



FIRE & LIFE SAFETY STANDARD

Title: Automatic Fire Sprinkler System	
Effective Date: 8/1/2017	Revised Date: 1/22/2018
Code References: National Fire Protection Association Standard 13	
Note: <i>This standard is a summary of Fire Department clarifications of City and State Codes. Information contained herein applies to typical circumstances and may not address all situations.</i>	

PURPOSE

This standard was developed with safety as the principle objective. Pursuant to the Marysville Municipal Code Section 13.20, the code official is authorized to render interpretations of the code, and to make and enforce rules and supplemental regulations in order to carry out the application and intent of its provisions. Such interpretations, rules and regulations shall be in conformance with the intent and purpose of the code and shall be available to the public during normal business hours. This standard includes requirements for:

- **Permits**
- **System Control Valves**
- **Plan Submittal**
- **Fire Extinguishing Alarm System**
- **System Design**
- **Standpipe and Hose Station**
- **Water Supply**
- **Inspection, Testing and Maintenance**
- **Centrifugal Fire Pump**

This standard has been developed to assist community development applicants, architects, engineers, contractors and the general public in designing and installing automatic fire sprinkler, fire pump and standpipe systems. This standard outlines the procedure to be followed when submitting automatic fire sprinkler system plans, and defines Fire Department requirements for automatic fire sprinkler system installations that may be more restrictive or not included in existing codes and standards.

SCOPE

This standard shall apply to the installation of new automatic fire sprinkler, fire pump and standpipe systems, or modifications to existing automatic fire sprinkler systems installed under previous standards adopted by the Fire Department.

Automatic fire sprinkler systems installed in all occupancies within buildings hereafter constructed shall be designed in accordance with the currently adopted edition of National Fire Protection Association Standard (NFPA) 13 (Standard for the Installation of Sprinkler Systems), except as noted within this standard.

Where hotels, motels, multiple-family residential apartment buildings and senior apartment buildings are provided with automatic fire sprinkler system protection as required by the California Fire Code, or California Building Code, said systems shall be designed in accordance with the current edition of NFPA13 (Standard for the Installation of Sprinkler Systems), except as noted within this standard.



Water supply systems installed to serve automatic fire sprinkler systems shall be designed in accordance with the current edition of NFPA 24 (Private Fire Service Mains and their Appurtenances), except as noted within this standard.

Fire pumps selected and installed to supply water for automatic fire sprinkler systems shall be designed in accordance with the current edition of NFPA 20 (Standard for the Installation of Centrifugal Fire Pumps), except as noted within this standard.

Standpipe and hose station systems shall be designed and installed in accordance with the current edition of NFPA 14 (Standard for the Installation of Standpipe and Hose Systems), except as noted within this standard.

Fire extinguishing system alarms installed to notify occupants within the interior of the building that automatic fire sprinkler system activation has occurred shall be designed in accordance with the current edition of NFPA 72 (National Fire Alarm Code), except as noted within this standard.

All buildings requiring automatic fire sprinkler system protection shall have sprinklers throughout and no building may be partially protected with sprinklers without approval of the Fire Code Official.

All single family dwelling units as defined by the California Building Code shall be sprinklered in accordance with current edition NFPA 13D (Standard for the Installation of Sprinkler Systems in One and Two-Family Dwellings and Manufactured Homes). Questions regarding plan review and inspections of residential fire sprinkler systems for one and two-family dwelling units shall contact the Marysville Fire Department. The contact phone number is (530) 741-6622.

All individuals and companies who propose to engage in the installation or alteration of fire sprinkler systems are subject to the requirements of this standard.

WHERE REQUIRED

Automatic fire sprinkler system protection shall be provided within buildings and structures as required by the current edition of the California Fire Code.

Automatic fire sprinkler system protection shall be provided in accordance with this standard in every building where required by current California Fire Code.

An approved fire control room shall be provided for all buildings protected by an automatic fire extinguishing system in accordance with the Marysville Municipal Code. Said room shall contain only system control valves, fire alarm control panels, and other fire equipment required by the code official. Fire control rooms shall be a minimum of 7 feet wide by 5 feet long and shall be directly accessible from the exterior of the building by an approved door. This room shall be enclosed and rated for one-hour. The location of the fire control room shall be approved by the



fire department. A durable sign shall be clearly marked "Fire Control Room" with three inch tall letters that contrast with their background. A key to the room shall be located within an approved Fire Department Knox Company key box located adjacent to the access door on the exterior of the building. Water heaters, furnaces, similar equipment or storage of any materials shall not be located within the fire control room.

