

## Smoothbore vs. Combination Fog

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By now you probably have a very clear understanding that I am a strong proponent of the smoothbore nozzle. But keep in mind, I am also a proponent of combination fog nozzles, for certain, specific applications. However, an appropriate use for or application of a combination fog nozzle is definitely not when you are operating off standpipe systems, and specifically not inside high rise buildings. In fact, I firmly believe that fog nozzles should not be used for interior structural firefighting, period.

I am going to lay out the facts behind my philosophy, but most importantly, I base this opinion on my own personal experience. As previously stated, I suffered burn injuries early in my career when using combination fog nozzles. Since then, I have become an advocate of direct fire attack and the use of smoothbore nozzles. I have not suffered serious heat- or thermal-related injury since that unfortunate event some 22 years ago, even though I have been assigned to some of the busiest fire companies on the Denver Fire Department.

Most proponents of the combination fog nozzle cite a couple of factors regarding their preference for this type nozzle. One of those is their desire to have the versatility to adjust the pattern from a straight stream to a cone shaped fog pattern, narrow or wide. Many in the fog camp also emphatically state that they would never actually open up to a fog pattern when operating inside a fire building, due to the potential to create steam. That comment always brings up the question: "Why are you taking the fog nozzle into the fire building to begin with?" Then come the standard answers, "just in case," or "because I might want to hydraulically ventilate," and of course my favorite, "I might need the protection."

### **Protection Myth**

Since it's my favorite, let's start with that one: protection. It will be a tremendous event in American fire service history when the entire fire service agrees, and fully understands, that what has been incorrectly referred to as "protection" for nearly 50 years, is not! A curtain of finely divided water droplets between you and a fire is not protection. The word protection, used in conjunction with a combination fog nozzle, must be replaced by another word that starts with the letter P. That word is pushing. Yes, that's actually what's occurring when a combination fog nozzle is opened up to a cone-shaped pattern: the nozzle operator is pushing all the stuff in front of him away. That stuff is heat, fire, smoke, and other nasty products of combustion.

Now, pushing this harmful stuff away from you is not always a bad thing, as long as you have a good place to push it. For example, I always selected a good, high-volume, low-pressure, constant-gallage—combination fog nozzle to attack a vehicle fire, that is, when it's outside in a ventilated atmosphere. I can attack the fire from a distance using the straight stream pattern, and after the initial knockdown, I can approach the vehicle opening up to a cone-shaped fog pattern, and I will push all the nasty stuff away from me. But I realize this is not protection, it's pushing. The protection came from my initial attack, putting water directly on the fire, and knocking the main body of fire down.

In my travels, teaching and speaking with other firefighters across the country, I find that when these facts are thoroughly explained to them, most are in complete agreement. However, many are still reluctant to break free from nearly 50 years of bastardized water application.

Those lost in this fog of bastardized water application will frequently cite this “need for protection” as their reasoning behind wanting to use a fog nozzle. The truly progressive thinkers in the American fire service now understand that this so-called “protection” is truly a myth. Capt. Dave Fornell gives a comprehensive explanation of this fog nozzle “protection myth” in his text, *Fire Stream Management Handbook*. As Fornell states, “All the wide pattern accomplishes is to give the firefighters a false sense of security.” Here are the facts. In order to achieve this so-called “protection”, you must open the fog pattern up from a straight stream to a wide fog pattern. (Keep in mind, it is not a solid stream from a combination nozzle, but a broken stream in a straight pattern). If you open up to a wide fog pattern, here’s what happens. First, whatever fire, heat, and/or smoke conditions exist in front of you will be forcefully pushed away. That’s not a bad thing if you are pushing that heat and smoke to an open atmosphere with no exposure concerns, such as while extinguishing a vehicle fire on the street.

However, in the typical, open floor center core construction of a commercial high-rise building, you can push the bad stuff all the way around the center core and back on top of yourself, possibly cutting off your escape route, or the escape route for other firefighters. Furthermore, that forceful pushing of heat, fire and smoke will seek the path of least resistance, which could be any one of the countless hidden void spaces in most buildings (such as the plenum in a commercial high-rise building), thus, potentially extending your fire laterally and vertically, and making the overall fire conditions much worse.

So it’s not protection, it’s pushing. That is, pushing the fire somewhere else, which will most likely have to be dealt with again, later in the operation.

This wide-fog approach can have even more devastating results in a typical residential high-rise fire. I frequently hear firefighters talk about wanting the fog pattern to help them make a long, hot hallway filled with heat and smoke. A friend and I were discussing nozzle tactics one night at the firehouse. He’s a good man, who resides comfortably in the fog camp. He stated that he wanted to have the fog nozzle on his standpipe pack so he could open it up in a hot hallway and provide protection for him and his crew. His scenario involved a fire inside a high-rise multiple dwelling. In as diplomatic a manner as possible, I proceeded to explain to my friend just how dangerous this tactic is, and how detrimental it could be to occupants of the building, including other firefighters, and that it could ultimately compromise the entire operation.

