of thirteen feet, six inches (13', 6").
- 3.03-3. Dead-end fire apparatus access roads in excess of one hundred fifty (150) feet long shall be provided with increased width and approved turnaround provisions as described in Section 3.05.
- 3.03-4. Fire apparatus access roads shall be maintained permanently in an unobstructed manner, and shall be subject to inspection by the Fire Department. Any removal of obstructing material shall be at the property owner's expense.
- 3.03-5. Fire apparatus access roads shall be marked with permanent **NO PARKING-FIRE LANE** signs. Signs shall measure twelve (12) by eighteen (18) inches, have red letters on a white background, and shall comply with federal Department of Transportation standards for R8-31 signs as illustrated below:

The following markings/notices shall be used to identify all FIRE LANES:

- a. Paint the entire surface of the curbing red.
 - b. Mark/stencil the face side of the curbing with 3 inch white lettering, to read "FIRE LANE-NO PARKING", at 50 foot intervals.
 - c. Install permanent "NO PARKING-FIRE LANE" signs at the entrance to the fire apparatus route, and at 150 foot intervals along the route. Signs shall measure 12 x 18 inches and have red letters on a white background.
 - d. Towing Notification: At each entrance to property where fire lanes are designated, signs shall be posted in a conspicuous location and shall state vehicles parked in fire lanes may be impounded, and the name, telephone number, and address of the towing firm where the vehicle may be redeemed.
- 3.03-6. No dip, bump or other surface irregularities shall impede the movement of fire apparatus having a wheel-base of two hundred sixty-four inches (264") with a minimum ground clearance of twelve inches (12"). The angle of departure (break over angle) shall not exceed twelve (12) degrees.
- 3.03-7. Fire apparatus access roads shall not exceed fifteen percent (15%) in grade for any one hundred fifty (150) foot segment, except as modified in Chapter 3.06.
- 3.03-8. The minimum turning radii for all turns shall be thirty-three (33) feet inside turning radius and forty-six (46) feet outside turning radius.

3.04 Building Access for Ladder Operations

Ref.: IFC 503.7.8

- 3.04-1. Buildings more than one (1) story in height shall be designed in such a manner that ground ladder operations with access to the interior can occur on the same side of the building as the fire apparatus access route.
- 3.04-2. Buildings or portions of buildings exceeding thirty (30) feet in height from the lowest point of fire department access shall be provided with a fire access route capable of accommodating Fire Department aerial apparatus.

Required access roadways shall be a minimum twenty-six (26) feet in width in the immediate vicinity of any building or portion of building more than thirty (30) feet in height.

At least one of the required access roadways meeting this condition shall be located within a minimum of fifteen (15) and a maximum of twenty-five (25) feet from the building, and shall be positioned parallel to one entire side of the building.

NOTE: The measurement for this requirement shall be taken from the exterior wall of the building to the nearest edge of the fire apparatus access road.

3.05 Dead-end Fire Apparatus Access Routes

Ref.: IFC 503.2.9

- 3.05-1. If fire apparatus access roads are not looped in such a way as to allow driving completely around the building or complex of buildings, the dead-end fire apparatus access roads shall meet the requirements of the following Table 3.05:

**TABLE 3.05-2
Requirements for Dead-End Access Routes**

| Length | Width | Turnaround Required |
|---------------|---------------------------|---|
| 0-150' | 20' | None Required |
| 151' – 500' | 20' | 96' diameter cul-de-sac, 90' hammerhead, or 60' "Y" |
| 501' – 750' | 26' | 96' diameter cul-de-sac, 120' Tee. 96' hammerhead, or 70' "Y" |
| Over 750' | Special Approval Required | |

NOTE: Curves and topographical conditions could alter the requirements for turnarounds and the width of access roads.

3.06 Permissible Modifications

Ref.: IFC 503.10

- 3.06-1. When the building or buildings are outfitted with a complete automatic sprinkler system, designated and installed in compliance with NFPA 13, the Fire Chief or his/her designate may authorize modification of the full standard fire apparatus access road and turnarounds.

EXCEPTION: NFPA 13-D systems with some upgrades as determined by the Chief, are permissible alternatives in one and two-family dwellings less than 3,600 sq. ft. in total area.

- 3.06-2. When proximity to property lines or other obstructions prevents the installation of cul-de-sacs or hammerheads on the end of a fire access route in excess of five hundred (500) feet, the Fire Chief or his/her designate may allow multiple fire apparatus turnarounds along the fire access route provided they are not more than three hundred (300) feet apart.

3.07 Fire Hydrants Along Fire Apparatus Access Roads

Ref.: IFC 508

- 3.07-1. Paved access to fire hydrants shall be maintained to accommodate the fire fighting apparatus.

3.08 Access to Individual Structures or Tenant Spaces-Rapid Entry Boxes

Ref.: IFC 506

- 3.08-1. When required by the Fire Chief or his/her designate, buildings shall be outfitted with an approved key box for Fire Department use only. Key boxes shall be installed in the following occupancies:

- a. Buildings outfitted with fixed fire protection systems.
- b. Buildings with security entrances.

The Fire Chief or his/her designate shall specify the key box location. It shall be mounted within five (5) feet of the ground.

Where factors suggest multiple key boxes are required or alternate locations are appropriate, the Fire Chief or his/her designate shall specify those locations.

3.08-2.

The key box shall contain keys to open doors or other access means at the following locations:

1. The main entrance;
2. Individual tenant spaces, except for self-service storage areas;
3. Rooms containing control valves for automatic sprinkler systems;
4. Rooms containing fire alarm system control panels;
5. Rooms containing elevator operating equipment;
6. Rooms or areas containing hazardous storage, including hazardous materials information vaults;
7. Rooms containing main electrical service panels; or,
8. Rooms or other areas where the Fire Chief or his/her designate determines immediate access is necessary.

The key box shall contain a key that operates the elevator recall and emergency override systems if not in Elevator Key box at lobby or machine room.

When electronic locks are employed, the key box shall contain a copy of the appropriate code that provides access.

All keys shall be clearly marked as to what door, room, area or lock they serve.

3.08-3 *APPROVED KEY BOXES AND INSTALLERS*

Approved key box: KNOX manufactured by THE KNOX COMPANY, and outfitted with a Medeco cylinder and key. Bellevue's standard key box approved is a model #3260 series hinged door style which can be surface or flush mounted on the building.

The distributors carry an Indemnification Agreement, which is signed at the time of purchase and forwarded to the Fire Department to be reviewed.

3.08-4 *APPROVED HAZARDOUS MATERIALS INFORMATION VAULTS*

An approved vault is the KNOX Model 1200-5 or 1200-7, manufactured by The Knox Company, equipped with a Medeco cylinder and key.

4

ADDRESSING and SIGNING

4.01 Premise Identification

Ref.: IFC 505.1

4.01-1. Approved address numbers shall be placed on all new and existing buildings, including one-and two-family dwellings, in such a position as to be plainly visible and legible from the road or street fronting the property.

4.01-2. Address numbers or letters on the front of buildings shall be a minimum six (6) inches high for commercial occupancies and four (4) inches high for single family occupancies. Address numbers or letters shall contrast with their background. The principal stroke of address numbers shall be at least three-quarter (3/4) inch.

When address numbers are located on clear glazing such as doors, windows or relights, the numbers shall be white to achieve contrast during all lighting conditions.

When the building is more than fifty (50) feet from the road, the height of each address number shall be increased as specified in Table 4-1 to a maximum of twelve (12) inches.

TABLE 4.02-1
Address Numbering Height Table

| DISTANCE | SIZE |
|-----------------|-------------|
| 0-100 ft | 6" |
| 101-150 ft. | 8" |
| 151-200 ft. | 10" |
| 201 and up | 12" |

4.02-2. Where the building is not visible from the street or more than one building is on a site, such as one on a long driveway or private roadway, provision shall be made to clearly identify which driveway or roadway serves the appropriate address.