Standpipe required systems shall be provided within all buildings 3 or more stories in height, except in Group R, Division 3 occupancies, in accordance with the California Fire Code.

During construction, every building 3 or more stories in height shall be provided with not less than 1 standpipe for use by the fire department in accordance with the California Fire Code as amended by the Marysville Municipal Code. Such standpipe shall be installed when the progress of construction is not more than 25 feet in height above the lowest level of fire department access. Such standpipe shall be provided with fire department hose connections at accessible locations adjacent to usable stairs and the standpipe outlets shall be located adjacent to such usable stairs. Such standpipe system shall be extended as construction progresses to within 1 floor of the highest point of construction having secure decking or flooring.

An approved 2 ½ inch hose station shall be installed adjacent to all fire access doors required for high-piled combustible storage areas as required per Table 3206.2 of the CFC as amended by the Marysville Municipal Code.

PLAN SUBMITTAL REQUIREMENTS

Automatic fire sprinkler system(s) shall be designed by one of the following persons:

- A. A State of California Licensed professional engineer holding a license in civil engineering, mechanical engineering or fire protection engineering.
- B. A State of California Licensed C-16 (Fire Protection) contractor when that contractor is also installing said system(s).

All drawings and the front sheet of the hydraulic calculation report shall have the appropriate engineer or contractors' stamp affixed to it along with a wet signature.

Automatic fire sprinkler system plans for new installations, system upgrades, partial systems, system alterations and special systems shall be submitted to the Marysville Fire Department at 107 9th Street, Marysville, CA.

All plan review and inspection fees shall be paid prior to the review of plan submittals. Plan review fees include the original plan review and one additional review by the Fire & Life Safety Division. An administrative charge shall be paid for all resubmittals upon the second or subsequent revision. Additional fees will be charged for all expedited, special request, or outside contracted plan reviews as determined necessary by the Fire Code Official.



A minimum of two 30 inch by 42 inch drawings, hydraulic calculation reports and product material cut sheets shall be submitted by the applicant for all new systems or modifications to existing systems beyond the installation of fire sprinkler drops into tenant spaces.

Upon approval of the submittal, one set shall be retained by the Fire & Life Safety Division and the others returned to the applicant.

An approved set of automatic fire sprinkler plans shall be retained at the construction site by the contractor until final occupancy is approved by the City. All deviations from the approved plans shall be submitted for review and approval to the fire department prior to inspection.

All water supply information provided shall be current to within 12 months of the date of request.

Hydraulic calculations for automatic fire sprinkler systems shall take into account the friction loss required through fire protection backflow assemblies and elevation changes between the reference location and project location for the required flow and pressure.

Drawings submitted to the Fire & Life Safety Division shall include all information required by the current edition of NFPA 13. Plans not providing all required information will be returned to the applicant as incomplete.

Where modifications to an existing system are made, all new connection points to that system shall be clearly identified and the most remote area shall be shown on the drawing.

Hydraulic reference points shown on the plan shall correspond with comparable reference points on the hydraulic calculation sheets.

When the Room Design Method is used, all unprotected wall openings throughout the floor protected shall be identified. The fire-resistive rating of walls serving the room shall also be identified.

A pressure gauge and sectional control valves shall be installed on all floors risers and standpipe outlets including the roof.

Methods used for future tenant improvements shall be shown for all new installation drawings.



SYSTEM DESIGN REQUIREMENTS

Automatic fire sprinkler systems shall be designed in accordance with NFPA 13, except where noted within this section.

Note: For tenants that are known to store commodities that will result in the design of a fire sprinkler system that will exceed the design criteria from NFPA 13, the owner shall be responsible to have the automatic fire sprinkler system designed and installed based on the actual storage commodity and arrangement.

Flammable finishing spray booths as defined by the Fire Code shall be designed in accordance with Extra Hazard Group 2 design requirements. Spray booths shall have a separate monitored control valve and drain. For hydraulic purposes, calculations shall be based upon all fire sprinkler heads within the booth flowing simultaneously.

Fire sprinklers shall not be located within smoke-heat vent openings.

All combustibile concealed spaces shall follow the provisions of the current edition of NFPA 13.

