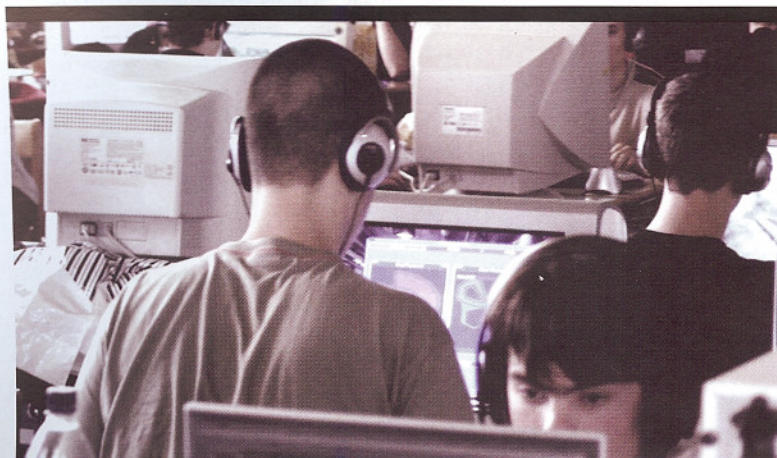


# INFLUENCE OF NEW GENERATION COOLING SYSTEMS



Keeping the data centre churning.

In many ways, the tendency in South Africa of the private sector to take fire detection and suppression into their own hands and lessen the reliance on the fire authorities has resulted in the application of cutting-edge design philosophies being applied as they emerge without the need for strict adherence to the local fire standards.

"A statement was made recently in a British data centre periodical 'By 2011, in-rack and in-row cooling will emerge as the predominant cooling strategy for high-density equipment' and current trends indicate that in South Africa it will be no different," says Dave Boyack -business development manager, Xtralis. "This is possibly most evident in the fast evolving world of the data centre where even on a global scale, the codes and standards struggle to keep pace with the actual characteristics and challenges presented for smoke detection in these environments."

Locally the relevant standard promotes smoke detection configurations that have evolved from older style cooling system layouts and primarily advocates the use of aspirating smoke detection (ASD) systems for return air protection and 'first knock' shutdown of air handling units (AHU). Point type smoke detectors, closely spaced, would then operate in a still air environment to trigger a second knock and suppressant gas release.

### Weak points

"While this configuration has served us well for many years, there are a few weak points. Quality ASD systems rely on accurate laser-based technology and offer high sensitivity and very accurate smoke measurement. However, when applied in the above return air protection configuration, these systems no longer operate once first knock has been achieved and the AHU shut down. Point detectors which are a far less advanced and reliable form of detection are then relied upon to release costly fire suppressant gas," Boyack says.

Due to much higher processor density in modern data centres and the resultant increase in head load, the shut down cooling systems may no longer be advisable. Organisations such as the Uptime Institute

have recommended that in order to achieve compliance with their criteria in certain categories of data centre, the shutting off of cooling systems at any point in time may not be permitted. This effectively means that point type smoke detectors will have very little effect due to their very limited tolerance to airflow.

"ASD systems however have a long history of proven reliability in high airflow environments and may indeed be the only technology suitable for these applications," he says.

"New generation cooling configurations such as hot/cold aisle containment systems (HACS/CACS) or in row cooling will all have a unique effect on airflow in the data centre and typically each configuration would require a different ASD design," adds Boyack.

"The location of sampling points as a prime example is in the hot aisle for a hot/cold aisle system but would be placed in front of the in-row cooler in a HACS system as virtually all airflow is horizontal. Point detectors mounted on the ceiling in this application would prove to be ineffective as vertical smoke movement does not take place. Furthermore, these solutions are designed to run continually with no shutdown of AHU on first knock and suppressant release with the AHU or in-row cooler operational," Boyack explains.

"This also favours ASD products such as VESDA that offer absolute detection technology. Unlike relative detection that uses drift compensation, absolute detection technology does not use software compensation for dirt build-up in the detector allowing it to reduce its sensitivity in order to reduce false alarms."

### Data centre questions

Questions to ask when designing a smoke detection system for a data centre are:

- Will the cooling system be shut down prior to suppression release?
- Is the primary movement of air horizontal or vertical?
- What is the typical air speed (measured in metres per second or air changes per hour)?
- Is the data centre manager, client and fire engineer aware of the implications of air movement?
- Has the correct smoke detection technology been specified?

"In summary, the challenge of providing effective smoke detection in a data centre environment continues to grow due to the influence of new technologies. If you are designing a new data centre, have recently or are planning to upgrade your cooling systems or are unsure of the smoke detection systems you have in place, it's time to act now to ensure that in the event of a fire, your detection system will provide the best protection against downtime and loss of lives, assets or revenues," Boyack concludes.

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