



Guidance Document: Impact of Noise on Computer Hard Drives

FIA Guidance for the Fire Protection Industry

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Fixed Extinguishing Installations Section

Guidance paper on Impact of noise on Computer hard drives



Impact of Noise on Computer Hard Drives

Gaseous fire extinguishing systems have for decades been used extensively to protect computer rooms, IT rooms, data storage areas and other high value facilities. The extinguishing systems and their components conform to the relevant product and system standards (EN, ISO and NFPA) and national regulations and or insurance requirements. Further, recurring inspections and maintenance requirements of the above standards ensure reliable function over the entire lifetime of such extinguishing systems.

Recently, isolated malfunctions of hard drives for data backup have been reported in IT rooms in connection with the release of some gaseous fire extinguishants and/or their associated audible alarms.

According to the information currently available, these malfunctions have ranged from an emergency shutdown to permanent functional failure, with the associated data loss from the hard drives.

Malfunctions have been reported after the following events:

- Functional test of the pneumatic alarm system without activation of the extinguishing system during recurring inspections and maintenance
- Discharge tests with extinguishing gas with and without activation of the alarm horn
- Hand-clapping or shouting in the immediate vicinity of the hard drives

The occurrences have only come to light in IT rooms where newer, more sensitive hard drives have been installed.

Recent testing by members of the Eurofeu, in association with test laboratories and hard disk suppliers, has highlighted the following:

- Sound pressure level of 110 decibels or more with high sound frequencies can interrupt the read-write process and/or lead to permanent failure of the drives
- The sound pressure can be produced during release of a fire extinguishing system in the case of fire by extinguishing nozzles or by alarms and other acoustic sources
- The errors and defects occurred regardless of the Extinguishing agent used
- Whilst phenomenon is associated with all brands of hard disk drive, there are differences in the behaviour of different types of disks. "Enterprise class" hard drives were less sensitive against noise than "near-line-class" devices

The following were noted as mitigating the effects:

- Installing the drives in sound proof enclosures reduced the observed effects
- Changing the nozzle spacings i.e. using more nozzles or using sound damped nozzles
- The distance between the nozzle and disk drive should be as large as possible
- Reducing the incident sound levels of alarms and horns
- Use of proprietary software to minimize the tolerance of hard drives to sound

It is expected that the new technology hard drives (solid state/flash drives) will be far less susceptible to influence by sound.

However, in the meantime, we recommend that the manufacturer of the hard drive supplied is consulted to determine whether they are aware of vulnerability of their hard drive to noise.

Where there are concerns about vulnerability of the hard drive to noise, we recommend a controlled shutdown where the hard drives are turned off before any system activation and certain functional tests.