NY Fire Consultants, Inc.
Fire Safety Message

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STANDPIPE SYSTEMS

Standpipe systems are an important part of the fire protection system in a building. The standpipe system provides water that firefighters can manually discharge through hoses onto a fire. Water is fed into a piping system. The piping runs vertically (up and down) and horizontally (side to side) throughout the building. The piping running vertically is usually called risers. The risers are usually located in the staircase enclosures or in the hallways in the building. This piping system supplies water to every floor in the building. When a standpipe system is installed and properly maintained it is a very effective means for extinguishing fires.

STANDPIPE DESIGN

Standpipe systems are used in buildings where it may be difficult for the Fire Department stretch fire hose from the street to remote or higher areas of the building. For example, standpipe systems are required in buildings that are over six stories or 75 feet in height. A standpipe system may be combined with an automatic fire protection system. For example, a standpipe system and a sprinkler system may be installed in the same building. The standpipe and the sprinkler systems may even share the same water supply and riser piping. The top of the standpipe riser extends up onto the roof. Three hose connections are attached to the top of the standpipe riser. These three connections make up the roof manifold. The roof manifold is used when extinguishing fires on the roof or adjoining buildings. It is also used when testing the water flow in the standpipe.

Roof Manifold

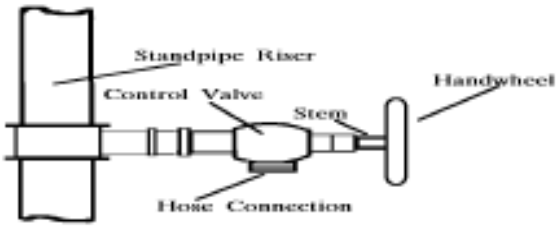
At selected locations in the building the piping is connected to a hose. These connections are controlled by gate valves. No water is allowed into the hose until the valve is opened. The gate valve must be manually opened by the firefighter. The hose is usually stored on a quick release rack.

A nozzle is attached at the end of the hose. The nozzle is used to direct the stream of water from the hose.

Roof Manifold

The hose and nozzle must be easy to reach at all times. The hose outlets are located so that every part of the building may be reached with a hose stream. The maximum length of a single hose line is 125 feet. Hose lines shall be made up of fifty-foot *factory coupled** lengths. Only one length less than fifty feet will be permitted where hose length is not of equal fifty-foot increments, and no length shall be less than twenty-five feet. Sometimes the hoses are installed in cabinets. If the hoses are installed in cabinets each cabinet should be labeled "FIRE HOSE". When the hose outlets are not easy to see, signs should be posted telling where the hose outlets are located. A pressure-reducing device should be installed in the piping at each hose outlet. An occupant of the building may be injured if a hose is used when the pressure-reducing device is not installed. The pressure-reducing device may be adjusted or removed by Fire Department personnel during an emergency.

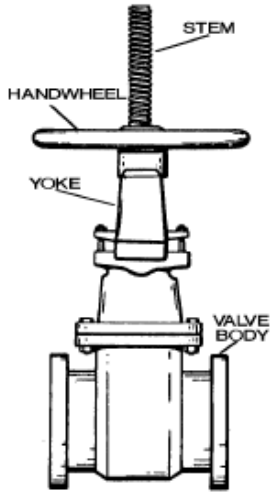
Another kind of connection to the standpipe is found in some systems. A short length of piping is welded to the riser. At the end of this pipe are a control valve and a 2-$\frac{1}{2}$ inch hose connection. No hose is installed to this connection. The Fire Department attaches its own hose to this connection when fighting a fire.



Fire Department Connection to a Standpipe Riser

Each standpipe system is also fitted with a drain valve. The drain valve is located at the lowest point on the standpipe system. The drain valve is used when the standpipe system is being tested or repaired. The drain valve is usually sealed in

the closed position. OS&Y (Outside Stem and Yoke) gate valves are installed at several places in the system. The OS&Y valves can be used to shut down just a part of the standpipe system. Sections may be shut down when fighting a fire. Sections are also shut down for testing, repairs or maintenance. It is easy to tell if the OS&Y valve is in the open or closed position. If the stem is raised above the control wheel the valve is open. If the stem is flush with the control wheel the valve is closed. A typical OS&Y gate valve is shown below in the open position.



Typical OS&Y valve

TYPES OF STANDPIPE SYSTEMS

Wet Standpipe This system has water in the standpipe all of the time. The water in the system is always under pressure. In some cases a fire pump may be used to increase the water pressure. The wet pipe system is the most commonly used standpipe system. It is used in heated buildings where there is no danger of the water in the pipes freezing. Any part of the standpipe system that is exposed to freezing temperatures should be insulated. It is very important that the water in the piping does not freeze. Frozen water may prevent the standpipe system from working.

