



## STANDPIPE OPERATIONS(1.1)

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- NFPA 14
- NFPA 13E

### TASK SKILL DESCRIPTION AND DETAIL

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Firefighting in buildings equipped with standpipes is challenging, and the success depends upon both the condition of the standpipe system and our skill and efficiency in using it. Engine and ladder companies need to be familiar with the standpipe systems found in their response areas and any special characteristics or problems with these systems.

### TYPES OF STANDPIPE SYSTEMS

Standpipe systems can be categorized in one of two ways:

1. **By whether or not the system riser contains water.**
  - **Standpipe systems can be broadly classified as wet, dry or combination.**
    - Wet systems contain water in the riser at all times supplied by city main, gravity tank, pressure tank, and/or fire pump.
    - Dry systems may be equipped with an automatic source of supply, but many contain no water and the only supply is from fire department pumps. This latter type is called a “manual dry” standpipe system.
    - Combination systems consist of sprinklers interconnected with a standpipe system. Most of these systems are "wet" and are of special concern because the water flow demands of both sprinkler heads and hose lines attached to the standpipe system requires prompt augmentation by fire department pumps.
2. **By the size (diameter) of the hose outlets.**
  - Standpipe systems may contain only 2 1/2-inch outlets, both 2 1/2-inch and 1 1/2-inch outlets, or 2 1/2-inch outlets reduced to 1 1/2-inch with a removable fitting. In many cases, 1 1/2-inch unlined, linen hose designed for “occupant use” will be encountered.
  - These are also referred to as:
    - Class I Systems: provides 2.5” hose connections to supply water for use by fire departments and those trained in handling heavy fire streams.
    - Class II Systems: provides either a 1.5” hose station to supply water for use by trained personnel or a hose connection for the fire department during initial response.



- Class III Systems: provides a 1.5" hose station to supply water for used by trained personnel and 2.5" hose connections to supply a larger volume of water for use by fire departments and those trained in handling heavy fire streams.

Engine companies shall utilize only Department issued hose for standpipe firefighting. Engine companies shall not attempt to use the "occupant use" hose sometimes provided with these systems, even in those instances when the hose is 2 1/2-inches in diameter. Occupant use hose may not be maintained properly, is often old, and may fail under Department operating pressures. If a reducer is encountered, it must be removed to permit attachment of our 2 1/2-inch hose to the standpipe outlet. *(The stretching of occupant use hose by ladder and rescue companies operating remotely from an engine company while performing searches may be justified in an attempt to save lives.)*

### **SUPPLYING STANDPIPE SYSTEMS**

Many Siamese connections are equipped with either metallic or plastic vandal proof caps. The caps are usually attached with screw eyes placed over the pin lugs on the female swivel. These caps help protect the system from the entry of debris.



Both metal and plastic caps are removed by striking the center of the cap with a tool. Caps can also be removed by prying one of the screw eyes off the pin lug.

Standpipe systems are supplied through a wide variety of fire department connections. Interior floor outlets are often used when FDC connections are vandalized or to reinforce augmentation with additional supply lines. Interior connections will require the use of a double female adapter.



Single 2.5" FDC on residential dwellings



2.5" Siamese FDC



5" FDC on combination Standpipe/Sprinkler System

Standpipe systems shall **always** be supplied with a minimum of two 2 1/2-inch hoses when connecting to a Siamese FDC.



\*Officer's discretion if they choose to use 3" hose to supply the 2.5" Siamese FDC.

**\*The standpipe shall be supplied by a pumping engine once IC/Engine Company Officer determine that a standpipe stretch is the method of choice to put a hoseline in service for fire attack.**



**Supplying the FDC with LDH**

Refer to LFR pump chart for pump discharge pressures when pumping to the standpipe and supporting fire attack operations.

Consider the following when determining pump pressure at standpipe operations:

- Nozzle pressure
- Friction loss of hose on fire floor
- Friction loss in standpipe (20 PSI)
- Elevation
- Friction loss of hose from Engine to FDC
- A pressure of no more than 175 PSI should be used to pump a standpipe system

### **OPERATING FROM A STANDPIPE SYSTEM**

A. Standpipe Kit: Each engine company shall carry a "standpipe kit" with the following minimum basic complement of tools in the standpipe bag:

- 2.5" flow gauge with 60° elbow
- 2 hose straps
- 18" Pipe Wrench
- 2 collapsible spanner wrenches
- Elkhart constant gallonage nozzle (250 gpm nozzle @ 50 psi nozzle pressure)
  - Nozzle breaks-apart to a 1" smooth bore tip for an option





B. Two 50' lengths of 2.5" hose loaded in a horseshoe style load. One section of the 2.5" hose will have a 2.5" to 1.5" reducer attached on the male end. This reducer allows the direct connection to the 2" attack line.