- 4.02-3. Address numbers at least three (3) inches high and having a principal stroke of three-quarter (3/4) inch shall be prominently displayed on rear entrance or access doors when required by the Fire Chief or his/her designate.
- 4.02-4. Exterior access doors or individual dwelling, housekeeping, living units or commercial tenant spaces also shall be clearly marked. Numbers and/or letters of such units shall be at least two (2) inches high and shall have a principal stroke of three-quarter (3/4) inch.
- 4.02-5. Doors opening onto interior corridors in multi-family dwelling or commercial tenant spaces shall have letters and/or numbers at least one-and-one-half (1-1/2) inches high and shall contrast to their background.

4.03 *Required Signs and Sign References*

Signs of various descriptions are referenced throughout these Development Standards. The following list has been developed to assist in locating these signs and their descriptions:

- 1.05-1 Record Documents:
Approved Site Plan (8.5” x 11” or 11” x 17”) to scale of 1:30 or 1:50.
- 2.05-1 Flammable Liquids:
Warning Signs for Tanks & Containers.
- 3.03-6 Fire Access Roads:
Fire lane signs.
- 4.01 Address and Premise Identification:
Approved address numbers and sizing.
See Table 4-1.
- 6.03 Hydrant Marking and Clearance:
Hydrant “No Parking” signs.
- 7.06-1 Identification Signs (Fire Suppressions Systems):
Riser placard denoting locations of control valves and low point drains.
- 7.06-3 Sprinkler Room Door Label:
Signs for the Valve room door “Sprinkler Riser”
- 7.11-7 Sprinkler Alarm Bell Sign:
Exterior alarm bell signing “Fire Alarm Call 911” “1” white letters on red background

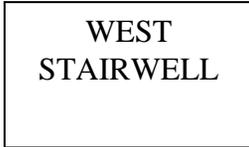
- 7.12 Elevator Sprinkler Signs:
Elevator sprinkler shutoff valve signs.
Thermal detector “DO NOT TEST” warning signs.
“ELEVATOR AUTOMATIC DISCONNECT” signs.
- 7.15-1 Heat Trace Signage:
Trace heat tracing, when approved, with “HEAT TRACE IDENTIFICATION RIBBON”.
- 8.09 Fire Alarm Signage:
Pictograph at the Fire Alarm Control Panel (FACP) of the building layout.
FACP room door sign “FIRE ALARM CONTROL PANEL”.
- 8.10 Elevator Shaft and Machine Rooms:
Thermal detector “DO NOT TEST” signs.
Shunt trip “ELEVATOR AUTOMATIC DISCONNECT” sign.
“In Case of Fire-use stairs Do not use Elevator” (Pictorial of stickman walking down stairs posted next to or above elevator call button on all floors.
- 9.06-1 Carbon Dioxide Systems:
Pre-discharge alarm warning sign.
- 10.05 Occupant Capacity Signs:
Occupant load signs.
- 10.06 No Smoking Signs.
- 10.07 Automatic Fire/Smoke Vent:
Opaque mechanical heat/smoke vents in roof require “AUTO VENT” signs.
- 10.11 Hazard Identification Signs:
Signs warning of hazards, when required by the IFC, are specified i.e. “Electrical Room”.

TABLE 4.03-1
Samples of Various Required Signage

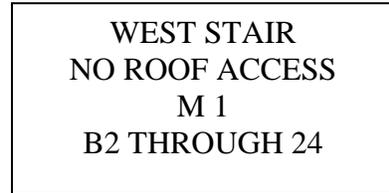
| | | |
|---|---|---|
| AUTO VENT | CAUTION:FLAMMABLE COMBUSTIBLE FUEL STORAGE | DUCT DETECTORS |
| ELECTRICAL | ELEVATOR AUTOMATIC DISCONNECT | ELEVATOR MACHINE ROOM |
| ELEVATOR PIT SPRINKLER SHUTOFF | EMERGENCY FIRE ALARM PANEL | EMERGENCY GENERATOR SHUT OFF |
| FIRE/SMOKE DAMPERS | FM 200 | HEAT TRACE |
| FUEL TANK | IF BELL RINGS CALL 911 | MECHANICAL |
| NO SMOKING | PRE-ACTION | REMOTE FUELING STATION |
| SHUNT TRIP | SPRINKLER RISER | TRANSFORMER ROOM |
| | UL 300 | |

TABLE 4.03-2
Samples of Stairway Identification Signage

Signs shall be required on all exterior doors leading to stairwells. Fire alarm notification shall correspond with stairwell identification signs. Signs shall be installed on the exterior door for identification.



EXTERIOR STAIRWELL



INTERIOR STAIRWELL

5

WATER SUPPLY AND FIRE FLOW

5.01 *General Specifications*

Ref.: IFC 508

- 5.01-1. Water mains shall be installed in accordance with the engineering specifications of the City of Bellevue or the water authority having jurisdiction and subject to such testing as specified by the City of Bellevue Utility Department or water authority having jurisdiction.
- 5.01-2. Fire Department hose connections and controlling valves used in connection with fire protection facilities shall be installed at locations and to specifications approved by the Fire Chief or his/her designate.
- 5.01-3. All required fire flow, either temporary or permanent, shall be available at a minimum residual pressure as designated by the City of Bellevue Utilities Department or water authority having jurisdiction.

5.02 *Quantity*

Ref.: IFC 508

- 5.02-1. The required quantity of water shall be equal to the calculated fire flow for the greatest hazard or protected risk in the proposed development, and shall be based on a demand duration as determined by Table B105.1 Appendix B of the International Fire Code.
- 5.02-2. Where the existing fire flow on a system is inadequate, or a new system is proposed, engineering design calculations may be required to verify fire flow.
- 5.02-3. Required fire flow for buildings shall be determined by the Fire Chief or his/her designate using Table B105.1 Appendix B of the International Fire Code.
- 5.02-4. Buildings having a required fire flow less than two thousand fire hundred (2500) gpm may have fire hydrants on one side of the building only.

5.02-5. Buildings having a required fire flow of three thousand five hundred (3500) gpm or more shall have hydrants served by a main that loops the building or complex of buildings and reconnects back into a distribution supply main in a separate location.

EXCEPTION: Where property lines, topography or other features prevent fire department vehicle access to one or more sides of a building or complex of buildings, this requirement may be waived if, in the opinion of the Fire Chief or his/her designate, suitable fire protection features are installed on the premises.

5.02-6. Buildings having a required fire flow of three thousand five hundred (3500) gpm or more shall have hydrants served by an underground main that is served from two directions or two sources of water supply.

Note: It is the intent of this section to arrange the water supply so that should one source or direction be disrupted, an alternate water supply will be available.

5.02.7. In those circumstances where the required fire flow exceeds the available fire flow, modifications based on the installation of automatic fire sprinkler and/or automatic smoke detection systems may be used in accordance with Chapters 5.03 and 5.04 of these Standards.

5.03 *Credit for Automatic Sprinkler Systems*

Ref.: IFC Appendix B

5.03-1. Fire flow credit for automatic sprinkler protection shall be granted only when the entire structure is protected by an approved automatic sprinkler system, designed in accordance with NFPA-13 or NFPA-13R, and for single family dwellings less than 3,600 sq. ft. in total area, designed in accordance with NFPA-13D.

5.03-2. Credit toward fire flow requirements shall be granted by the Fire Chief or his/her designate where sprinklers are installed:

- a. For the purposes of area or height increases as specified in the International Fire Code
- b. For the purposes of one-hour fire resistive substitution as specified in the International Fire Code
- c. In Group R occupancies as defined in the International Fire Code, or,
- d. As a substitute for fire apparatus access.

- 5.03-3. There shall be no additional credit toward fire flow requirements by installing an automatic sprinkler system where the system is required by the International Building or Fire Codes to protect hazardous storage or processes, or in any Group H or I occupancy.

