

General Information

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Data Center Fire Protection

Can You Take The Heat?

When you consider top priority tickets for the data center, security, data protection, and power consumption rise to the top. But the one thing that every data center should have, that we often throw on the back burner, is fire protection. Right now, if you heard that your data center was engulfed in flames, you would likely sit in shock, especially if you were not equipped with the proper protection. Fortunately, you can avoid this reality by taking the proper steps to protect your data center.

■ The Heat Source

Dave Admirand, chief data center engineer at PTS Data Center Solutions (www.ptsdcs.com), says in his own experience, electrical fires are the most common types of fires in data centers. He says, "These are typically caused by electronic equipment failures or failures of the branch circuits powering the data center equipment, including UPS and air-conditioning equipment—if located in the data center."

Joe Ziemba, marketing manager of engineered systems for ANSUL (www.ansul.com), says another primary cause of fires is wastebaskets. "Despite the emergence of nonsmoking facilities globally, apparently there are still some examples of fires caused by accidental ignition," Ziemba says. "There are also some prevalent sources that are more closely associated with data centers such as overheating of equipment, wiring difficulties in subfloors, and electrical malfunctions. Finally, fires in data centers may also originate in surrounding rooms within the building."

■ Taming The Heat

Ziemba says every small to midsized enterprise should have fire protection and prevention strategies. He says, "Some of the common strategies for fire protection include proper alarms and detection, personnel fire extinguisher training, and the installation of a clean fire suppression system. Consideration must also be given to manual or automatic shutdown of the network system as well as the power and air-conditioning into the room. An exit plan to egress the

room quickly should also be in place for personnel working in the area.”

Admirand says, “All data centers should have an emergency power shutdown system for both power shutdown and air-conditioning shutdown. This is

commonly called the EPO (emergency power off) system. This system will eliminate the source of energy (electricity) that typically starts an electrical fire.” In addition, he says data centers should have a form of smoke detection for the overall space.

SMEs, Admirand says, should have addressable photovoltaic-type smoke detectors installed on the ceiling. “Typically,” he says, “the quantity of detectors depends upon the frequency of air changes in the room. A useful rule of thumb is to space the detectors to cover 125 square feet each. If the data center has an access floor, smoke detectors should be installed below the floor per manufacturer’s recommendations. The spacing typically matches the spacing on the ceiling.”

If a sprinkler system is available in the building, Admirand says a dry-pipe sprinkler system should be provided. In addition, he says to minimize the fuel load in the data center. “Do not store anything in the room that is not necessary, and do not store flammable items in the data center if at all possible.”

■ Prevent The Heat

So what does the industry offer when it comes to fire detectors and extinguishing systems designed for the data center? According to Ziemba, there is a myriad of different smoke and heat detectors available, and some, he says, are so sophisticated that they can detect—and help extinguish—a fire even before it reaches the incipient, or flame, stage. He says, “Detectors that provide early warning capabilities are very effective in this type of situation. Addressable control panels serve as the brains for the overall fire suppression system in that they receive the signals from the detectors, provide some type of warning to the occupants, and then discharge the system.”

Admirand says smoke detection systems include nonaddressable smoke detectors (the least expensive), addressable smoke detectors (midrange cost systems, but easier to use when trying to identify the source of a smoke alarm), addressable smart smoke sensors (more costly, but self-monitoring and the most sensitive of the individual smoke sensing/detecting devices), and smoke sampling sensors such as a VESDA (Very Early Smoke Detection Apparatus) system.

As for EPO systems, Admirand says the components are actuation switches with protective covers to prevent accidental activation, industrial-grade contactors or heavy-duty commercial relays, hard-piped wiring, and in some cases, control panels. These devices, he notes, are all available from electrical component vendors such as General Electric (www.ge.com), Square D (www.squared.com), and Siemens (www.siemens.com).

According to Admirand, sprinkler systems are available in two flavors: wet- or

dry-pipe systems. The wet-pipe systems use flooded piping and release water whenever a sprinkler head opens. He says, "This could be caused by the heat of a fire or the accidental breaking of a sprinkler head. The dry-pipe systems use pressurized air in the piping system, and the water is held back by a form of deluge valve."

Admirand says the two most popular types of deluge valves used in a preaction sprinkler system are single interlock and double interlock configurations. He notes that a single interlock valve will release its water if either the pressure in the sprinkler piping is lost or the preaction system control panel signals the valve to operate. On the other hand, a double interlock valve releases its water only after both the pre-action control panel has signaled it to operate and the pressure in the sprinkler piping is lost.

Ziemba says ANSUL offers a full line of fire protection products designed specifically for data centers. The company's CLEANGUARD portable fire extinguisher is easy to use, nonmagnetic, and electrically nonconductive. Ziemba says the extinguisher will not affect sensitive electronic equipment such as computers. He says for an SME, the new SAPPHIRE clean agent systems and the INERGEN systems are becoming increasingly popular. Ziemba adds, "Both have advantages in pricing and installation, but most importantly, they will protect the room while also protecting the environment." ■