

The Impact of HVLS Fans on Fire Protection

High-volume, low-speed (HVLS) fans are large ceiling fans designed to rotate slowly and efficiently while moving significant amounts of air across vast spaces. They have become increasingly common in various types of commercial buildings, especially warehouses, factories and gymnasiums.

HVLS fans differ from traditional ceiling fans due to the extended diameter of their fan blades (also called the blade sweep), typically measuring anywhere from 8 feet to 30 feet long. Using their larger blades, these fans combine warm and cool layers of air to establish a wind-chill effect, delivering a powerful yet gentle breeze to building occupants.

HVLS fans can serve as a cost-effective, reduced-energy alternative to standard air conditioning systems during the warmer months and maximize employee comfort and productivity through improved airflow. However, they also carry unique hazards, particularly relating to fire protection. The layout of these fans may limit the effectiveness of nearby sprinkler systems when a fire starts within a commercial building, potentially allowing the flames to continue spreading and inflicting further destruction. Because of this risk, HVLS fans are also subject to specific recommendations from the National Fire Protection Association (NFPA).

With this in mind, it's vital for commercial property owners with HVLS fans on-site to understand their associated hazards and ensure compliance with applicable standards. This article provides more information on the fire protection challenges stemming from HVLS fans and highlights related NFPA recommendations.

Fire Protection Challenges

When a fire develops in a commercial building, prompt suppression tactics are crucial to minimizing the overall damage. Unfortunately, the considerable blade sweep and air velocity created by HVLS fans can hinder fire suppression efforts in several ways, posing the following challenges:

- **Delayed fire detection and sprinkler activation**—The downward air draft generated by HVLS fans can keep smoke and heat from rising as quickly as they otherwise would during a fire, thus taking longer for smoke alarms and sprinkler systems to detect the flames and activate suppression measures. This means the fire could keep expanding before alarms get triggered and water is dispersed across the flames. Considering how rapidly fires can grow, these delays can have serious consequences.
- **Obstructed sprinkler discharge patterns**—Along with delaying the activation of sprinkler systems, HVLS fans can also interfere with sprinklers' discharge patterns once they've been triggered. This is particularly common when the lengthy fan blades—whether they are rotating or stopped—are located too close to or overlap with ceiling-mounted sprinkler heads. In these instances, the pathway of the water released from the sprinkler heads could be obstructed by the fan blades, limiting how much it actually reaches the flames and, in turn, allowing the fire to keep expanding.
- **Accelerated fire growth**—In some cases, the strong airflow produced by HVLS fans may even fuel an ongoing fire and promote continued horizontal spread across the building's floor, thereby exacerbating the flames and related damage.

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NFPA Recommendations

In light of the fire protection challenges associated with HVLS fans, multiple NFPA standards—namely NFPA 13 and 72—outline certain recommendations that commercial property owners should follow when operating these fans on-site. While these recommendations are considered voluntary, many federal agencies (i.e., OSHA), state governments and local jurisdictions have implemented them within their own regulations and municipal codes, ultimately making them legally binding.

Key NFPA recommendations regarding HVLS fans for commercial property owners to abide by include:

- The total diameter of the blades on each fan should not exceed 24 feet.
- Each fan should be centered approximately between four adjacent sprinkler heads. Alternatively, the sprinkler system can be designed around each fan location to ensure proper distancing (especially for properties currently being built or under construction).
- The vertical clearance from each fan to the nearest sprinkler head deflector—the metal plate that directs water in the direction it needs to go—should be at least 3 feet.
- Each fan should have an interlocking mechanism in place that forces it to shut down and stop rotating immediately upon receiving a sprinkler waterflow signal from an alarm system designed in accordance with NFPA 72 guidelines.

It's important for commercial property owners to be aware that NFPA standards can evolve over time. As such, they should continue to monitor these standards for possible changes, making adjustments as needed to ensure compliance. It may be beneficial to consult qualified building contractors, legal counsel and public officials for specific compliance guidelines.

In addition to following NFPA recommendations, commercial property owners should keep their HVLS fans, sprinkler systems and other fire suppression

equipment on regular inspection and maintenance schedules to confirm that all parts and mechanisms remain in good condition. Repairs and replacements should be made when necessary.

Finally, commercial property owners should note that insurers may have additional requirements and recommendations related to HVLS fans. Working with trusted insurance professionals can help commercial property owners understand their specific obligations and maintain sufficient coverage.

Conclusion

Although they can offer several advantages in different commercial settings, HVLS fans come with substantial fire protection challenges. By reviewing their potential hazards and adopting applicable NFPA recommendations, commercial property owners can promote the safe operation of HVLS fans while minimizing the likelihood of fire suppression failures and associated losses.

Contact us today for additional risk management guidance.