5.04 Fire Flow Calculations for Remodeled Buildings

Ref.: IFC Appendix B

- 5.04-1. Buildings undergoing remodeling where there is no building area added shall not be subject to fire flow calculations.
- 5.04-2. Buildings in which area is added shall have a fire flow figure based on the existing building and its fire protection features added to the fire flow calculations for the new area.

6

FIRE HYDRANTS

6.01 *General Specifications*

Ref.: IFC 508.5

- 6.01-1. Fire hydrants shall be installed in accordance with the City of Bellevue Utility Department or the water authority having jurisdiction.

6.02 *Marking and Clearance*

Ref.: IFC 508.5.4

- 6.02-1. There shall be no parking of motor vehicles, refuse containers or other obstructions within fifteen (15) feet of a hydrant.
- 6.02-2. When required by the Fire Chief or his/her designate, paved areas within the vicinity of a hydrant shall be permanently marked by painting the words "NO PARKING" in letters at least eighteen (18) inches tall on the pavement.
- 6.02-3. Fire hydrants located on private property shall be marked with an approved, reflective hydrant marker provided by the property owner placed in the street, alley, fire lane or access route in a location specified by the Fire Chief or his/her designate.

6.03 *Hydrant Spacing and Distribution*

Ref.: 508.5

- 6.03-1. Fire hydrants shall be installed as per fire flow and spacing requirements specified for the type of development and in accordance with Fire Department specifications.
- The location and distribution of fire hydrants shall be as specified in Appendix C, International Fire Code, Bellevue Municipal Code Chapter 23.11.
- 6.03-2. Paved access to fire hydrants shall be maintained to accommodate fire fighting apparatus, and to prevent damage to landscaping and pavement when the fire hydrant is being tested at its full flow.
- 6.03-3. In one- and two-family unit developments, fire hydrants shall be spaced on not more than five hundred (500) foot intervals along public streets or approved fire apparatus access routes.

- 6.03-4. In other developments (including multi-family, commercial, education, institutional, assembly, storage and industrial buildings and complexes), fire hydrants shall be spaced in accordance with Appendix C, International Fire Code, 2003 Edition.

If more than one fire hydrant is required to meet the fire flow demand, all hydrants shall be within six hundred (600) feet of the building or complex or buildings measured along approved fire apparatus access routes or municipal streets.

- 6.03-5. The number of hydrants required for a building or complex of buildings shall be based on the formula:

Required fire flow = Number of hydrants times 1500 gpm.

Fractions greater than one-half ($1/2$) shall be rounded up to the next higher whole number. Fractions less than one-half ($1/2$) shall be dropped.

- 6.03-6. Buildings having a required fire flow less than two thousand five hundred (2500) gpm may have fire hydrants on one side of the building only.

- 6.03-7. Buildings having a required fire flow of three thousand five hundred (3500) gpm or more shall have hydrants served by a main that loops the building or complex of buildings and reconnects back into a distribution supply main in a separate location.

EXCEPTION: Where property lines, topography or other features prevent fire department vehicle access to one or more sides of a building or complex of buildings, this requirement may be waived if, in the opinion of the Fire Chief or his/her designate, suitable fire protection features are installed on the premises.

- 6.03-8. Buildings having a required fire flow of three thousand five hundred (3500) gpm or more shall have hydrants served by an underground main that is served from two directions or two sources of water supply.

Note: It is the intent of this section to arrange the water supply so that should one source or direction be disrupted, an alternate water supply will be available.

6.03-9. For average conditions, fire hydrants shall be located at least fifty (50) feet from the building or buildings they serve. When, in the opinion of the Fire Chief, the materials or processes in a building or complex of buildings constitute a hazardous condition, hydrants shall be located at least eighty (80) feet from the building.

EXCEPTION: Where property lines, topography or other features prevent this spacing, fire hydrants may be located closer to the building or buildings if, in the opinion of the Fire Chief or his/her designate, suitable safeguards such as four-hour fire resistive walls without openings are provided to protect fire equipment and fire fighters using the hydrant.

6.04 *Fire Hydrants Along Parkways and Arterial*

Ref.: IFC 508.5

6.04-1. Notwithstanding the hydrant spacing requirements of this chapter, when a project site is located across a parkway or primary (major) arterial, hydrants shall be located on the same side of the parkway or arterial as the project if required by the Fire Chief or his/her designate.

7

AUTOMATIC FIRE SPRINKLER AND STANDPIPE SYSTEMS

7.01 *Standards Established*

Ref.: IFC 903

- 7.01-1. All automatic fire sprinkler systems and standpipe systems whether voluntary or required shall be designed, installed and tested as specified in compliance with the latest editions of International Building Code (IBC) Section 903, the International Fire Code (IFC) Chapter 9 and nationally recognized standards listed in Chapter 45; and specified in the following subsections of these standards.

7.02 *Water Supply Information for Hydraulic Calculations*

Ref.: IFC 903.3.5

- 7.02-1. Current water supply computer modeling obtained from the City of Bellevue Utility or the water authority having jurisdiction shall be submitted with all hydraulically engineered sprinkler and standpipe systems.

7.03 *Sprinkler and Standpipe Riser Materials*

Ref.: IFC 704.1

- 7.03-1. Fire sprinkler or standpipe risers extending through more than two (2) floors and not enclosed in an approved fire-resistive shaft as specified in the Building Code, shall be constructed of approved non-combustible materials.

7.04 *Fire Department Hose Connection (FDC) for Supply*

Ref.: IFC 903.3.7

- 7.04-1. When required by the Fire Department the FDC shall be located adjacent to the curb cut of the main entrance of the project site or building it serves.

The FDC shall be arranged to face the street, driveway or fire apparatus access route as specified by the Fire Department.

FDC's shall be arranged so the lowest point on the inlet connection is between thirty (30) and forty-two (42) inches above finished grade at its location.

Any above grade portion of the supply piping in the fire department connection line shall be approved metallic pipe or tube. Buried portions of this piping must be metallic, conforming to Bellevue Utilities Department standards or as otherwise approved by the Fire Department.

7.04-2. The fire department hose connection shall be located not more than fifty (50) feet from the nearest fire hydrant and fifty (50) feet away from the building it protects, or as approved by the Fire Department.

7.04-3. The fire department hose connection and cast plate surrounding it shall be painted Rustoleum Regal Red or equal. Where yard style fire department hose connections are installed, the entire riser and hose connections above grade shall be painted as specified. Painting of the fire department hose connections shall not interfere with the operation of the swivel or cap connections.

A metal, weather resistant sign shall be affixed at the fire department hose connection. It shall be affixed securely to the building wall immediately above the fire department connection, or wrapped around the outside pipe and tack welded just below the fire department connection. It shall be 4" x 6" in size, be a red background with white, 1" block printing, and describe the type of connection as follows (sign information to be approved by the Fire Code Official):

Other methods of fire department connection identification are by the approval of the Fire Code Official.

TABLE 7.04-3.1
Sprinkler & Standpipe Signage

(Top Line)

| | |
|---|------------------------------|
| Automatic sprinklers only: | "SPRINKLERS" |
| Class I or III standpipes (wet): | "STANDPIPES" |
| Combined, sprinklers & standpipes: | "COMBINED" |
| Dry standpipes: | "DRY S/PIPES" |
| Dry standpipes & sprinklers: | "DRY S/P & SPKRS" |
| Single standpipe: | "ONE S/P ONLY" |

(Bottom Line – Information Line)

| | |
|-------------------------------------|------------------------|
| Plastic pipe: | “CPVC” |
| Multiple, Single Standpipes: | “ONE OF __#__” |
| Limited pressure: | “__#__ PSI MAX” |

TABLE 704-3.2

Sprinkler and Standpipe (FDC) Sign Examples:



- 7.04-4. Where fire department hose connections (FDC) are subject to vehicular damage, they shall be protected by crash posts as specified by the Utility Department having jurisdiction, or if not applicable, then according to **10.03** – Alternate Guard Post (BOLLARD) Specifications.
- 7.04-5. All fire department hose connections shall be outfitted with a swing check valve for each hose connection. All swing check valves shall be installed in such a way as to be accessible for service and maintenance. Automatic drainage provisions between the check valve and the hose connection must be provided.
- 7.04-6. Threaded plug-style caps for fire department hose connections are prohibited. Only approved frangible-style or quarter-turn protective covers with pins or lugs shall be used on fire department hose connections.