All fire sprinklers within duct work shall be accessible for periodic inspection by a 3 inch diameter opening covered by a 6 inch wide sealed access panel.

A letter from the owner or authorized agent certifying the use and layout configuration shall accompany the plan set submittal as required within the current edition of NFPA 13.

WATER SUPPLY REQUIREMENTS

Fire department connections (FDC) shall be visible, accessible, and installed on the address street side of buildings or in approved locations, and provided with listed caps.

FDCs located as part of the backflow assembly shall be on the system side of the backflow device, readily accessible and facing within 5 feet of the fire access road.

FDCs shall be located at approved locations on the property when the private fire service water main system also serves additional fire protection equipment including fire hydrants, fire pumps and foam systems.

To minimize the potential for over pressurization of the private underground fire line, the following shall be provided for all automatic fire sprinkler system water mains:

- A. An isolation valve between the protected backflow assembly and the fire sprinkler system riser shall be an approved post indicator valve type. Subject to the approval of the fire department, this valve is not required if the backflow assembly services only one building.
- B. All valves controlling private fire service water main supplies, including fire protection backflow assembly valves, post indicator valves and sectional control valves, shall be electronically supervised by the building fire-extinguishing system alarm control panel. This provision excludes valves serving fire hydrants and underground isolation valves.



- C. FDC's shall be located between 10 and 40 feet from an accessible fire hydrant. Said hydrant shall be located on the same side of the fire department access road as the FDC's.
- D. FDC's shall be within 5 feet of the curb or back of walkways adjacent to a public street or approved fire access road.
- E. When the FDC's are attached directly to a fire protection backflow assembly device, the connections shall be facing the adjoining fire access road.
- F. A minimum 3 foot clear space shall be provided and maintained around fire protection equipment.
- G. Visual obstructions or screens including walls, plants, and covers shall not obstruct access to the FDC, system control valves or fire hydrant(s). The Fire Department shall have final approval of visual screens with regards to fire department equipment.

There shall be one FDC per building.

Existing buildings with automatic sprinkler systems that are enlarged with the addition of 1,500 sq ft or more shall conform to the provisions of this standard and may require a new FDC which will be capable of serving the entire system.

A minimum of two inlets, 2 ½ inches in size shall be provided for each FDC. Systems designed for a total combined water demand in excess of 500 gpm shall be equipped with one inlet for each additional 250 gpm of flow or fraction thereof.



CENTRIFUGAL FIRE PUMP REQUIREMENTS

Diesel fuel supply systems in excess of 55 gallons shall be required to be permitted by the Certified Unified Program Agency (CUPA). If the amount exceeds 60 gallons, a valid fire department flammable-combustible liquid permit shall be required as well. All applicable fees shall be paid prior to system installation. Permit shall be renewed on an annual basis.

Fire pump rooms or buildings which are classified in accordance with the California Building Code (CBC) as a Group H, Division 2 or 3 occupancy, shall be protected by an approved automatic fire sprinkler system.

All fire pump rooms shall be temperature controlled in accordance with NFPA 20.

Interior doors serving fire pump rooms shall be self-closing and fire-resistant in accordance with the CBC.

Tank supports and connections shall be approved by the CBC to resist damage as a result of seismic activity. Fuel tanks shall obtain approval from a structural engineer as part of this submittal.

Product piping shall be hydrostatically tested to 150 percent of the maximum anticipated pressure of the system, or pneumatically tested to 110 percent of the maximum anticipated pressure of the system, but not less than 5 psi at the highest point in the system or manufactures guidelines. This test shall be maintained for a sufficient time period to complete visual inspection of all joints and connections. For a minimum of 10 minutes, there shall not be leakage or permanent distortion. Care shall be exercised to ensure that these pressures are not applied to vented storage tanks.

An exterior audible alarm bell shall be located directly outside the fire pump room or house to alert of fire pump activation. To ensure that audible alarms are clearly heard, they shall have a sound level at least 15 dBA above the average ambient sound level for the area. An approved sign shall be placed above or adjacent to the alarm bell to indicate its purpose.

A weatherproof outdoor strobe and a bell shall be located above the fire control room for the fire department use subject to this department approval. Test headers shall be installed as part of the installation along with the looped flow meter.