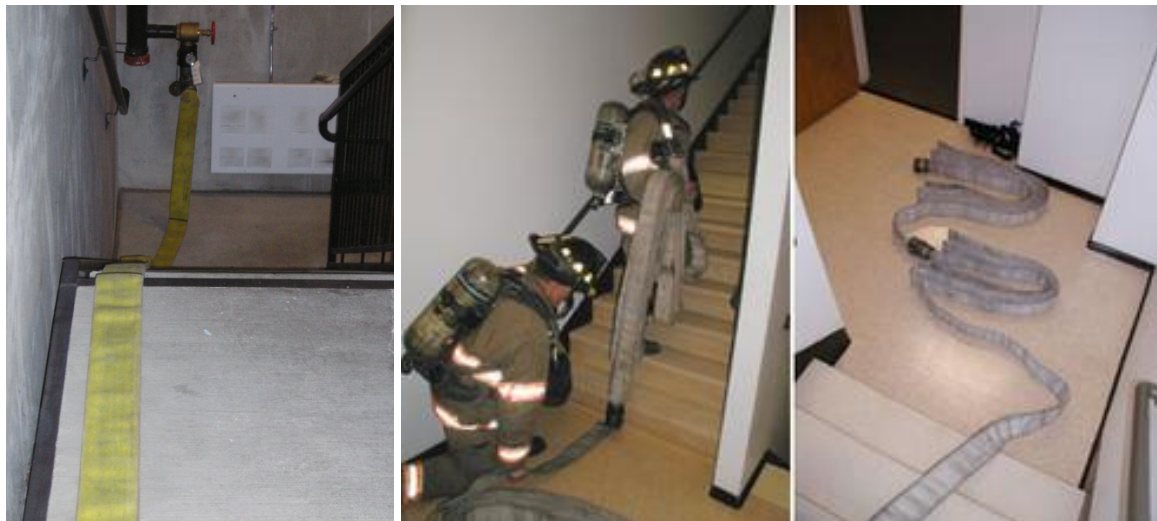
C. One 100' length of 2" hose loaded in a horseshoe style load. The nozzle will be connected to the male coupling.

Due to the complexity of supplying and stretching from a standpipe system, the first and second due engine companies will operate together in order to ensure prompt and efficient placement of the first hoseline. Ideally, two engine companies are needed to operate one hoseline off a standpipe outlet.



## STRETCHING FROM A STANDPIPE OUTLET

The first hoseline shall be attached to a standpipe outlet on the floor immediately below the fire floor. Hose outlets located in corridors on the fire floor shall not be used.



Selecting the standpipe connection on the floor below the fire floor and flaking the hose up the staircase

Prior to attaching the in-line pressure gauge to the standpipe outlet, flush the standpipe thoroughly through the outlet to remove any debris that may be in the standpipe and check for any pressure regulating devices.



Pressure regulating devices or PRDs may be installed in the standpipe outlet. PRDs are designed to reduce, restrict, or otherwise control the pressure available at the standpipe hose outlet. Some types are removable. Others may be overridden or adjusted, but this may require special tools. Others are **not** field-adjustable and **cannot** be removed or adjusted.

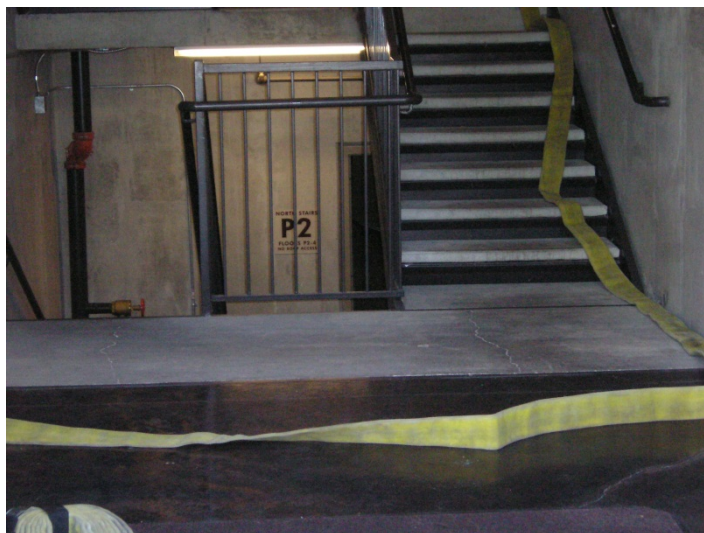
\*At fire operations, every effort must be made to remove the PRD, or ensure it is fully open.



The in-line pressure gauge shall **always** be used to ensure correct flow pressure and a good fire stream.