EXCEPTION: Approved KNOX style locking FDC plugs are allowed to be used.

7.05 Identification Signs

Ref.: IFC 510.1

- 7.05-1. In all buildings outfitted with fire sprinkler or wet standpipe systems, a permanent placard specifying the locations of all controlling valves shall be mounted in the room with the system riser. The placard shall include a plan view and elevation view of the building showing the locations of all controlling valves and all low point drains on the respective system. The placard shall be protected from moisture and physical damage.
- 7.05-2. All sprinkler and wet standpipe system controlling valves shall be clearly marked as to the portion of the building or fire protection system they control.
- 7.05-3. A permanent hydraulic placard shall be provided at the base of each riser stating the design criteria of the system, water supply available, and other pertinent information such as occupancy/storage constraints or limitations.

7.06 Special Condition Sprinkler Installations

Ref.: IFC 903.2.13

- 7.06-1. In systems designed and installed in compliance with NFPA 13, 13D, or 13-R, closets, regardless of size, containing laundry equipment, furnaces and other sources of ignition shall be sprinklered. Intermediate temperature sprinklers shall be used, except as modified by NFPA-13. The index of response shall be appropriate to the overall occupancy. Closets and bathrooms which expose the egress path from a dwelling shall be sprinklered, regardless of size.
- 7.06-2. Electrical or communications equipment rooms or closets shall be provided with automatic sprinkler protection, regardless of size.

- 7.06-3. Interior soffits, valances, canopies, lights, displays or any architectural structure shall be sprinklered beneath when the condition creates an obstruction to ceiling sprinkler discharge.
- 7.06-4. Display cases constructed as parts of walls shall be sprinklered when the area of the display case exceeds ten (10) sq. ft. Enclosed, fixed, free-standing display cases need not be sprinklered if they are less than twenty (20) sq. ft. in area and not more than four (4) feet in least dimension, or have ceilings or tops that would enable adjacent ceiling sprinklers to discharge into the display cases.
- 7.06-5. Enclosed coolers or freezer display cases less than 84 inches tall and with an inside width or length less than 36" need not be sprinklered. Non-combustible ceiling or floor cavities and similar spaces must be sprinklered unless they meet the requirements of NFPA 13-2002 Section 8.14.1.2 *Concealed Spaces Not Requiring Sprinkler Protection*. In particular, the following will require localized protection:

- 1) All cable trays
- 2) Cable rings greater than 6 inches in diameter
- 3) bundles of cabling (exceeding 20 cables)

Cables must have 24 inches of separation to be considered as a separate bundle/tray.

Note 1: *Minor quantities of combustible materials can be present in concealed spaces constructed of noncombustible materials but should not typically be viewed as requiring sprinklers. It is not the intent of this section to require sprinklers, which would not otherwise be required, in the interstitial space of a typical office building solely due to the presence of the usual amount of cabling within the space. Cable trays and bundles in excess of 20 cables are considered to be beyond "minor quantities".*

Note 2: *Fuel fired units within the ceiling cavity must be protected with sprinklers in the immediate vicinity, usually from two sides.*

- 7.06-6. Emergency feeder circuit wiring shall meet one of the following conditions:
1. Be installed in spaces or areas that are fully protected by an approved automatic fire suppression system
 2. Be a listed electrical circuit protective system with a minimum 1-hour fire rating
 3. Be protected by a listed thermal barrier system for electrical system components
 4. Be protected by a fire-rated assembly listed to achieve a minimum fire rating of 1 hour

5. Be embedded in not less than 2 in. of concrete
 6. Be a cable listed to maintain circuit integrity for not less than 1 hour when installed in accordance with the listing requirements
- 7.06-7. When sprinklers protect commercial cooking and exhaust equipment, the use of listed grease extractors shall not preclude the installation of sprinkler protection in the exhaust ducts. Water spray nozzles or sprinklers may not be used directly over deep fat fryers.
- 7.06- 8. Exterior, noncombustible canopies greater than four (4) feet in width that are used to cover parking, staging or loading areas, or spaces used for combustible storage, shall be protected by sprinklers.
- 7.06-9. Exterior, combustible eaves with enclosing soffits require sprinkling within if they are not separated from the adjacent attic with construction equaling 1/2" gypsum board (ventilation holes excluded). Such spaces, if separated from the attic, may remain unsprinklered at the Chief's discretion, if they are fire stopped with 1/2" gypsum board (at 60 ft. maximum intervals) into volumes less than 160 cubic feet, and the cross-sectional area of the space does not exceed 5 sq. ft.
- 7.06.10. When single or two-family dwellings are sprinklered due to inadequate fire flow or fire department access the sprinkler system must be designed in accordance with NFPA Standard 13D except as follows:
- a. The garage is to be [substantially] protected as well as a wet system allows.
 - b. A minimum water supply of 1" is allowed, installed per utility standards.
 - c. The FDC (1 1/2" in size) may be mounted on the building wall near the front of the building or at an alternate location as approved by the Fire Department (only required for single or two family dwellings in excess of 3,600 sq.ft.).
 - d. Attics or crawl spaces intended to be utilized for storage shall be sprinklered.
 - e. Combined service meters (domestic, fire and/or irrigation) less than 1 1/2" in size normally require the use of a domestic (hydraulic) shutoff valve. (ref.: Uniform Plumbing Code Section 610.1).

Note: *The foregoing is an approved alternate to the code requirement, which is to size the meter and service line for the **total** demand. Typically sizing the meter and service line for the total demand will result in a larger meter and service line.*

- 7.06.11. Sprinkler shop drawing submittals shall include seismic hanger and bracing calculations and supporting details as required by the 2007 edition of NFPA-13 (NFPA-13D designs).
- 7.06.12. All new fire sprinkler systems shall be tested in accordance with NFPA-13. Those systems which share hose connection piping with a standpipe system shall be tested at 50 psi above the calculated required supply pressure of the standpipe system.
- 7.06.13. Composite wood joists require special sprinkler design considerations as outlined in NFPA 13. If they are sheathed across the bottoms, forming combustible concealed spaces, the minimum remote area of calculation must be 3,000 sq. ft. If they are unsheathed and the depth of exposed joist below noncombustible insulation exceeds 16", then each joist pocket must be sprinklered. These are important issues that must be resolved before a permit can be issued.
- Composite wood joists occurring in residential occupancies do not require 3,000 sq. ft. of remote area. However, all rooms below such construction must be sprinklered, regardless of size (bathrooms and closets are not excepted).

7.07 Non-Metallic Pipe or Tube Thermal Protection

Ref.: NFPA 13, Section 1.6.2

- 7.07-1. Non-metallic sprinkler pipe or tube shall be as specified in its product listing.
- 7.07-2. Where water-filled piping is installed under an insulation blanket in a cold attic or other cavity, details of this protection must be clearly shown on the shop drawings. As a condition of occupancy, the General Contractor or Building Owner shall submit a letter certifying that it is installed in a manner that will prevent freezing. Additionally, the building inspector may inspect the insulation as a condition of occupancy.

7.08 Dry Pipe Performance

Ref.: IFC 901.5

- 7.08-1. Regardless of system piping capacity, dry pipe and double interlock preaction sprinkler systems shall be capable of delivering water to the Inspectors Test Connection within sixty (60) seconds of the Inspector's Test valve being opened. Approved quick opening devices may be used to meet this requirement.