SYSTEM CONTROL VALVES

Automatic fire sprinkler system control valves shall have a permanent sign affixed that identifies the protection area or system(s) that the valve controls. Signs shall be durable, painted white with red letters ½ inch high with 1/8 inch stroke, and shall be permanently banded to the valve or affixed to a wall adjacent to the valve.

Barricades shall be installed to protect automatic fire sprinkler system control valves and FDCs from vehicular damage. A 6 inch metal Schedule 40 pipe, filled with concrete, shall be set in concrete to a depth of 36 inches below grade. The dimension of the hole shall not be less than 12 inches in diameter and shall not be less than 36 inches from any device being protected. Where more than one barricade is required the distance between barricades shall not exceed four 4 feet. Barricades shall not obstruct the operation of the device being protected.

Floor control valves shall be provided on all floors regardless of occupancies except for those



systems installed based on NFPA 13D.

An automatic fire sprinkler system inspector's test valve located behind a wall shall have an access panel door accessible at all times and clearly marked with approved signage.

If pre-action valves are placed within an automatic fire sprinkler system, they shall be designed to "fail safe" in the event of a power failure.

Exterior canopies attached to a structure and greater than 4 feet shall be sprinklered regardless of construction type.

FIRE EXTINGUISHING ALARM SYSTEM

Audible fire sprinkler flow alarms shall comply with the following provisions:

- A. An approved exterior water flow alarm shall be provided for each fire sprinkler riser.
- B. Water flow alarm bells shall be located on the wall directly outside the fire control room.
- C. All fire sprinkler systems shall be electronically supervised by an approved central station UL, UUFX certified alarm service provider.
- D. When a central station company is monitoring more than one zone or building with a single retransmitter, the central station company shall identify the particular zone or building or both that is in alarm. Fire alarm panels installed at the premises shall be capable of differentiating between signals, including water flow, manual and automatic activating components and transmitting distinctive fire alarm, supervisory and trouble signals.
- E. Fire alarm panels shall be located within the fire control room.
- F. The activation of a fire sprinkler system shall cause the system to initiate a signal to the central station company within 90 seconds. Retransmission from the central station to the Fire Dispatch Center shall not exceed 60 seconds.