Dry Standpipe with an Automatic Dry Pipe Valve This system is usually supplied by a public water main. Under normal conditions there is no water in the standpipe. Instead, there is air under pressure in the standpipe. A dry pipe valve is installed to prevent water from entering the standpipe. The dry pipe valve is designed to open when there is drop of air pressure in the standpipe. When a hose is opened it causes a drop in air pressure in the standpipe system. Then the dry pipe valve automatically lets water flow into the standpipe. A control valve is installed at the

automatic water supply connection. This valve should be kept open at all times to supply the standpipe system. This system is usually installed in a building that is not heated.

Dry Standpipe with a Manual Control Valve This system is supplied by a public water main. Under normal conditions this system has no water in the piping. The water is not allowed into the standpipe until a control valve is manually operated. The control valve remains closed until a fire occurs. This system is usually used in a building that is not heated.

Dry Standpipe with No Permanent Water Supply Under normal conditions this system has no water in the standpipe. Water is pumped into the standpipe system by the Fire Department. The water is pumped in through the siamese connection. This system cannot be used unless water is supplied by the Fire Department. A sign must be attached to each of the hose outlets. It should read **"Dry Standpipe for Fire Department Use Only"**. This system is usually used in a building that is not heated.

CLASSES OF STANDPIPES SYSTEMS

Standpipe systems are classified depending on who is expected to use the system.

The three classes are briefly described below.

Class I: This system is designed to be used by professional firefighters. For example, the system is used by Fire Department and Fire Brigade personnel. The fire hoses in these systems are 2-$\frac{1}{2}$ inches in diameter. The large hose diameter makes it difficult to control the stream of water from the hose.

Class II: This system is designed to be used by the occupants of a building. The hose and nozzle are connected to the standpipe. They are ready to be used by occupants in case of a fire. The hose is 1-$\frac{1}{2}$ inches in diameter. The hose stream is easier to control than the Class I hose.

Class III: This system may be used by either professional firefighters or by occupants of the building. The hosing may be adjusted to either 1-$\frac{1}{2}$ or 2-$\frac{1}{2}$ inches in diameter. This is done by attaching special reducing valves to the hose line.

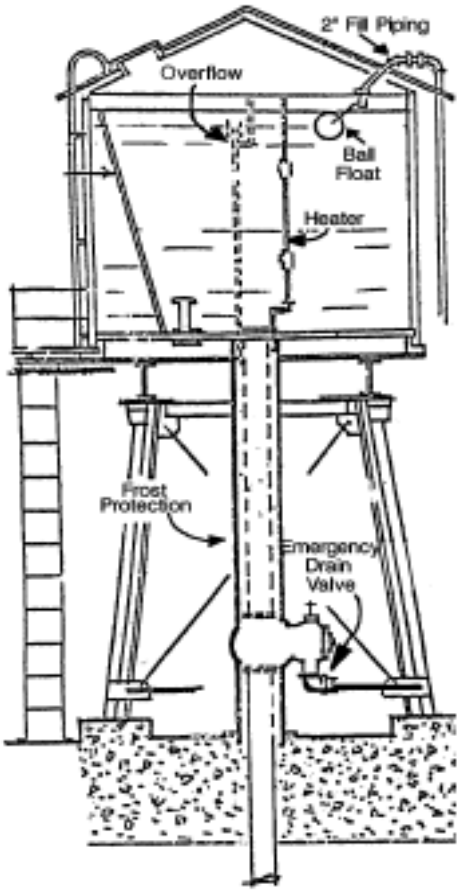
INSPECTION AND MAINTENANCE

The standpipe system must be regularly inspected by the Certificate of Fitness holder. This is to make sure that the system is working properly at all times. All

parts of the standpipe system should be visually checked **monthly**. This visual inspection should make sure that the system is free from corrosion. The inspection should also make sure that there is no physical damage to the system. Special attention should be paid to any evidence of tampering with the standpipe system. Any part of the system that is damaged or missing should be repaired or replaced immediately. All valves and connections to the automatic water supply sources should be inspected **weekly**. The valves should be checked to make sure that they are in the correct position. The valves should also be labeled to show their correct position and purpose. The hose outlets should be checked to make sure that the pressure reducing devices are present. The Fire Department should be notified when any part of the system is shut down for maintenance or repairs. A sign should be posted indicating that the section is shut down. All Fire Department connections must be tested at least once every **5 years**. All major defects in the system should be immediately reported to the local firehouse. The owner of the building and the Bureau of Fire Prevention should also be notified. Major defects include: an empty tank; a break or a leak in the system water piping; an inoperative or shut water supply valve; and a defective siamese connection. The defects should be corrected as soon as possible. A complete or partial shutdown of the standpipe system for repairs or any other reason must also be reported. Minor defects should be reported to the owner of the building. The defects should be repaired within days. If the defects are not corrected within **30 days,** they must be reported to the Bureau of Fire Prevention. The date of all inspections, maintenance and repairs made on the system must be recorded on the inspection record card. The record should also include the Certificate of Fitness number and the signature of the Certificate of Fitness holder. This record must be posted near the main control valve. All records must be kept for a period of at least **one year**. They should be made available to any representative of the Fire Department.