7.09 Hydraulically Engineered Sprinkler Systems

Ref.: NFPA 13 (2002) Section 11.2.3.2.1

- 7.09-1. Hydraulically engineered sprinkler systems shall be designed and calculated so the system demand curve including hose stream allowances is at least ten (10) percent, or 10 psi, whichever is greater, below the water supply curve.

- 7.09-2. Booster pumps do not require a generator if the city water supply can supply the sprinkler demand or a diesel driver is used.
- 7.09-3. Where quick response sprinklers are utilized, the area reduction allowed by NFPA-13 is not permitted.

7.10 Sprinkler System Supervision

Ref.: IFC 903.4

- 7.10-1. An unsupervised shutoff valve shall not be installed upstream of the water flow pressure switch.
- 7.10-2. Tamper security switches shall be installed on all main and auxiliary controlling valves.
 - EXCEPTION:** Existing control valves located outside a building and in a locked underground vault or pit need not be electronically supervised provided the valves are locked in the “open” position in a manner approved by the Fire Department.
- 7.10-3. See Chapter 8.06 of these Standards for supervisory and water flow requirements pertaining to the fire alarm control panel.
- 7.10-4. All sprinkler systems shall have an approved local alarm notification system including an outside audible alarm notification appliance. Off-premises supervision alone shall not be construed to meet this requirement. Local alarm must be visible from the public right-of-way or as otherwise approved by the Fire Department.
- 7.10-5. When electronic supervision is not required, valves may be supervised by one of the following methods (**NOTE! Removal of valve handles is not permitted**):
 - a. Locking the valves open with 3/16-inch plated or galvanized chain or 5/16-inch 7x19 stainless or galvanized wire rope. The chain or wire rope shall be threaded through the valve wheels so they may not turn more than one-quarter (1/4) turn. Chain or wire rope shall be locked with a padlock.
 - b. Sealing valves open with approved weekly recorded inspections when the valves are within locked enclosures.

7.11 Elevator Machine Rooms and Hoist way Pit

Ref.: ASME A17.1 (2000 edition)

- 7.11-1. Sprinklers installed in pits shall be arranged in such a way that the spray pattern shall not spray higher than two (2) feet above the pit floor with the spray pattern directed level and not down.

- 7.11-2. The sprinkler system shall be arranged to disconnect electrical service to the elevator main line prior to the application of water by the following method:
- a. A fixed temperature 135 degree Fahrenheit thermal detector shall be provided within the elevator equipment room to disconnect the main line power.
 - b. Such thermal detectors shall be ceiling mounted and located within eighteen (18) inches of each sprinkler head.
 - c. Thermal detectors shall be an auxiliary function of the elevator equipment only, and shall be identified with signs reading: "**Elevator Control Only-- DO NOT TEST**". The signs shall have letters at least one-half (1/2) inch high on a contrasting background.
 - d. Power for the automatic disconnect control circuit shall be derived from the load side of the elevator power main disconnecting means. The disconnect control device shall be located in the elevator equipment room, and shall be provided with a sign reading "**ELEVATOR AUTOMATIC DISCONNECT.**" The sign shall have letters at least one-half (±) inch high on a contrasting background.
 - e. Automatic sprinkler heads installed in elevator pits do not require a power disconnect device. A shut-off valve shall be provided in an accessible location with the handle not more than six feet above the floor. The elevator machine room and the pit require separate control valves.
 - f. Top of elevator shaft sprinklers are not required by the City of Bellevue. If installed, the elevator machine room conditions apply.
 - g. Residential elevator equipment in one and two family residences are not permitted to be sprinklered unless shunt trip and elevator recall is provided. If shunt trip and elevator recall is not installed, then sprinkler protection must be removed. Elevator equipment must be installed in a dedicated room, closet or space.

7.12 Mixed Residential Occupancy Sprinkler Systems

Ref.: NFPA 13R, Section 3.3.6

- 7.12-1. In MIXED-USE residential occupancies four stories or less, residential sprinkler systems designed and installed in compliance with NFPA 13-R may be used if the following is satisfied:
1. The residential area must be the predominate use.
 2. The non-residential use must have similar fire loading as compared to the residential uses.

7.13 Heat Tracing

Ref.: IFC 102.8

- 7.13-1. Heat tracing or heat taping to prevent freezing may be employed only in those areas where other methods of heating can be shown to be impractical. Heat tracing or heat taping must be listed for applications protecting fire protection systems, the power supply must be supervised by the fire alarm system, and connected to standby power supplies if available. The products and details of installation must be submitted to the Fire Department for approval prior to installation.

7.14 Sectional Floor Control Valves

Ref.: IFC 903.4.3

- 7.14-1. Isolation valves shall be provided on each floor of sprinklered buildings such that an individual floor may be isolated without impairing additional floors.

EXCEPTION: Sprinkler systems designed and installed in compliance with NFPA Standard 13-D or for R-3 occupancies.

An alternative is to allow the top level of sprinklers below an unheated attic to be supplied from the next lower level. This is to avoid exposure of sprinkler piping to potential “attic freeze-up.” A maximum floor area of 26,000 sq. ft. per sprinkler system is allowed.

Continued next page

- 7.14-2. Separate dry systems shall be provided for each floor level..

REQUIREMENTS FOR STANDPIPE SYSTEMS

7.15 Fire Department Connections

Ref.: IFC 905

- 7.15-1. All buildings outfitted with standpipe systems that have a water supply requirement in excess of one thousand two hundred fifty (1250) gallons per minute, or 4 standpipes, shall be outfitted with two (2) separate fire department hose connections for supply, or as otherwise approved by the Fire Department.
- 7.15-2. All projects that are high-rise, complexes with two or more structures above a common garage or foundation, or those which may otherwise be rendered inaccessible to the Fire Department shall be equipped with two complete Fire Department Connection points. These are generally to be located on opposite sides of the project at approved locations.

7.16 Standpipe Hose Station Outlets

Ref.: IFC 905.2

7.16-1. Standpipe hose station outlets shall be provided with National Standard Threads, and the threads shall be protected by a rocker lug (pin) cap. Plastic thread protection is not acceptable.

7.16-2. Where wall-recessed cabinets are installed for hose outlets in standpipe systems, they shall have the following minimum clear dimensions to assure easy access and valve operation:

Class I Standpipe Systems:

Height: Twelve (12) inches

Width: Sixteen (16) inches

Valve handles in any position shall be not less than four (4) inches from any surface (except the back of the cabinet) in the enclosure or cabinet, and shall be arranged so a twelve (12) inch wrench can operate the valve.

7.16-3. All hose outlet valves shall have adequate clearance around them to accommodate a fire department hose appliance having a dimension of ten (10) inches by ten (10) inches.

7.16-4. All hose outlet valves for fire department use shall be arranged so they are between thirty-six (36) and forty-eight (48) inches above finished floor, with the outlet oriented to the clear working space.

7.17 Standpipe Design

Ref.: IFC 905

7.17-1. Standpipes shall be designed by hydraulic calculation, utilizing Hazen-Williams formulas and procedures described in NFPA-13, Chapter 11. The coefficient of roughness (C-factor) must be 100 for dry standpipes utilizing black steel pipe.

7.17-2. Standpipe systems without a fire pump shall be designed to operate with a Fire Department Connection (FDC) inlet pressure of 200 psi unless otherwise approved by the Fire Department.

7.17-3. A flow of 300 gpm at 150 psi (maximum 200 psi) must be provided at the most remote outlet of the most remote standpipe in addition to the flow and pressure requirements of NFPA 14.

7.17-4. Every required stairway shall be equipped with a standpipe. (IFC 905.4). Each required standpipe must include roof outlets if the roof slope is less than 4:12.

Exception: The top most hose valve may be positioned on the intermediate landing of a stair that accesses the roof (an

alternating tread device is the minimum quality "stair") whether by hatch or stair penthouse.