FIRE CONTROL ROOM

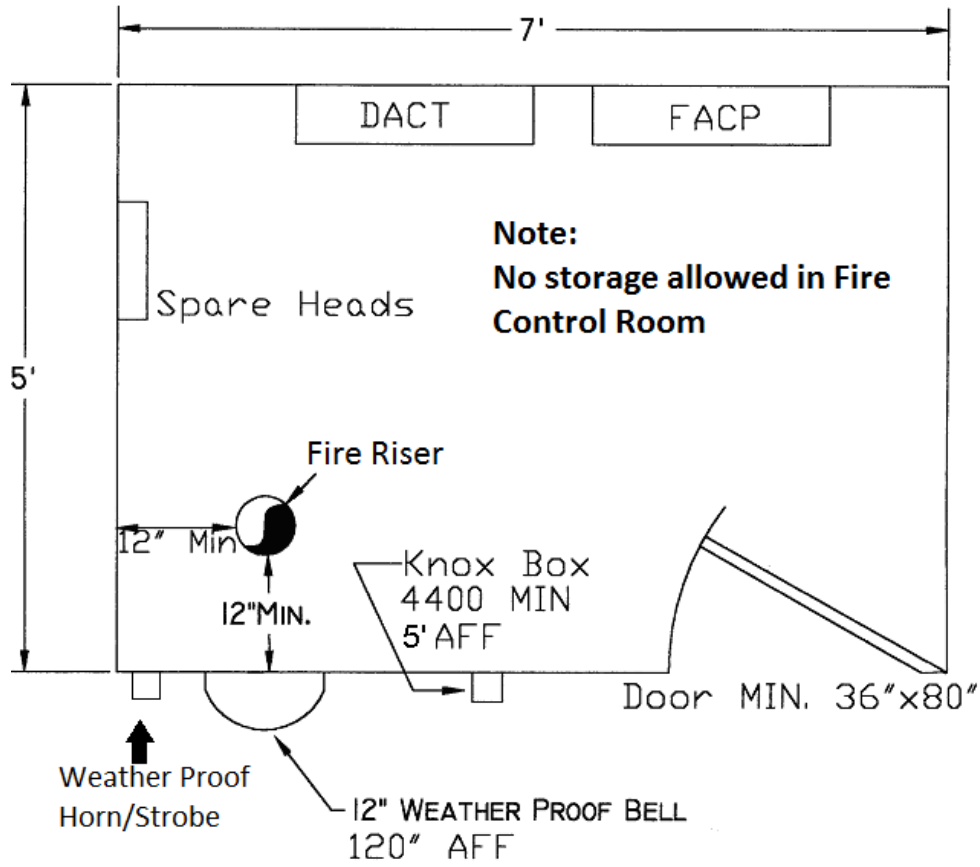


Figure 1
Example Fire Control Room



STANDPIPE AND HOSE STATION REQUIREMENTS

For buildings under 75 feet in height from the fire department access road, assume 150 psi residual pressure at the FDC for the purpose of standpipe design. A fire pump will not be required provided the city water supply is adequate for the design of the fire sprinkler system.

For buildings 3 stories or less in height, the minimum flow rate for the hydraulically most remote standpipe shall be 500 gpm.

For buildings where a fire pump is required and standpipes are installed, the design shall include the hydraulically most remote standpipe outlet to discharge 500 gpm at 100 psi residual pressure.

Required hose station(s) shall be installed near approved fire department access locations or where otherwise required. Hose station outlets shall be a minimum of 2 ½ inches in diameter and shall be mounted between 3 to 5 feet from the floor. Hose stations shall be capable of flowing a minimum of 250 gpm, and shall be fed from outside the hydraulic demand area for the system.

Standpipes, sprinkler risers and hose station system valves shall be clear and unobstructed from all sides at a minimum of 6 inches.

Standpipes shall be located on the landing and in a vestibule if provided of each floor when required approved subject to the fire department approval.

Standpipe outlets shall not exceed 300 feet based on actual travel distances without obstructions subject to the fire department approval.

INSPECTION, TESTING AND MAINTENANCE

It is the responsibility of the installing contractor to be on the job site during the inspection. Failure to do so will result in the cancellation of the inspection. Canceled inspections without notifying our division will be counted as 1 inspection.

Inspections shall be scheduled a minimum of 48 hours in advance of the date requested.

Inspection times are approximate and may vary because of delays at previous inspections or emergency response by fire department personnel. Please allow time on either side of the inspection time for the inspector to arrive.



The following system tests shall be witnessed by the fire department:

- A. All welded fittings shall be inspected prior to hanging the pipe. All welds shall bear the stamp of a certified welder.
- B. All risers, mains, branch lines, fire sprinkler drops, earthquake bracing and other system components shall be inspected to verify that the installation conforms to the approved plans for the project and NFPA 13.
- C. A hydrostatic pressure test of 200 psi for 2 hours shall be performed on all new systems. No loss of pressure or water leakage during the test period is permitted. An accurate test gage shall be installed on the system riser and at other locations required by the fire inspector. Persons conducting the test shall be ready for the test to begin at the scheduled appointment time, and all pumps, hose lines and other equipment shall be disconnected.
- D. All tenant improvements which requires an increase in the square footage to the permitted structure shall have the fire sprinkler system hydrostatically pressure tested at a minimum of 150 psi for two hours. This applies to all new installations exceeding a minimum of two branch lines, 20 sprinklers or at the discretion of the fire inspector.
- E. Fire pump acceptance testing in accordance with the standards established by NFPA 20.
- F. Standpipe and hose station acceptance testing in accordance with NFPA 14.
- G. A main drain and inspectors test drain test shall be performed during the final walk through of the system.

A final inspection is required for the system prior to occupancy being approved.

A completed Contractors Material and Test Certificate for Aboveground Piping form and As-Built drawings shall be provided to the fire inspector before final occupancy is approved.

A set of approved fire sprinkler plans shall be kept at the job site prior to initial inspection.

A record set of fire sprinkler drawings and calculations for the building shall be retained within the fire control room for fire department use. Documents shall be protected from damage within an approved cabinet.

A laminated site/floor plan(s), including relevant zones, shall be posted in the fire control room. A revised laminated floor plan shall be provided for any changes to the fire sprinkler system.



Existing automatic fire sprinkler systems that have been modified with the addition or replacement of system risers, mains, branch lines and other equipment, except fire sprinkler drops into tenant spaces, shall be hydrostatically tested at 150 psi for a 2 hour test period. No loss of pressure or water leakage is permitted in the system.