GRAVITY TANKS

Gravity tanks are used for water storage. They are made of wood, steel or concrete. Gravity tanks are used as a primary or secondary water supply source for standpipe systems. A gravity tank system delivers water from the tank through the standpipe system without the use of pumping equipment. A gravity tank should be at least 25 feet above the highest standpipe hose outlet that it supplies. Tanks may be located on the tops of buildings or raised on tall supporting towers.



A Typical Gravity Tank

The water pressure in a gravity tank system depends on the elevation of the tank. This is its main advantage over other kinds of systems. Every one foot the tank is above the discharge outlet generates 0.434 psi (pounds per square inch) of water pressure. So, in other words, the higher the tank is elevated the greater the water pressure. The gravity tank is extremely reliable. It does not depend on the operation of mechanical equipment to supply the standpipe or sprinkler system. Automatic fill pumps supply the water to most gravity tanks. The pumps fill the tank at a rate of 65 gpm (gallons per minute) or more. Two floats control the amount of water in the tank. The floats turn on the fill pump when the water in the tank is too low. The floats shut off the pump when the desired water level is reached. The floats make sure the gravity tank always has the right amount of water to supply the standpipe or sprinkler system. All gravity tanks have an overflow pipe that drains off too much water in the tank. This happens if the floats do not turn off the fill pump. A fill pump is not necessary if the water pressure in the city water main is able to keep the tank filled with the right amount of water. Gravity tanks are exposed to very low temperatures. All parts

of the gravity tank must be insulated or heated to keep the water from freezing. Several methods are used to heat the tank and the pipe that supplies the water.

- Hot water is circulated by gravity
- Steam is discharged directly into tank.
- Steam coils are placed inside the tanks.
- Heat from the sun is used.

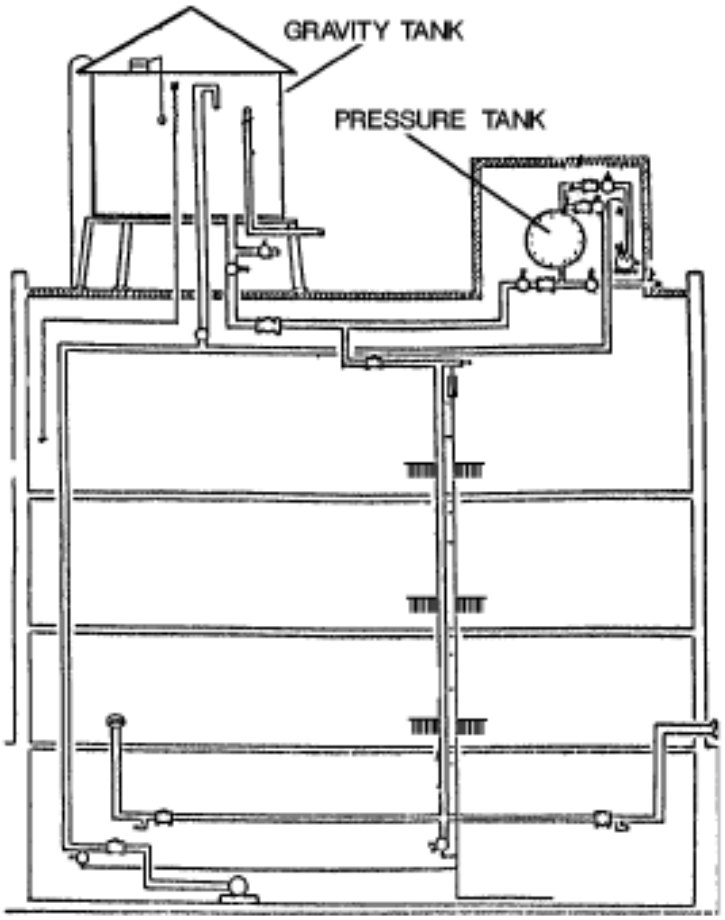
The Certificate of Fitness holder can find out the temperature of the water by looking at a thermometer. The thermometer is located near the heating device. The tank can be severely damaged if the water inside freezes. During freezing weather, the temperature of the water inside the tank and the riser must be checked **daily**. The temperature of the water should always be at least 40° Fahrenheit. Ice should not be allowed to build up on the gravity tank. The extra weight of the ice might weaken the supports of the tank and cause the tank to collapse. Falling icicles may also cause damage or injury. It is essential to be sure that the tank is properly heated, insulated and carefully maintained. The water level in the gravity tank should be visually inspected each **month**. The gravity tank should always have a full supply of water. A full tank of water is needed to be sure the standpipe system works properly during a fire. Keeping the tank full of water also prevents wooden tanks from shrinking. A full tank of water helps keep steel tanks from rusting.

