

**INTERNATIONAL**

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Issue 95 • September 2023

# **FIRE PROTECTION**

**THE GLOBAL VOICE FOR PASSIVE AND ACTIVE FIRE PROTECTION**

**How can sustainable fire protection  
in data centers succeed?**

**The German fire protection company  
FOGTEC has the answer!**





# How sustainable fire protection in data centres succeeds

In an increasingly digital society and economy, the importance of secure data centres is growing by the day. A fire can cause devastating disruptions and outages, as the incident at hosting provider OVH in Strasbourg, France, a year ago has shown. Holistic fire-protection concepts are suitable for avoiding such disasters. Fire tests show that modern systems are reliable and do not only offer economic advantages but also have a positive impact from the environmental and sustainability point of view.



**Ralph Paulwitz**

## The sustainability of data centres – not just an energy-balance issue

When considering modern data centres, which are growing rapidly in number and size, sustainability is becoming increasingly important. As part of a comprehensive sustainability assessment, other aspects must also be considered in addition to the pure energy balance: on the one hand, the direct factors, such as the materials and media used, also with regard to ecological effects during their production; on the other hand, indirect factors, such as the use of means of transport. With all the systems installed, data centres today play a significant role in the overall social sustainability balance. A clever selected fire-protection system can therefore make a valuable contribution.

▼ Approval fire test for server rooms according to FM 5560.

## Data centres: special fire risks and their consequences

In addition to the server rooms, data centres have a large number of other technical areas that contain the infrastructure for operating IT. Since these electrical consumers generate an enormous amount of heat, they also pose a higher fire hazard. In addition, uninterruptible power supply (UPS) and energy storage systems are now increasingly operated with lithium-ion batteries; these batteries with a special fire behaviour must meet high fire-protection requirements.

The major fire that destroyed an OVH-cloud data centre in Strasbourg in the spring of 2021 shows the dramatic consequences of an inadequately secured facility. Over 65,000 customers were unable to access their data for days and the cost of this incident is estimated at a value of more than 100 million euros.



Image courtesy of iflB

Ralph Paulwitz is Head of Sales (Fixed Systems) at FOGTEC Brandschutz GmbH.



In order to ensure optimum fire protection of data centres, holistic solutions are required that take into account various fire requirements in a safe, ecological and sustainable manner. Fire tests have demonstrated that effective sustainable fire protection is possible through the choice of extinguishing medium and the applied technology.

**Holistic solution to fight fire**

In plant fire protection, we have to deal with a large number of technical areas, which, in themselves, have different risk potentials. This also applies to data centres. A closer look reveals that fire protection should not be limited to the server area. The graphic illustrates once again how comprehensively ‘fire protection’ must be thought of in areas with increased fire risks such as data centres.

In addition to areas with cable fire loads, liquid fires and various medium fire hazard risks, lithium-ion batteries are of considerable importance due to their rapidly increasing use and fire behaviour. In addition, uninterruptible power supplies, as well as additional energy storage devices, are particularly in focus and, of course, firefighting should be safe and tolerable for people located in the premises or adjacent. In order to provide controlled protection



Image courtesy of FOGTEC

▲ Server areas in the data centre.

against a (possible) fire event in data centres, early fire detection and firefighting systems must go ‘hand in hand’ and be precisely coordinated with each other.

While conventional fire-suppression systems consist of a mixture of different systems, high-pressure watermist (HPWM) systems are able to cover all fire and risk scenarios efficiently and demonstrably safely with just one central pump system. This includes the previously mentioned sensitive battery areas. The use of different

service teams for the maintenance of different extinguishing systems and the associated expenses are no longer required. Considering the aspect of sustainability again in this context, many trips by maintenance teams and transports of gas cylinders to refill are eliminated, which in turn is positive for the sustainability balance. The holistic approach is not the only advantage HPWM systems offer over conventional firefighting systems.

▼ One fire suppression technology for all areas in the data centre.