Automatic fire sprinkler systems shall be inspected, tested and maintained in accordance with NFPA 25 (Inspection, Testing and Maintenance of Fire Protection Systems) as adopted by the State. A written record of all required owner inspections shall be retained on the site for fire department review.

Automatic fire sprinkler systems shall be serviced by a California State licensed C-16 (Fire Protection) contractor or be California State Fire Marshal licensed in accordance with California Code of Regulations, Title 19 or NFPA 25 as adopted by the State. A written report shall be forwarded to the fire department which outlines all discrepancies noted during the inspection and the corrective actions required. Upon correction of all discrepancies, a certification label shall be affixed to the system riser by the fire protection company.

Existing automatic fire sprinkler systems which have been modified to include new riser(s), mains, branch lines and other equipment, with the exception of fire sprinkler drops into tenant spaces, shall be serviced in accordance with California Code of Regulations, Title 19 or NFPA 25 as adopted by the State. A written report shall be forwarded to the fire department which outlines all discrepancies noted during the inspection and the corrective actions required. Upon correction of all discrepancies, a certification label shall be affixed to the system riser by the fire protection company.

An annual flow test of each pump assembly shall be conducted under minimum, rated, and peak flows of the fire pump by controlling the quantity of water discharged through approved test devices by a State of California licensed contractor. Said testing shall be conducted as described in NFPA 25. A written record; using an approved format, of all annual fire pump testing shall be submitted to the fire department which shows the results of all testing and deficiencies found. Any deficiencies noted shall be repaired immediately.

A flow test of each standpipe and hose system shall be conducted every 5 years through approved test devices by a State of California licensed contractor. Testing shall be conducted as described in NFPA 25. A written record; using an approved format, of all flow testing shall be submitted to the fire department which shows the results of all testing and deficiencies found. Any deficiencies noted shall be repaired immediately.



KNOX BOX REQUIREMENTS

NFPA 1-16.3.4.4 (buildings under construction), NFPA 1-18.2.2.1 (existing buildings), and the IFC 506.1 (new construction) require that a key box with keys to designated area of a structure be installed on a building in an approved location when access to the structure or areas of the structure are determined by the Fire Chief or his designee to be difficult due to security features of the building. These guidelines provide information regarding which buildings will be required to install a Knox Box, how to obtain a Knox Box and where they are to be located on the building.

Buildings requiring a Knox Box:

- (a) Any building that has installed within it an automatic fire suppression system, a remotely monitored automatic fire alarm system, or an elevator will need a Knox Box.
- (b) Any commercial building that has more than two stories will need a Knox Box.
- (c) Any building containing hazardous materials requiring the filing of a Tier II report will need a Knox Box.
- (d) Residential buildings with eight or more rental units will need a Knox Box.

Location:

- (a) Knox Boxes must be installed within three feet horizontally of the principle entrance door of the building or within three feet horizontally of another entrance to the building which is acceptable to the fire department. They need to be installed no less than 5.5 feet vertically from the threshold of the door and no more that seven feet vertically from the threshold of the door. However, the preference of the Fire Department is that Knox Boxes be installed at the 5.5 foot level.
- (b) Key boxes must be installed on the side of the building facing the street of address unless the Fire Department has approved another location.
- (c) In the diagram below, a Knox Box may be installed anywhere in the gray shaded area only.

Keys Required:

With the exception of Knox Boxes located on residential buildings, all Knox Boxes must contain the key for the principle entrance, the key for every other keyed exterior entrance, and any keys to interior doors deemed required by the fire department. All keys in the Knox Box must be clearly labeled with regard to their function. Any time the locks on the doors for which the keys are stored in the Knox Box are changed, the owner of the building must immediately notify the Fire Department and immediately provide the Fire Department with the keys for the new locks.

On residential buildings Knox Boxes need only contain the keys to portions of the building not leased to residents including their apartments and any storage or garage areas they rent within the building. However, keys to such areas as common hallways, utility rooms, laundry rooms, basements, and any spaces used by the building owner for storage or for other purposes must be placed in the Knox Box.



How to Obtain a Knox Box:

Knox Boxes must be ordered directly from the Knox Box Company. When calling the Knox Company, ensure you state you are installing the box in the city of Marysville.

Questions:

If you have any questions about the installation of Knox Boxes, please contact us at (530) 741-6622.