Ask yourself, how did the heat, fire, and smoke get into the public hallway in that high-rise multiple dwelling in the first place? It certainly didn’t get there by accident. Experience has shown time and again that there is a high probability that an occupant from the fire apartment more than likely left their door open to the public hallway when they hastily fled the fire environment. As the fire continues to develop, eventually the fire alarm audible horns begin to sound and countless other complacent occupants open their doors to investigate and possibly attempt to escape via the public hallway. Many

will retreat back into their apartments, unable to close their doors to the public hallway due to extreme heat and smoke conditions.

Once the engine company makes the fire floor, the hallway is well involved with fire. The perceived “protection” behind a powerful cone of small water droplets will not protect, but it will probably kill, and has! If we are coming down that hallway with a wide fog in front of us, we are once again, forcefully pushing everything away from us. Furthermore, none of these finely divided water droplets are likely reaching the burning solid fuels that are causing all that heat and smoke to begin with. So, rather than extinguishing the fire and dealing with the real problem (the disease), we are merely treating the symptom of that disease by forcefully pushing the heat, fire, and smoke being produced by those burning solid fuels into open, uninvolved apartments and on top of the people we are supposed to be helping.

It might even be some of our own guys that we are harming, brother firefighters attempting to complete a primary search, when all of a sudden it feels like the world is coming down on top of them as they are dangerously chased out (if they’re lucky enough to get out) by the heat and smoke. Those firefighters who have been on the receiving end of this know exactly what I am talking about. It’s no different than having some buffoon open a nozzle, or worse yet, a master stream, to a wide fog pattern from the outside while the real brothers are taking a beating on the inside.

Plain and simple, protection comes from killing the fire. If the fire is killed, quickly, you protect yourself and others. When a combination fog nozzle is opened up to a cone-shaped pattern, a very powerful venturi of air is created that forcefully pushes heat, fire, smoke, and other products of combustion ahead of the attack team. Outside, this is not a problem; but when this tactic is employed inside a structure, it can lead to serious problems.

I’ll address the steam and visibility issues later, but right now, the force of the entrained air will violently push the heat, fire, and smoke forward, and any occupants attempting to escape will likely be killed. Any other apartments with doors open to the public hallway will also soon be involved with fire. Any occupants still inside these other apartments with open doors, if not protected, will likely be incinerated by this powerful current of superheated air. And, all the while, not a drop of water will likely reach the burning solid fuels. In his book, Fornell also states, “Additional air movement caused by improper use of fog streams can also accelerate burning, releasing more heat than if the fire were left to itself.

### **The Line of Duty Death of Firefighter James Heenan**

On January 1, 2001, a young firefighter by the name of James Heenan died of injuries sustained while operating at a structure fire in West Deptford Township, New Jersey. The New Jersey Division of Fire Safety conducted a comprehensive investigation into the incident. A report was issued on December 15, 2003, as part of their Firefighter Fatality and Serious Injury Report Series. In the report, investigation of the tragic incident revealed that there were three primary factors contributing to Firefighter Heenan’s death. According to the report, “the introduction of fog fire streams into the hole in the floor and through the exterior basement windows pushed the fire and superheated gases back

down upon FF Heenan, thus causing the burn injuries that ultimately led to his death.” The facts relating to the line-of-duty death of Firefighter Heenan are extremely sad and tragic. Those include the fact that fire and superheated gases were pushed onto Firefighter Heenan, and there is no mention of protection from fog streams, because it didn’t protect him.

### **Treat the Disease, Not Just the Symptom**

This inappropriate use of water fog is a classic example of attempting to treat the symptom without actually attacking the real disease. Remember, until water of sufficient volume reaches the burning solid fuels, the fire will continue to burn, and the heat, gases, smoke, and other products of combustion will continue to be produced. A curtain of finely divided water droplets between you and a fire does nothing to attack and kill that fire. A powerful, solid stream of water, rotated vigorously and directed forward toward the probable seat of fire, will cool the upper atmosphere during advancement, preventing flashover, while delivering solid water droplets to burning solid fuels, in essence a direct hit to the fire.

The power of a fog stream to move air has been compared to that of a modern positive pressure blower. There are circumstances when this tool can be used to give us a specific tactical advantage, such as when operating outside at a vehicle fire. Once again, the propane Christmas tree drill has been used for years to demonstrate the power of a fog pattern, but, unfortunately, the word protection has often been used to describe what’s taking place. Once again, it’s not protection, it’s pushing. The protection only occurs when the fire is extinguished.

So, those proponents of the combination fog nozzle must be honest, and change their terminology, something as simple as, “I prefer to use a combination fog nozzle so I can push the fire away from me.” Okay, that’s an honest answer; not a very good tactic, but nevertheless, an honest answer. Just like the propane Christmas tree drill, what allows the firefighters to approach, operate the valve, and shut off the fuel supply, is the force of the water fog pushing the heat and flame away from the approaching firefighters.

Firefighters have been burned, and seriously injured during the propane Christmas tree burning exercise when improper placement of the fog streams allowed heat and flame to contact the approaching firefighters. So ultimately, the fog stream is not providing protection, it is pushing, and the protection is only achieved after the fuel is shut off. The worst part of this training is that many instructors teach this in such a manner that the student firefighters will attempt to apply this protection myth inside buildings, during interior structural firefighting.

This article was excerpted from Chief Dave McGrail’s book, *Firefighting Operations in High-Rise and Standpipe-Equipped Buildings*.