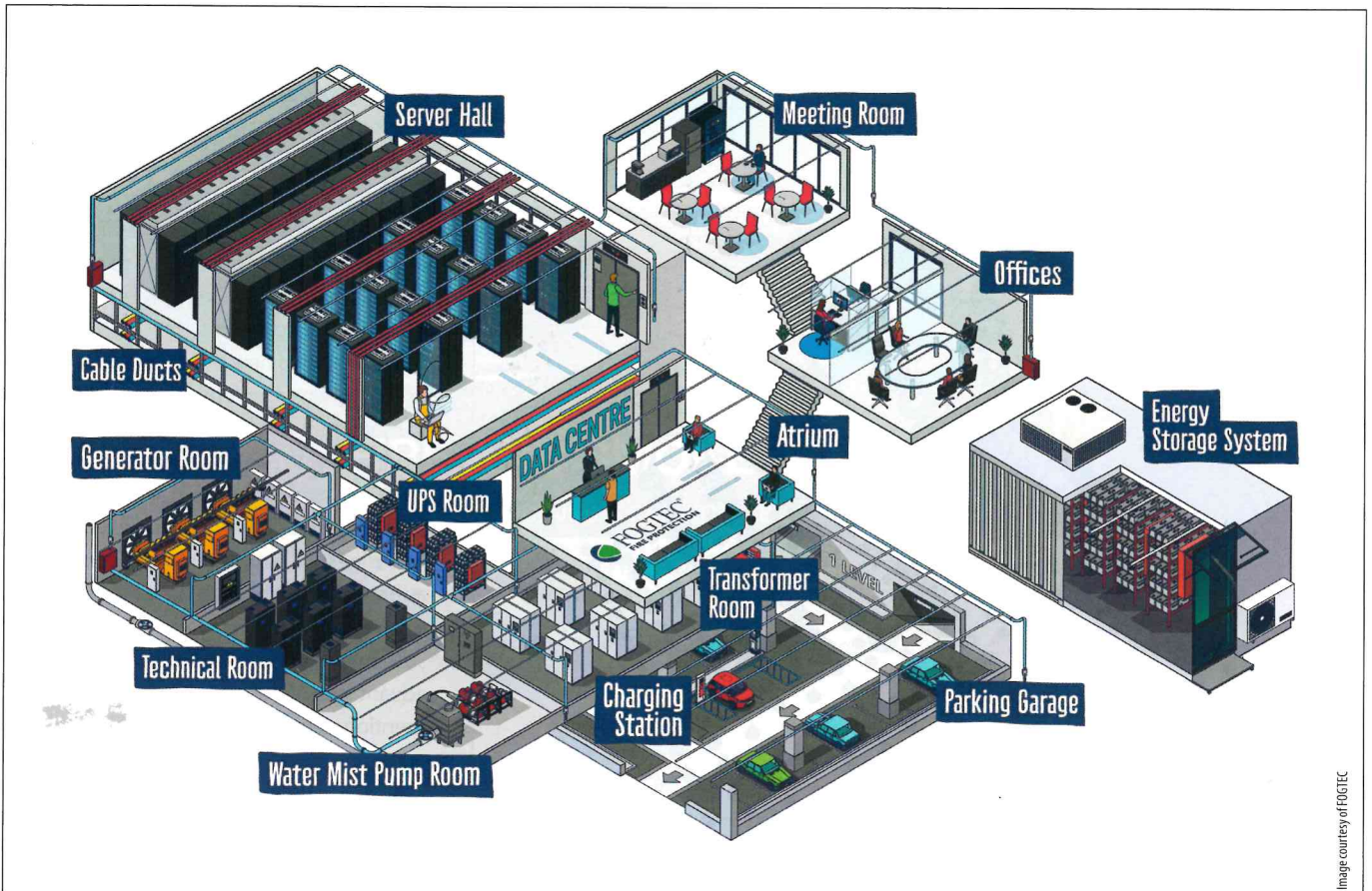


Image courtesy of FOGTEC



**High-pressure watermist (HPWM) – the environmentally friendly and sustainable alternative to conventional gas extinguishing systems and sprinkler technology**

If one considers the primary purpose of a gas extinguishing system, one finds that it is mainly to remove oxygen from the fire. However, in order to be able to build up the gas concentration in the room required for extinguishing success, a sealed room is required. Consequently, structural overpressure relief must be created to maintain room integrity. In addition, if the system is triggered, the ventilation and consequently the servers have to be shut down, which cannot be in the interests of the data centre operators due to the lack of cooling.

Despite their widespread use to safeguard building integrity, conventional sprinkler systems are not the ideal choice here either, as they consume large quantities of water, causing considerable damage to electrical and electronic equipment. Massive impairments such as failures of servers, control cabinets and controls for air conditioning and power supply in the data centre would be the result. In addition, a sprinkler system requires a water supply of several 10,000 litres for at least 60 minutes of system operation, which takes up valuable space in the technical centre.

An HPWM system, on the other hand, requires only about 10–20% of the water volume of a conventional sprinkler system, which guarantees minimal firefighting water damage. Generally, the local water supply can be accessed directly, eliminating the need for costly and space-intensive storage of water, since the pump system can easily be placed in small spaces. In addition, no other extinguishing agent is able to reduce temperatures so quickly and partially wash out smoke gases, which furthermore recommends watermist for all areas where people are present.