- 7.17.5 The most remote portion of a sprinklered floor or story shall be within 200 feet travel distance to a protected, accessible hose connection. Travel distances in parking garages may not include travel between stalls. To qualify, the stall must remain open and be marked as "NO PARKING".
- 7.17.6 Where combined standpipe systems are installed or required no portion of that standpipe system may be dry

7.18 *System Testing and Inspections*

Ref.: IFC 901.6

- 7.18-1 All sprinkler systems shall be hydrostatically tested at 200 psi for 2 hours per NFPA 13. The Fire Department may also permit air testing at 50 psi for 24 hours per NFPA 13.

APPENDIX 7

FIRE SPRINKLER and STANDPIPE SYSTEMS

Automatic Sprinklers Over Cooking Surfaces:

NOT ACCEPTABLE FOR NEW OR REMODELED FACILITIES AND FOR DEEP FAT FRYERS, NEW OR EXISTING.

BELLEVUE FIRE DEPARTMENT

SPRINKLER PLAN REVIEW CHECKLIST

Permit Number _____ Date _____

Project Name _____

Address _____

Permit Applicant Company _____

Certified By _____ Phone _____ , Fax _____

BASIC PROJECT INFORMATION

- 1 NFPA OCCUPANCY/STORIES: _____
- 2 TYPES OF CONSTRUCTION: _____
- 3 Property requires sprinklers for area or height (IBC Chapter 5)? Yes No
- 4 Property requires sprinklers for other reasons? _____ _____

BLDG. & SPRINKLER PLAN DESCRIPTION

| Drawing # | Number Sprinklers | Location | Elev./ Level | Sprinkler Occupancy | IBC Occupancy | Sprinkler Const Type | IBC Const Type | Hydraulic Calcs Y/N |
|-----------|-------------------|----------|--------------|---------------------|---------------|----------------------|----------------|---------------------|
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

CHECKLIST NOTES:

- Items which are not applicable are noted "NA" in the "Yes" column.
- Items marked in the "NO" column are EXCEPTIONAL. Provide an explanation with the Permit Application.
- All references are to the 1999 NFPA-13, 8-1 or to the BFD Development Standards.

ADEQUATE

A. BASIC SHOP DRAWING INFORMATION

| | | Yes | No |
|----|--|-----|----|
| 1 | Plans drawn to graphic scale[ff], sheets uniform size, each floor [NFPA 13, 8-1.1.1] | | |
| 2 | Name of owner/occupant [a],street address [b], compass [c] | | |
| 2a | Name and address of contractor, contact and phone number [gg]. | | |
| 3 | Plans show: partitions [e], fire walls [f], & Occupancy class of each area [g] | | |
| 4 | Location and size of concealed spaces, closets, attics, and bathrooms [h] | | |
| 4a | NFPA-13R & -13D: spklr. all closets w/dry. eqpt., furnaces, etc. {6-7.07-1} | | |
| 4b | Soffits over 24" wide & Display cases protected, Fig.4-6.5.1.2(b) & {6-7.07-3} | | |
| 5 | Any general unsprinklered spaces per NFPA 13, 5-13? | | |
| 6 | Kitchen Hood exhaust ducts spklrd? {6-7.07-6} | | |
| 7 | Total area protected by each system on each floor is OK? [n]: | | |
| 8 | Existing system info is sufficient to evaluate spklr. addition proposed? [dd] | | |
| 9 | Construction types fully described (roof/floor framing) [d] and cross section | | |

B. SITE INFORMATION

| | | Yes | No |
|---|--|-----|----|
| 1 | Underground work is part of this Permit? | | |
| 2 | Site Plan to scale, water mains (circulating), roads, elevations, hydrants | | |
| 3 | Locations of water connection, valves, & FDC plus fire flow data | | |
| 4 | NO other sources of water supply, with pressure or elevation [k]. | | |
| 5 | U/G pipe type, weight, joints, depth of bury [bb]? | | |
| 6 | Type of valves, fittings, and valve pits (Backflow & Meter)? | | |
| 7 | Thrust blocking & rod coatings | | |
| 8 | Exposures within 60 ft.: distance, construction, occupancy & height [k]. | | |

C. VALVES, ALARMS & RELATED INFORMATION

| | | Yes | No |
|----|--|-----|----|
| 1 | Make, type, model, & size of alarm or dry pipe valve plus trim details [x]. | | |
| 2 | Make, type, model, & size of preaction or deluge valve plus trim details [y]. | | |
| 3 | Capacity in gallons of each dry pipe system [q]. | | |
| 4 | Model and location of control & check valves [w]. | | |
| 4a | Floor control valves provided on 3 stories or more {6-7.16-1} | | |
| 5 | Drain valves, risers, & discharge points, plus test connections [w] | | |
| 6 | Backflow preventer info. (mfgr., size, type) [oo] | | |
| 7 | Kind, location & voltage of exterior alarm bells [z]. | | |
| 7a | Spklr. system shall operate inside alarm system throughout premises. {6-7.11-4} | | |
| | Coordinated with Fire Alarm Contractor & so noted | | |
| 8 | Switches: water flow, low air, pressure alarm, tamper? | | |
| 8a | Switches on galvanized trim pipe? | | |
| 9 | Central station service is required (Who is responsible? _____) | | |
| 10 | Air compressor detailed (power, tank size & tank pressure)? STANDPIPES: Required in this building? | | |
| 11 | Standpipe type & size shown in all reqd. stairs & on roof (150' hose reach)? | | |
| 12 | Pipe material, schedule, & heating provision? | | |
| 13 | Control & check valves and FDC? Multiple standpipes conn. at base? | | |
| 14 | Size & position of hose outlets (2.5" outlets between 36" and 48" AFF) [aa] | | |
| 15 | Standpipe elevation reflecting hydraulic references and dimensions | | |
| 16 | Standpipe switches: water flow & tamper? FIRE DEPT. CONNECTIONS (FDC): FDC included with this Permit? | | |
| 17 | FDC size = sprinkler or standpipe riser up to 6" {6} | | |
| 18 | FDC inlets are 2.5" NST with frangible or ¼ turn caps? {6} | | |

- | | | | |
|---|--|--|--|
| 2 | Each area calc. has been checked against the plans for node, pipe diameter & length, and fittings consistency plus elevation changes [kk]. | | |
| 3 | Each remote area is shown with its criteria & demand at common point? | | |
| 4 | Selected remote area demands are displayed for the hydraulic placard? [jj]. | | |
| 5 | All total demands are 10% below water supply curve psi. {6-7.10}? | | |
| 6 | Drawings & Calcs reflect origin of design criteria correctly (storage criteria, room design, area-density, or UFC criteria)? | | |
| 7 | Schedule of settings for pressure-reducing valves [nn]. | | |
| 9 | Plumbing fixture load or domestic demand included in calculations? | | |

G. MISCELLANEOUS INFORMATION

- | | | Yes | No |
|---|--|-----|----|
| 1 | Elevator Shaft & Machine rm. spklrs. 212°F. on listed gate valves {6-7.12-1} | | |
| 2 | 135°F. fixed detector <=18" of ea. spklr. in mach. rm.?-3a} | | |
| 3 | Heat tracing & insulation used to "freeze-protect" {6-7.15-1}? | | |
| 4 | Heat trace is spklr. listed, supervised, & on standby power? {6-7.15-1} | | |
| 5 | Special hazard conditions exist or special extinguishing systems installed? | | |

8

FIRE DETECTION AND ALARM SYSTEMS *(Section Under Revision)*

9

ALTERNATIVE AUTOMATIC FIRE EXTINGUISHING SYSTEMS

9.01 *Standards Established*

Ref.: IFC 904

- 9.01-1. Automatic fire-extinguishing systems, other than automatic sprinkler systems, shall be designed, installed, inspected, tested and maintained in accordance with the provisions of this section and the applicable referenced standards:

NFPA 12 – Carbon Dioxide Systems
NFPA 12A – Halon Systems
NFPA 2001 – Clean Agent Systems
NFPA 72 – Fire Alarm Systems
NFPA 17A – Wet Chemical Systems
NFPA 17 – Dry Chemical Systems
NFPA 11 – Foam Systems
NFPA 11A – Foam Systems
NFPA 16 – Foam Systems

9.02. *Submission of Plans*

Ref.: IFC 105.2

- 9.02-1. All special extinguishing systems shall be submitted for approval at the time of permit application. The submittal shall include the information indicated in Appendix Table IV as a minimum, which is expected to be used as a Checklist. The intent of this submittal is to provide the City of Bellevue's plans examiner with enough information to allow a qualitative review of the adequacy of the proposed system to protect the indicated equipment. It shall include "flagged" or otherwise marked details from the Manufacturer's Installation Guide, so as to provide a complete reference for both plan review and for field inspection. It shall include a tabulation of flows from respective nozzles and a summary which substantiates the volumes of extinguishing agent provided. This is in addition to the normal flow calculations that determine orifice sizing.
- 9.02-2. The design for these systems must include a written sequence of operation and a performance matrix. These features, upon approval will be utilized as a basis for acceptance testing.

- 9.02-3. Special extinguishing systems that incorporate an electric based detection system must have a permit issued for that phase of the work in addition to the mechanical portion. This will require two separate permit applications. Such detection systems shall satisfy NFPA-72 as appropriate.
- 9.02-6. Submit an acceptance test procedure upon request by the Fire Department. This will be a comprehensive procedure including the detection, actuation, and operation of related equipment aspects of the system. All signs required by the Authority Having Jurisdiction or the applicable national standard are to be furnished and installed at the time of acceptance testing. All piping systems shall be subjected to some level of pressure testing as approved by the Fire Department.
- 9.02-7. Reserve supplies of extinguishing agents shall satisfy the requirements of the referenced national standards, or in some cases provided at the request of the Fire Department.

9.03 Wet Chemical Systems

Ref.: IFC 904.11

- 9.03-1. All wet chemical systems intended for kitchen hood protection shall include additional agent and nozzles to protect solid fueled grills and deep fat fryers as required by NFPA-96 or the manufacturer. These systems shall also be configured to maintain the hood exhaust fan in operation. Deep fat fryers may only be protected with a wet chemical system or other approved/listed suppression systems.

9.04 Dry Chemical Systems

Ref.: IFC 904.11

- 9.04-1. Dry chemical system drawings shall clearly indicate what ventilation equipment is required to be shutdown and what doors and dampers are to be closed upon or before actuation.
- 9.04-2. Dry chemical systems are no longer approved for protection of new kitchen hoods. Modifications to existing systems in most cases will require replacement of the dry chemical system.

9.05 Clean Agent Systems

Ref.: IFC 904.10

- 9.05-1. Clean agent system submittals must include manufacturer's documentation that the concentration proposed is adequate for the occupancy to be protected. The calculations must account for losses through openings that are not closed upon actuation.
- 9.05-2. Clean agent detection systems frequently serve to also actuate preaction type fire sprinkler systems. In this case, the first smoke detector must release the solenoid on the preaction valve. If the sprinkler system is a

double interlocked preaction type, then a second smoke detector may not be used for the second alarm to open the sprinkler preaction valve.

9.06 *Carbon Dioxide Systems*

Ref.: IFC 904.8

- 9.06-1. Total flooding type Carbon Dioxide systems inherently require pre-discharge warning to the occupants of an enclosed space or room, closing of openings, and shutdown of ventilation equipment. The provisions for these features must be clearly shown on the submitted documents and the performance matrix.
- 9.06-2. Pre-discharge evacuation warning signs must be mounted in a conspicuous location approved by the Fire Department.

9.07 *Halon Systems*

Ref.: IFC 904.9

- 9.07-1. New Halon 1211 or 1301 systems are not permitted. Existing systems may be recharged under approved permit conditions.
- 9.07-2. Halon replacement systems such as FM-200 or Energen must be documented to clearly show that the replacement system is equal to or superior to the existing Halon system with respect to its fire suppression capabilities.

9.08 *Foam Systems*

Ref.: IFC 904.7

- 9.08-2. Acceptance testing of a foam system shall include actual flow and concentration testing of the foam-water solution. A comprehensive acceptance testing procedure must be submitted and approved before any formal testing may proceed. Provision for disposal of foam concentrate and foam-water solution is the responsibility of the permit applicant.

10

MISCELLANEOUS STANDARDS

10.01 *Standards Established*

Ref.: IFC 102.7

Unique fire protection issues are included below, for which interpretations of the policy of the City of Bellevue Fire Department are provided. The resolution of these issues is intended to be in compliance with the requirements of the IFC or the appropriate NFPA standard.

10.02 *Protection of Fuel Gas Equipment*

Ref.: IFC 603.9, 3404.2.9.6.5, 2206.4, 2206.6.1, 2207.5.3, 2703.9.3, 3403.6.4, 3404.2.9.6.5, 3404.4.5

- 10.02-1. When required by the Fire Chief or his/her designate, fuel gas piping, meters, tanks, and/or appurtenances shall be protected from vehicular damage by crash posts as specified by the Utility Department having jurisdiction, or if not applicable, then the standard “guard post” detailed in section 10.03.
- a. Protective posts shall be four (4) inch schedule 40 or better steel posts set in thirty-six (36) inches of concrete, at least fifteen inches in diameter. The inside of the posts also shall be filled with concrete.
 - b. Posts shall be located at least five (5) feet from the fuel gas equipment, and shall be so arranged as to not interfere with maintenance or operations of the equipment.
 - c. Posts shall extend aboveground to a minimum height equal to the height of the device being protected, but in no case less than four (4) feet above finish grade at that location.
 - d. The number of posts shall be sufficient to protect the fuel gas system equipment, and shall be as specified by the Fire Chief or his/her designate. Posts shall be spaced not more than four (4) feet apart.
- 10.02-2. Where fuel gas piping and equipment is protected in a means acceptable to the fuel gas utility company, that method shall be considered acceptable to the Fire Chief or his/her designate.

10.03 *Alternate Guard Post (BOLLARD) Specifications*

Ref.: IFC 312.1

- 10.03-1. Guard posts to protect hydrants, fire department connections, and other equipment must satisfy the Utility Having Jurisdiction or the following, whichever is most stringent:
- a. Protective posts shall be four (4) inch schedule 40 (minimum) hot-dipped galvanized steel.
 - b. Set posts in thirty-six (36) inches of concrete at least 15 (fifteen) inches in diameter, sloped at grade to enhance runoff of water away from the post. The top to be rounded to enhance water runoff.
 - c. Posts shall extend aboveground to a minimum height of three (3) feet.
 - d. Posts shall be located at least five (5) feet from the hydrant, FDC, or other equipment, and shall not interfere with operation of the connections.
 - e. The number of posts shall be sufficient to protect the hydrant, fire department connection, or other equipment, and shall be spaced not more than four (4) feet apart.

10.04 *Automatic Fire/Smoke Vent*

Ref.: IFC 910.3.1

- 10.04-1. When spring-loaded, opaque mechanical automatic fire or smoke venting devices are installed in the roof of any building, the devices shall bear a permanent sign or stencil on them that reads as follows:

AUTO VENT

(6"high red letters)

Lettering shall be placed on the venting device exterior surface that is parallel to the roof.

- 10.04-2. Manual release cables **with handles** shall reach within ten (10) feet of the floor.

10.05 *Emergency Pump Shutoff*

Ref.: IFC 2203.2

- 10.05-1. Where emergency pump shutoff switches are required at automotive or marine service stations, they shall be arranged to de-energize all fuel dispensers at the site.