The proper number of hose lengths must be carried into the building so the fire can be reached from the standpipe outlet. This will need to be a coordinated and communicated effort between the first and second due engine companies to get an adequate amount of hose. Determine the number of sections needed to reach the fire area and consider the needs of the fire room itself. For longer hose stretches, increase the length of the hose by adding 2.5" hose rather than 2" hose. Multiple lengths of 2" hose will increase friction loss reducing gallons per minute.



Stretch the hose to the outside of the stairwell up to the fire floor





Using the space provided on the floor below to dress the hose

Take advantage of using the floor below the fire floor to flake out the hose lay and recon what the floor above may look like.



The 2" hose is connected directly to the 2 1/2" reducer. The flow requirements through the 2" line allow only one line to be supplied by the 2 1/2" hose.

\* If a second line is required on the fire floor, an interior 2 1/2" stretch off the attack engine is the method of choice. This creates safety into our operations in case the standpipe system fails.





Flake the 2" hose above the fire floor, if possible, to assist with hose advancement to the fire area.

*\*This option should not be attempted if the door on the fire floor, separating the hall and the stairwell, has been compromised by the fire as this may put you above the fire with an uncharged hoseline.*

Set the nozzle near the entry door and make one loop to carry down the hall to the fire room, if needed.



Charge the line by opening the outlet valve on the standpipe and verify you have the flow required to meet the fire attack needs. This will need to be a coordinated and communicated effort with the firefighter at the standpipe outlet by reading the in-line pressure gauge.



It should be noted that the inline gauge reading is only accurate when the nozzle is open fully and water is flowing. If the gauge is read after opening the hose outlet valve, but before the nozzle is opened; the reading will not be accurate.

#### Gauge Flow Pressures

| GPM | 2.5" Hose | 2" Hose | Flow Gauge Reading |
|-----|-----------|---------|--------------------|
| 250 | 100 Ft.   | 100 Ft. | 120                |
| 250 | 150 Ft.   | 100 Ft. | 125                |
| 250 | 200 Ft.   | 100 Ft. | 130                |

**Target flow for LFR's high-rise hose pack is 250 GPM**

*\*The use of the smooth bore break-apart nozzle should be used when debris from the standpipe is clogging the tip or when you need an increase in gallons per minute.*

Once the line is charged and crews are ready to make the stretch to the fire room; communicate and coordinate the hoseline advancement with supporting companies, typically the second due Engine Company. The Officer in charge must ensure that he has enough hose to make the hose stretch and fill his hose team positions as needed: nozzle position, back-up position (Officer in-charge), door/pinch positions.



As with the advance of any hoseline, ensure the line is charged and bled before entering the fire area. At times this may require charging and bleeding the line in the stairway, such as when an apartment door is left open and high heat conditions exist in the hallway. Other times, the line can be stretched dry to the apartment door; charged then bled in the public hallway prior to making entry into the fire occupancy based on the conditions you encounter on the fire floor.



As the first due Engine Company begins its advance on the fire, the second due engine must assist with line movement and be prepared at any moment to relieve the first engine company. Air conservation is an important consideration for the second due engine. If it is not possible to conserve air due to smoke and heat conditions, additional engine companies may be utilized by the Incident Commander to reinforce the critical position of the first hoseline.

Engage in fire attack operations using standard fire attack actions.

#### **Trouble shooting standpipe operations:**

- Combat standpipe debris with two specific actions
  1. Flush standpipe outlet prior to hooking up the line.
  2. Use a smooth bore nozzle for the firefight so that any subsequent debris will be more likely to pass through the large bore nozzle design.

#### **Difficulties encountered with Siamese connections:**

1. Malfunctioning clapper valve:
  - Immediately stretch and connecting a second 2 1/2-inch line
2. Caps stuck in place/frozen female couplings
  - Tap swivels to loosen paint, polish, dirt, etc.
  - Put 4-5 “left turn” twists into hose, insert into coupling and turn hose to the right
  - Insert double male, attach double female to double male and then attach hose
3. Defective threads/swivels out-of-round
  - Insert Engine’s 2 1/2” Siamese into the good side of the FDC, then insert hose into the Siamese you’ve placed
  - Connect to the standpipe’s interior connection on the first floor, a double female will be needed to make this connection

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#### **REFERENCE INFORMATION**

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This heading includes information about the following:

- NFPA 14 – Standard For The Installation Of Standpipes And Hose Systems
- NFPA 13E – Recommended Practice For Fire Department Operations In Properties Protected By Sprinkler And Standpipe Systems
- [WWW.firetactics.com](http://WWW.firetactics.com)
- See article for Standpipe Operations – Pressure Regulating Devices