



Extension FactSheet

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Water Sources for Fire Protection in Small Communities

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Large cities use the public water supply for fire protection. Large fire hydrants connected to large diameter water pipes deliver the necessary flowrate for fighting fires. The water stored in the community reservoirs and water towers is often adequate without disrupting service.

Small community water supplies, however, may not be adequate for fighting fires. Flush hydrants, required to maintain the distribution system, are not fire hydrants and do not provide adequate water flowrates for fire protection. The volume of water stored in small community water towers is generally not enough to fight most fires. Using potable water sources to fight a fire will likely disrupt customer service for a day or more. Most rural water supplies can provide only enough water for “first aid” in starting to control a fire until adequate water from other sources can be brought to the site.

Volume of Water Needed

Firefighters need quick access to large volumes of water to control and put out a fire. While more water is generally better, the minimum water volumes and flowrates are recommended by the National Fire Protection Association.

Minimum volume and flowrates for adequate fire protection are calculated for each community. Local fire companies survey the number, type, construction material, contents, and proximity of structures in a community. The minimum water supply is calculated from:

- the cubic feet of each structure,
- its occupancy hazard classification, and
- its construction classification.

Occupancy hazard classifications range from 3 for severe hazards, such as lumberyards, feed and grain mills, or fuel storage, to 7 for light hazards, such as a dwelling,

school, or office building. Construction hazard classifications are based on the building material. A construction hazard classification of 0.5 is for fire resistant concrete, brick, or stone buildings while a classification of 1.5 is for wood frame construction.

Minimum water supply values increase as the buildings are closer together. The values increase by 1.5 times if structures are closer than 50 feet apart.

A community may have enough water to provide fire protection but the water must be applied quickly to control a fire. The rate at which water flows to a fire is controlled by the capacity of the pipes, hydrants and the water pressure. The flowrate per water “stream” should be at least 500 gallons per minute and sustained for at least 60 minutes to control a fire. If the structures are close together, higher flowrates are needed. Large structures, such as a hospital or school building, may require more than one water stream, requiring more water. If structures are close together, the risk of a fire spreading increases, so higher minimum flowrates are recommended.



Flush Hydrant



Fire Hydrant

<i>Structure separation</i>	<i>Minimum fire flow (gal/min)</i>
less than 30 feet	1,000
30 to 100 feet	750
more than 100 feet	500

Providing Water for Fire Protection

Fortunately, small communities have several options available for the development of water reserves for fire protection. For example:

- Large and high hazard sites can construct elevated water storage tanks.
- Cisterns and swimming pools can serve as a developed water source.
- Natural and constructed bodies of water, such as ponds, quarries, mines, springs, and even wastewater treatment lagoons can be improved to provide water for fire protection.

Water bodies in Ohio are subject to environmental conditions such as freezing weather and droughts. Many water bodies have steep banks, making access in an emergency difficult. Communities that plan to use these sources for fire protection need to do five things.

1. Map the location, volumes, and type of each water supply. This map should be provided to the fire alarm dispatcher.
2. An all-weather road must lead to each water source.
3. A dry-hydrant that matches local fire equipment should be installed at each water source. Details on dry-hydrants are in Ohio State University Extension Fact Sheet AEX-422, available at your local Extension office or on the Ohioline web site at <http://ohioline.osu.edu>.
4. Inspect each water source regularly to note any changes in water level or access and correct any problems.
5. A usage agreement should be obtained for each water source located on private property. An example agreement is shown below.

Fire companies will use one or more pumper trucks to transport water to the fire scene. Therefore, travel distance

is critical in getting water to a fire in a timely manner. A community should have multiple sources of water throughout the area rather than rely on only a central source.

Using a Community Water Supply for Fire Protection

If a community chooses to use the public water supply for some or all of its fire protection needs, the spacing of fire hydrants must be considered. The large hydrants served by large pipes are more expensive than those required for domestic use. Careful placement of fire hydrants can keep costs reasonable while still providing adequate fire protection. The distance from a dwelling to the nearest fire hydrant ranges from 250 to 500 feet and is a factor in setting fire insurance rates.

*Example Water Usage Agreement**

We the undersigned owner(s) of a lake or pond located at _____ do hereby grant the _____ Fire Department permission to maintain a dry hydrant and access roadway to said lake or pond to be utilized for emergency fire suppression purposes.

All other uses of said pond or lake shall be after notification and permission of the owner.

**After: National Fire Protection Association, 1993.*

Community Fire Protection Program

As a part of developing a fire protection program in your community, talk to your local insurance provider about fire insurance costs and requirements. More importantly, talk to your local fire company about ways to improve fire protection in your community through the installation of dry hydrants in water bodies in and around the community. The local water system manager should be consulted about the potential and costs of using the community water system for fire protection. Also contact the National Fire Protection Association for more detailed information on its standards for Water Supplies for Suburban and Rural Fire Fighting (NFPA 1231). The Association's phone number is 617-770-3000 and its web site is www.nfpa.org.

Visit Ohio State University Extension's web site "Ohioline" at: <http://ohioline.osu.edu>

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