10.06 Hazard Identification Signs

Ref.: IFC 2703.4

When visible hazard identification signs designed in compliance with NFPA 704 are required, the size of the numerals shall comply with the following table:

**TABLE 10.06-1
Hazard ID Signs**

| Legibility Distance | Size |
|---------------------|------|
| 50' | 1" |
| 75' | 2" |
| 100' | 3" |
| 200' | 4" |
| 300' | 5" |
| >300' | 6" |

“Legibility Distance” shall be measured from the public street or approved fire apparatus access route, as determined by the Fire Chief or his/her designate.

11

SMOKE CONTROL *(Section Under Revision)*

12

HIGH RISE BUILDING PROVISIONS *(Section Under Revision)*

13

REFERENCED STANDARDS

ASME

American Society of Mechanical Engineers (ASME) Standard A17.1, “Safety Code for Elevators and Escalators” 2000 Edition.

American Society of Mechanical Engineers (ASME) Standard A17.13, “Safety Code for Existing Elevators and Escalators” 1996 Edition.

BMC

Bellevue Municipal Code (BMC) Chapter 23.11

IBC

International Building Code (IBC) 2003 Edition.

IFC

International Fire Code (IFC) 2003 Edition.

IMC

International Mechanical Code (IMC) 2003 Edition.

NFPA

National Fire Protection Association (NFPA) Standard No. 11, “Low Expansion Foam and Combined Agent Systems” 1998 Edition.

National Fire Protection Association (NFPA) Standard No. 11-A, “Medium- and High-Expansion Foam Systems” 1999 Edition.

National Fire Protection Association (NFPA) Standard No. 12, “Carbon Dioxide Extinguishing Systems”, 2000 Edition.

National Fire Protection Association (NFPA) Standard No. 12-A “Halon 1301 Fire Extinguishing Systems”, 1997 Edition.

NFPA – continued

National Fire Protection Association (NFPA) Standard N. 12-B, “Halon 1211 Fire Extinguishing Systems”, 1990 Edition.

National Fire Protection Association (NFPA) Standard No. 13, “Installation of Sprinkler Systems”, 1999 Edition.

National Fire Protection Association (NFPA) Standard No. 13-D, “Installation of Sprinkler System in One and Two Family Dwellings and Mobile Homes”, 1999 Edition.

National Fire Protection Association (NFPA) Standard No. 13-R, “Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height”, 1999 Edition.

National Fire Protection Association (NFPA) Standard No. 14, “Installation of Standpipe and Hose Systems”, 2000 Edition.

National Fire Protection Association (NFPA) Standard No. 15, “Water Spray Fixed Systems for Fire Protection”, 1996 Edition.

National Fire Protection Association (NFPA) Standard No. 16, “Deluge Foam-Water Sprinkler and Foam-Water Spray Systems”, 1999 Edition.

National Fire Protection Association (NFPA) Standard No. 16A, “Closed-Head Foam-Water Sprinkler and Foam-Water Spray Systems”, 1994 Edition.

National Fire Protection Association (NFPA) Standard No. 17, “Dry Chemical Extinguishing Systems”, 1998 Edition.

National Fire Protection Association (NFPA) Standard No. 17-A, “Wet Chemical Extinguishing Systems”, 1998 Edition.

National Fire Protection Association (NFPA) Standard No. 20, “Centrifugal Fire Pumps”, 1999 Edition.

National Fire Protection Association (NFPA) Standard No. 22, “Water Tanks for Private Fire Protection”, 1998 Edition.

National Fire Protection Association (NFPA) Standard No. 24, “Private Fire Service Mains and Their Appurtenances”, 1995 Edition.

National Fire Protection Association (NFPA) Standard No. 25, “Maintenance of Water Based Fire Protection Systems”, 1998 Edition.

National Fire Protection Association (NFPA) Standard No. 72, “National Fire Alarm Code”, 1999 Edition.

National Fire Protection Association (NFPA) Standard No. 750, “Water Mist Fire Protection Systems”, 2000 Edition.

NFPA – continued

National Fire Protection Association (NFPA) Standard No. 2001, “Clean Agent Fire Extinguishing Systems”, 2000 Edition.

UL

Underwriters Laboratories, Inc. (UL) Standard No. 300, “Fire Testing of Fire Extinguishing Systems for Protection of Restaurant Cooking Areas” – with revisions through December 1998.



APPENDIX
PERMIT CENTER REVIEW CHECKLIST

BELLEVUE FIRE DEPARTMENT
LIFE SAFETY PLAN REVIEW CHECKLIST, 1

Permit Number _____ Date _____

Project Name _____

Address _____

Permit Applicant Company _____

Certified By _____ Phone _____, Fax _____

BASIC BUILDING INFORMATION

1 OCCUPANCY & AREAS: _____
_____.

2 TYPES OF CONSTRUCTION: _____
_____.

3 HEIGHT (# STORIES & ELEVATION): _____
_____.

4 FLOOR AREAS & TOTAL: _____
_____.

5 AREA & OCCUPANCY SEPARATIONS: _____
_____.

6 HIGH RISE, MALL, ATRIA: _____
_____.

7 HAZARDOUS OCCUPANCY: _____
_____.

8 SPECIAL CONSTRUCTION OR OCCUPANCY: _____

(Multi-towers over single garage, area separation walls, special occupants, ...)

9 FLOOR FRAMING DETAILS: _____

10 SPRINKLER CODE TRADEOFFS: _____

CHECKLIST NOTES:

- Items which are not applicable are noted "NA" in the "Yes" column.
- **Items marked in the "NO" column are EXCEPTIONAL. Provide an explanation.**
- All references are to the 2003 IBC, IFB, or the BFD Development Standards.

A. ACCESS ROAD

ADEQUATE

Yes No

- 1 Access road to within 150 ft. of back of building?
- 2 Hose lay routes can be negotiated by firefighter?
- 3 Road is 20 ft. wide?
- 4 Road is paved and will support 64,000 lbs.?
- 5 Slope of road is less than 20%
- 6 Slope of road exceeds 15% (requiring sprinklers)?
- 7 Road over 150 ft. has a turnaround?
- 8 Through road (2 routes) is required?
- 9 Storm water detention vault is below access or turnaround? (Will support outriggers)
- 10 Mitigations required or suggested?

| Yes | No |
|-----|----|
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |

B. HYDRANTS & DISTRIBUTION

Yes No

- 1 Hydrant positioning per UFC Table A-III-B-1?
- 2 Hydrant positioning for R3 per BFD Stds?
- 3 Existing hydrants are across arterial (4-lanes)?
- 4 Mitigations required or suggested?

| Yes | No |
|-----|----|
| | |
| | |
| | |
| | |

C. WATER SUPPLY & FIREFLOW

Yes No

- 1 Water supply map page" _____, Hydrant # _____, Main Size _____
- 2 Available water supply: Ps= _____ psi, Pr= _____ psi, Flow= _____ gpm
- 3 R3 size versus apparent fire flow: _____ [UFC Table A-III-A-1]
- 4 Site high point and adjusted Static pres. (Ps): delta _____ ft. = _____ psi
- 5 Mitigations required or suggested?

| Yes | No |
|-----|----|
| | |
| | |
| | |
| | |
| | |

D. EGRESS SYTSEM

Yes No

- 1 Approx. occupant load per floor: _____
- 2 Number of stairways required: _____ & Satisfactory?
- 3 Stairs separated over 50% of diagonal distance?

| Yes | No |
|-----|----|
| | |
| | |
| | |

G. MISCELLANEOUS ISSUES

- 1 Air compressor on standby power or tank mounted?
- 2 Wet chemical commercial cooking extinguishing systems installed?
- 3 Commercial cooking grease laden exhaust ducts sprinklered?
- 4 Special extinguishing systems proposed?

| Yes | No |
|-----|----|
| | |
| | |
| | |
| | |

B

APPENDIX
SECTION NOT USED