**Small droplets, big effect**

High-pressure watermist represents an attractive, environmentally friendly and sustainable alternative to conservative gas extinguishing as well as sprinkler technology. Using special nozzles, pure water is finely atomized under high pressure of more than 60 bar. The mist droplets produced in this process have an average diameter of 20–150µm and are distributed in the room in an almost gas-like manner. This reduction in droplet diameter significantly increases the heat exchange surface with the fire. This has the effect of displacing the atmospheric oxygen directly at the source of the fire and lowering the oxygen concentration locally.

The result: the fire is smothered. The watermist also spreads very quickly and

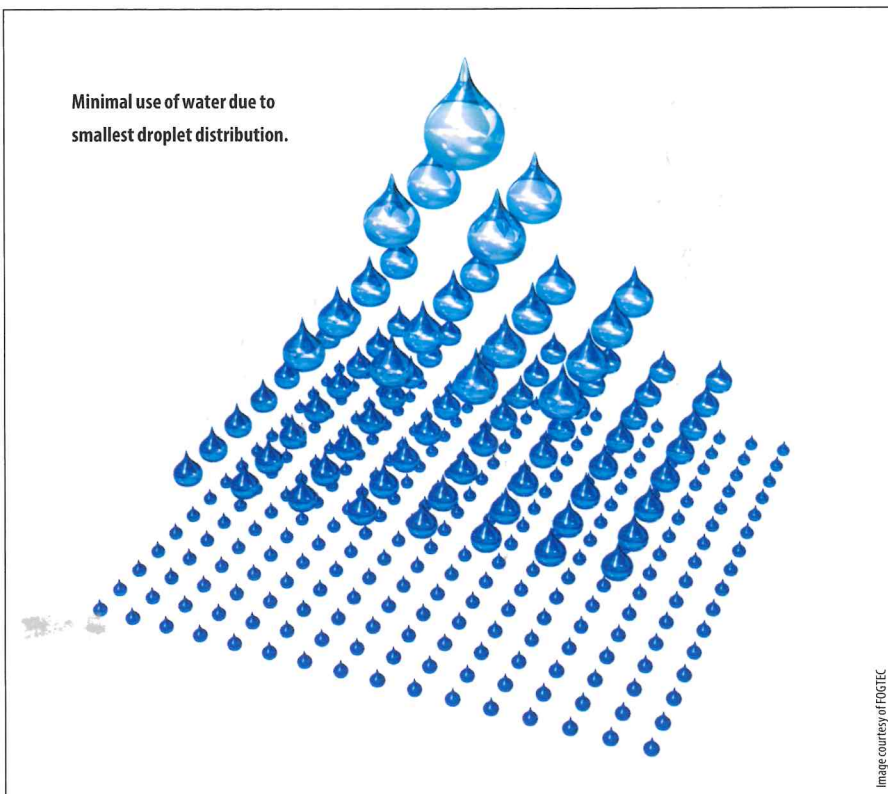
without need of pre-warning time in the relevant areas, which means that even hidden sources of fire can be reached. In addition, the evaporation energy achieves a significantly better cooling effect compared to conventional sprinkler technology, and the amount of water required to fight the fire is reduced by 80 to 90%. No wonder that watermist technology has been established in fire protection for more than 25 years and is endorsed by stakeholders, planners, consultants as well as independent testing institutes and within the International Water Mist Association (IWMA).

**Sustainable technology for firefighting**

When a HPWM system is triggered, the cost of restarting is limited to the cost of fresh water and the possible replacement of some nozzles. Additional structural measures such as pressure relief and room sealing, on the other hand, can be saved, and thanks to the ‘pre-action’ systems, false triggering and the unintentional escape of water are virtually eliminated.

‘High-pressure watermist is the most cost-effective, efficient, environmentally friendly and sustainable fire protection solution for data centres. A steadily growing number of customers appreciate the advantages of watermist technology over conventional gas extinguishing and sprinkler systems.’– Rüdiger Kopp, Managing Director Fixed Systems of FOGTEC Brandschutz GmbH

For more than 20 years, designers, consultants and operators have valued FOGTEC’s HPWM systems for securing data centres. This applies both to existing buildings, which can be easily retrofitted and flexibly expanded with HPWM systems, and to new buildings worldwide. In China, two complete new buildings of more than 100,000m<sup>2</sup> area each were equipped with HPWM technology. In addition to the criterion of safe data preservation and the significant reduction of business interruptions, many companies appreciate the ability to fight fires with small amounts of water and the associated sustainability, as well as the other advantages of the ecological footprint mentioned before. After all, drinking water is a precious commodity that is not available in unlimited supply.



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