NFSA The Voice of the Fire Sprinkler Industry

TechNotes

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Hose Stream Demands – Part 2

The intent of this issue was to address issues with outside hose stream demands in situation with pumps and tanks. But before we get to that subject, we need to have additional discussion on one of the topics from last issue dealing with inside hose demand.

Clarification on Inside Hose from Last Issue

The last issue (#274) of e-TechNotes certainly seemed to have hit a nerve. Several people wrote in for clarification and wanted to argue the subject based on what I wrote regarding inside hose demand for combined sprinkler and standpipe systems.

I wrote several paragraphs on the subject, and I don't want to repeat them here, but basically, the position that I took in the last issue is that you are not required to add inside hose demand for a sprinkler system at a hose connection or hose station that is part of a standpipe system unless you are using the 2007 edition of NFPA 13. In the 2007 edition, there is a note in the annex (A.11.1.5.6) that states that 50 gpm "should" be added for the two most remote connections on the standpipe system. This is a recommendation from the standard, not a requirement, but it is certainly a good idea.

For the 2010 and 2013 edition of NFPA 13, this specific sentence was removed from the annex because the Automatic Sprinkler Technical Correlating Committee took a firmer stance on the situation. If you read page 13-100 in the Annual 2009 Report on Comments where the committee takes its final position before presenting its changes to the NFPA membership, the committee agreed that the following statement should be made in NFPA 13:

"Where 1-1/2 inch hose stations (that are not a part of a standpipe system are connected to the sprinkler system, 50 gpm should be added to the sprinkler demand at the two most remote hose stations. Where 1-1/2 or 2-1/2 inch hose connections are connected to the sprinkler system piping as a part of a standpipe system, the standpipe system demand is to be calculated separately in accordance with NFPA 14 and the water supply needs to be capable of meeting the most demanding of the sprinkler or standpipe systems."

This statement by the committee, which is the most recent and final word on the subject, has never been changed. Interestingly, it was supposed to be printed in NFPA 13, but has not been for two cycles. The NFSA staff will continue to work with the NFPA to see if this can be cleared up in future editions. But for now, this is an official statement of the committee as balloted in the 2010 revision cycle.

Even though the very clear language from the Report on Comments was not printed in NFPA 13 (as it should have been), the situation is still pretty clear. The annex note telling you to add 50 gpm for inside hose was removed, so there is nothing in the standard that says that inside hose demand is required to be added at standpipe outlets. In addition, section 11.1.6.6(1) of NFPA 13 specifically says that the sprinkler system demand is not required to be added to the standpipe demand. The intent is

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that the standpipe demand is to be calculated separately from the sprinkler demand. No part of the standpipe demand is required to be added to the sprinkler demand. If you were to add 50 gpm at a hose station or hose connection that was part of a standpipe system, then you would be adding part of the standpipe demand to the sprinkler demand and you would be violating section 11.1.6.6(1).

As I stated in the previous issue of this newsletter, the use of inside hose stations is rare. You find them in storage warehouses where hose stations that are not standpipe systems are connected to the sprinkler piping. You also find them in assembly occupancies with proscenium stages and hose stations on either side of the stage that are not standpipe systems. For these types of connections, you add 50 gpm of inside hose demand at the location where the most remote two hose stations connect to the sprinkler system piping.

If the hose stations in question are part of a standpipe system, Class I, Class II or Class III, then you are not required to add 50 gpm of inside hose to the location where the piping connects to the sprinkler piping. These standpipe demands are calculated separately in accordance with NFPA 14 and the water supply needs to be capable of handling the standpipe system demand separately.

Outside Hose and Pumps

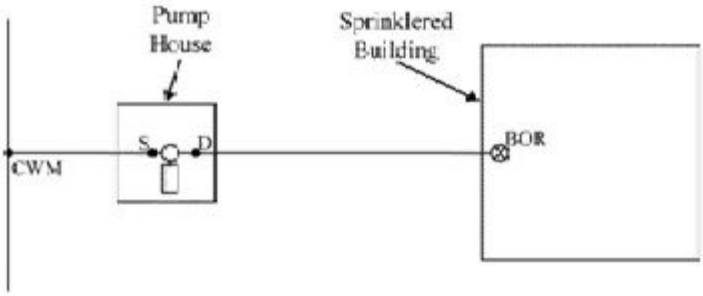
There are two sections of NFPA 13 that need to be used together to deal with outside hose stream demand and fire pumps. Section 11.1.6.2 and section 11.1.5.3 need to be used to answer the frequently asked question about sizing fire pumps and outside hose stream demand. These section numbers are from the 2013 edition, but there are similar sections in previous editions of NFPA 13.

