

BACK TO BASICS: CONTROL MODE (STANDARD SPRAY) SPRINKLERS

By Richard Schulte

The report developed by the Task Group 400 committee clearly demonstrated that many in the fire service have no idea how standard spray sprinklers actually work to control and extinguish a “high challenge” fire. Given that, perhaps it’s time to take a look at the basics of sprinkler protection.

NFPA 13/231C contain the following statements regarding sprinkler protection design criteria for the protection of rack storage (with standard spray sprinklers):

“Sprinkler protection [utilizing standard spray sprinklers] installed as required in this standard is expected to protect the building occupancy without supplemental fire department activity.”

“During the testing program, the installed automatic extinguishing system was capable of controlling the fire and reducing all temperatures to ambient within 30 minutes of ignition.”

While standard spray sprinklers are referred to as “control mode” sprinklers, it needs to be recognized that standard spray sprinklers are not only capable of controlling “high challenge” fires, but also extinguishing the fire.

In the case of a “high challenge” fire, the water spray discharge from operating sprinklers directly over the fire may not be able to penetrate the fire plume which develops. In this case, the sprinkler discharge reduces the ceiling temperatures directly over the fire and prevents damage to the structural system supporting the sprinkler supply piping. Since the sprinklers operating directly over the fire may not control the fire immediately, additional sprinklers operate. Those additional sprinklers which operate “pre-wet” the combustibles adjacent to the fire. The “pre-wetted” combustibles prevent the fire from spreading any further. In other words, “pre-wetting” contains the fire. Eventually, the contained fire consumes the combustibles which were initially ignited and the velocity of the fire plume is reduced. Once the velocity of the fire plume is reduced, sprinkler water spray discharge from the sprinklers located directly over the fire can penetrate the fire plume and will eventually extinguish the fire or the fire will consume all of the combustibles which were originally ignited and self-extinguish.

Why is it important for the fire service to understand how control mode sprinklers work? The answer to that question is simple-it is necessary to understand how control mode (standard spray) sprinklers work in order to make sense out of the two statements included in NFPA 13/231C excerpted above. Once this is explained and understood, the two statements excerpted above make perfect sense.

Property can be replaced-dead fire fighters can't be.

The need to know how standard spray sprinklers control and extinguish a fire is an important point in regards to fire fighter safety, particularly in large single-story industrial and storage buildings. In large single-story industrial and storage buildings protected by control mode sprinklers, there is no need to put fire fighters at risk by utilizing interior manual fire fighting operations. Given sufficient time, 30 minutes or less, control mode sprinklers will not only control the fire in these large buildings, but extinguish the fire. There is simply no need for interior manual fire fighting in these buildings.

In large single-story industrial and storage buildings protected by control mode sprinklers, there is no need to put fire fighters at risk by utilizing interior manual fire fighting operations.

In the event that the sprinkler system fails, for whatever reason, let the building burn. There is simply no reason to ever lose fire fighters solely for the purpose of property protection. Property can be replaced, dead fire fighters can't be. Let the sprinkler system be the hero.

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