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Fire Protection For Data Rooms

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The scenario of an Information Technology (IT) and data room being taken offline due to fire damage may not be first on the list of potential facility hazards, but it very well deserves the same attention and respect as any other potential hazard. In the current business climate, there are very few professions that do not depend on technology in some capacity to drive business operations. As technology's role in business continues to evolve, the use of IT and data rooms to secure company data is growing and changing. The types of spaces hold highly privileged and critical company information, yet are very frequently unprotected and susceptible to loss due to several elements of fire risk. Without proper precautions to safeguard these rooms, organizations risk disastrous results such as business interruption, loss of vital information, and significant financial strain to replace and recover infrastructure.



While providing IT and data rooms with some level of fire protection is somewhat commonplace, the level of protection — and, as a result, the overall design — can be compromised by not considering the risk of equipment downtime as a result of fire to be just as important as downtime due to server failure, power loss, or overheating. Roughly 6% of damages within IT and data rooms are related to fire.¹ While this percentage may seem small, the results of a data room fire can be devastating to business operations and expensive to

remedy. Fortunately, there are methods of fire suppression that can be used to safeguard IT and data rooms and minimize the potential for costly damages while minimizing collateral damage resulting from the method of suppression.

Most IT and data rooms are access controlled, so the most reliable fire suppression option is to install an automatic fire protection system that can be deployed instantly when a fire occurs. Traditional, water-based fire suppression systems are not usually viable solutions for IT and data rooms because they can actually compound the ill effects of a disaster. Commonly used automatic wet sprinkler systems dispense water that extinguishes flames but, in turn, causes severe damage to equipment. There are alternative solutions that can be deployed safely and efficiently to protect IT and data rooms from fire disaster damage and loss.

Determining how critical the IT and data room electrical equipment is can be an important deciding factor in the suppression system design approach.

An effective alternative to a water-based fire suppression system for IT and data rooms was a suppression system utilizing the clean agent, Halon 1301. A “clean agent”, as defined by The National Fire Protection Association (NFPA) as “an electrically non-conducting, volatile, or gaseous fire extinguishant that does not leave a residue upon evaporation.” Halon 1301 systems were very popular and widely used to protect high valuable electrical equipment due to the fact that it was a low-toxicity and chemically stable compound that was very effective in putting out a fire by breaking the chain reaction of the fire. However, in 1989 the Montreal Protocol determined Halon aided in the depletion of the Ozone layer. The U.S. Environmental Protection Agency also banned any further Halon manufacturing in 1994. Once the ban on any further manufacturing of Halon was in place, replacements for Halon had to be developed. This led to the development of alternative clean agent systems that have no known contribution to the depletion of the ozone (i.e., inert and synthetic gas suppression systems). However, any existing suppression system using Halon could continue to remain in service.

Inert gases are naturally present in the atmosphere, therefore they do not harm the environment and they are also non-toxic to humans. Inert gas suppression systems typically deploy gas blends using argon, nitrogen, and helium gasses that actually function to remove oxygen from the room where the fire is detected. These inert gas blends extinguish fire by reducing the level of oxygen below 15%, the minimum level needed to allow a fire to burn. However, to protect any personnel that may be within the room or area, oxygen levels should not be reduced below 14%; otherwise fatigue, shortness of breath, and other cognitive disturbances can occur. Once discharged, these systems typically will take up to 60 seconds to effectively “suffocate” a fire. An inert gas suppression system will require more canisters than a synthetic suppression system. However, these canisters can be located remote from the room or area they are protecting.

Synthetic gas suppression systems is another option, extinguishing fire by removing heat rather than suppressing oxygen levels. The low viscosity of a synthetic gas will not allow the gas to flow through a large network or piping, and as a result, canisters for this system must be

immediately adjacent to the area protected. The close proximity of the canisters allows the canisters to discharge their payload within 10 seconds after the detection of a fire. These systems are best used to control fire in its initial stage, prior to its growing and spreading. While these systems are effective and cause minimal damage when deployed, they can be expensive to use in large areas.

When deciding to safeguard IT and data rooms, there are steps to take to ensure you install the best type of system for the organization's distinct needs. The first step is to conduct an overall site analysis of the building where the IT or data room is housed. The organization likely already has a fire suppression system in place, but it may not be the best option for safeguarding the IT or data room. An experienced fire protection expert can help determine the optimal solution that will work with the current system set up. An expert will also be versed in applicable local or national code requirements to ensure installation and designs are compliant.

After the system is installed, regular testing and maintenance will ensure the system will operate as designed and reduce the chance of failure in the event of a disaster. Due to the dangers associated with inert gasses, educating employees who work in and around the IT and data room about the type of system installed and proper disaster protocol is also essential to help safeguard them from potential harm if a fire occurs.

Protecting an organization's IT and data room should be done with careful planning and consideration for the specific needs of the facility, equipment, and employee well-being. With proper education on the systems available and the guidance of a professional fire protection expert, data center facility managers can select a fire suppression system that ensures information will be kept secure and safe in the event of a disaster. With the average cost of an unplanned data center outage at slightly more than \$7,200 per minute², under-protecting an IT and data room from all possible risks should not be a feasible or an acceptable choice.

1 Data Center Journal, July 2007, HDI Gerlin

2 [DataCenterDynamics](#), 2013



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