Section 11.1.6.2 tells the user where to add the outside hose demand. It states that the outside demand gets added either at a hydrant or at the connection of the sprinkler piping to the city main, whichever is closer to the system riser. This alone should be enough for answering the question on sizing fire pumps, but over the years sufficient questions have been raised, so section 11.1.5.3 was added.

Section 11.1.5.3 states that the fire pump needs to be sized to supply the equipment that it serves. This means that if there are hydrants on the discharge side of the pump where the outside hose demand is being added to the sprinkler demand, then the outside demand needs to be added at those hydrants and the pump needs to be sized with the combined sprinkler/outside hose flow demand. But if the hydrants are on the suction side of the pump, or if the hydrants are on the city main feeding the pump, then the outside hose demand is not added to the sprinkler flow for the purposes of sizing the pump. The outside hose demand would be added to the sprinkler demand at the hydrant or connection to the city main.

To clarify these different situations, consider the following figure with a fire pump in its own pump house serving a sprinkler system in a nearby building. There are four nodes of interest on this figure: “CWM”, “S”, “D”, and “BOR”. Node “CWM” is the connection of the underground to the city water main. Node “S” is at the suction flange of the pump. Node “D” is at the discharge flange of the pump. Node “BOR” is at the base of the riser for the sprinkler system.

If there are hydrants between Node “D” and Node “BOR”, then the outside hose demand gets added to the sprinkler demand at the closest hydrant and the pump has to be sized including the total of the sprinkler demand and the outside hose demand (plus the inside hose demand if there was one).



If there are hydrants between Node “S” and Node “CWM”, then the outside hose demand gets added to the sprinkler demand at the closest hydrant, but the pump only has to be sized to handle the sprinkler demand (including any inside hose demand if there was any). The water supply still needs to be able to handle the sprinkler demand plus the outside hose demand, but since there are no hydrants downstream of the pump, the pump itself does not need to be sized to handle the outside hose demand.

If there are no hydrants on the fire protection service piping, but there are hydrants on the city main, then the outside hose demand has to be added at Node “CWM”. This makes sure that the water supply can handle the sprinkler and hose demands while allowing the pump to be sized to only have to handle the demands of the equipment downstream.

Outside Hose and Tanks

Similar to the situation with pumps, tanks are only required to have sufficient water in them for the equipment that they feed (see section 11.1.5.2 in the 2013 edition of NFPA 13 with similar sections in previous editions).

Some tanks have a hydrant connection right at the discharge flange of the tank so that fire departments can take water from the tanks to their fire trucks. In this case, the tank would need to be sized to meet the sprinkler demand plus the outside hose stream demand.

Some pump and tank combinations have a wall hydrant on the outside of the pump house on the discharge side of the pump, so the fire department can hook hoses up right to the wall hydrant and get water under pressure from the pump. In this case, the pump and tank would need to be sized to handle the sprinkler demand plus the outside hose stream demand.

In the case of a tank feeding a fire pump with no hydrants or hose connections anywhere in the building or on the grounds, then the tank and pump only need to be sized to handle the sprinkler system demand and no inside or outside hose stream demand is required.

If the tank is feeding a combined sprinkler and standpipe system with no outside hydrants, then the previous discussion regarding inside hose applies. The calculations need to be done separately for the sprinkler and standpipe systems. For the sprinkler system calculation, no inside hose is required. The tank just needs to hold enough water for the sprinklers to meet their duration demand and for the standpipe system to meet its duration demand on its own.

There is an interesting situation with the International Building Code (IBC) and the requirement for a secondary water supply in certain high rise buildings in very active seismic areas. Section 903.3.5.2 of the IBC requires a secondary water supply for the “hydraulically calculated sprinkler demand, including hose stream requirement” in certain seismic zones in case the public water utility is lost. In this case, since there is no additional calculation being done to support the standpipe system from this tank, some simultaneous flow from the standpipe outlets would be in order if the tank

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serves both standpipe outlets and sprinklers on the same floor.