Gravity Tank Supervision

The gravity tank must be constantly monitored to be sure that the tank and its parts are working. Electrical supervision devices monitor the water temperature and the water level in the gravity tank. These devices send signals to a central station company about the water level and water temperature. The central station company notifies the Certificate of Fitness holder when a problem with the gravity tank is detected. The Certificate of Fitness holder should correct the problem as soon as possible. The supervisory devices are sometimes called high and low alarms since they also send audible signals to alert the Certificate of Fitness holder when there is a problem. Failure of a standpipe or sprinkler system supplied by a gravity tank during a fire is usually caused by not enough water in the tank. The standpipe or sprinkler system cannot be supplied if there is not enough water in the tank. Too much water in the tank can also cause the fire protection system to fail. Too much water in the tank may cause damage due to the weight of the extra water. This could cause the gravity tank to collapse.

Inspection and Maintenance of the Gravity Tank

The gravity tank should be regularly inspected and maintained. Maintenance is needed to be sure that the tank functions correctly. For example, the tank may need to be painted regularly to prevent rusting. Before the inside of a gravity tank is repainted the surface should be thoroughly dried. All loose paint, rust, scale, and other surface contamination should be removed. The outside of the gravity tank will require local patching. A complete finished coat of paint is needed when the paint has weathered thin. A new coat of paint also improves the appearance of the tank after it has been patched. Painters must be careful that scrapings or other foreign materials do not fall down the outlet into the riser piping. The discharge outlet may be covered for protection during repairs. Only a few sheets of paper or a paper bag tied over the end of the settling basin stub should be used. The paper bag should be removed immediately after the job is finished. It is best if gravity tanks are used only for fire protection and for no other purpose. Tanks used for other purposes need to be refilled more often. The tanks become settling basins for sediment mixed in with the water. This sediment is then drawn into the piping. This may cause the standpipe system to become clogged and not work properly. The local firehouse should always be notified when a tank cannot be used for any reason.



Combination Gravity Tank and Pressure Tank Installation

Combination Gravity Tank and Pressure Tank Installation

Pressure tanks may be used in combination with gravity tanks to supply a standpipe or sprinkler system. Both tanks may be used to make sure that an adequate water supply is available. The pressure tanks also provide added water pressure to the fire protection system.

Emergency Action Plans

Deadline for all New York City Office Buildings December 31, 2006
On February 2nd the Fire Department sent letters to owners of all buildings who did not meet the December 31st deadline. In the letter, the Fire Department gave the owners of the non-compliant buildings until March 2nd to comply. The owners of the non-compliant buildings that didn't acknowledge the letters were told that the Fire Department Public Safety Unit will be visiting their building.

What is an EAP? An Emergency Action Plan outlines the procedures for a buildings response to a non-fire-related emergency involving an explosion, biological, chemical, radiological, nuclear or hazardous materials incident, natural disasters such as a hurricane or earthquake, or other emergency conditions that occur inside or in close proximity to their buildings.

Emergency Action Plans are professionally designed plans that include an official EAP document that is filed with the Fire Department and kept on site at a building. EAP training and implementation manuals must be created for the buildings staff and tenants. Emergency Action Plans take into account the building's size, its number of occupants, the number of exits/emergency stair pathways, how staff and tenants are to be notified of emergencies, the frequency of drills and who is in charge in an emergency.

NY Fire Consultants Services:

Fire and Life Safety Consulting
- Fire and Life Safety Inspections
- Fire Safety Plans for Residential Buildings (LL 10 of 1999)
- Fire Safety & Evacuation Plans Commercial (Class E) Buildings

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- FdNY Submissions
- Training
- Drills

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- Building Service Employees

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Violations Correction & Removal
- Environmental Control Board
- Fire & Building Department
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Chemical Spills
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