Stratos®

High Sensitivity Aspirating Smoke Detectors

APPLICATION NOTE

Warehouse Smoke Detection

Porcelosa - Watford, UK

Application of High Sensitivity Detection

The consequential loss from a warehouse fire is disproportionate to the cost of an efficient smoke detection system. Modern distribution warehouses are very large and high structures. This presents an unusual challenge for fire engineers to specify an effective smoke detection system.

Fire engineers will commonly use 'point' or 'beam' type smoke detectors as their preferred solutions to most normal risks, however, warehouses offer particularly unusual challenges to these types of detector since point type smoke detectors are not recommended for use above 35" (890mm) except in unusual circumstances. The reason for this is the well known phenomenon of smoke 'stratification', where smoke from any given size fire only produces sufficient thermal buoyancy to raise smoke to a given level (often well away from detectors), rendering conventional smoke detection virtually useless in this application.

Not only are point and beam type smoke detectors substantially less sensitive than High Sensitivity Aspirating detection, thereby providing slower detection, but the high ceilings in this class of environment make it very difficult for smoke to rise to their level (unless the fire is substantial). By contrast, high sensitivity aspirating systems may often have their sampling pipes arranged to sample from multiple heights (see fig. 2) within the protected area, overcoming this problem. Other concerns regarding the use of beam detectors may arise from high ceilings and high density racking, making maintenance difficult and costly. Large buildings flex a surprising amount under wind load or temperature stress, and this, along with birds and pallet stacking activity have been known to cause problems with beam detection in the past.

Modern warehouses often have large open areas, greater in size than permitted for a single fire Zone under national Standards of 6560ft² (2000m). The effects of roof profile, smoke curtains, roof beam obstructions and racking aisles on any smoke plume must be taken into account.

Efficient Detection

Warehouses by their nature are large open areas with a minimum of internal structural support. Roof profiles are as flat as possible with a minimal incline. Smoke curtains, where installed, run perpendicular to the apex. This means that aspirating smoke detection sampling pipe can follow the roof profile perpendicular to the apex with detectors conveniently sited at low level on the side walls for convenience of maintenance if necessary.

Smoke cools as it rises and will stop at a point where its temperature is the same as the surrounding air (smoke stratification). To rise higher, smoke from a bigger, hotter fire must be produced. Sampling pipe should be mounted at roof level as required by National Standards. Where the racking density and warehouse height are excessive, consideration should be given to the provision of additional sampling pipes at intermediate levels within the racking at intervals of 20' to 30' (6 to 10m). Such sampling pipes often follow sprinkler pipe routes.

Unwanted Alarms

Aspirating smoke detection systems are impervious to unwanted alarms from building movement, birds, or moving pallets. Stratos-HSSD aspirating smoke detection systems continuously adapt to environmental changes to prevent unwanted alarms or reduction in performance from dust contamination etc.

Performance Testing

Warehouses are high and access to individual sampling points is difficult. Systems are normally tested with a performance test such as those described in the BFPSA Code of Practice for Aspirating Smoke Detection Systems.

Fig. 1. Stratos installed in a warehouse/superstore

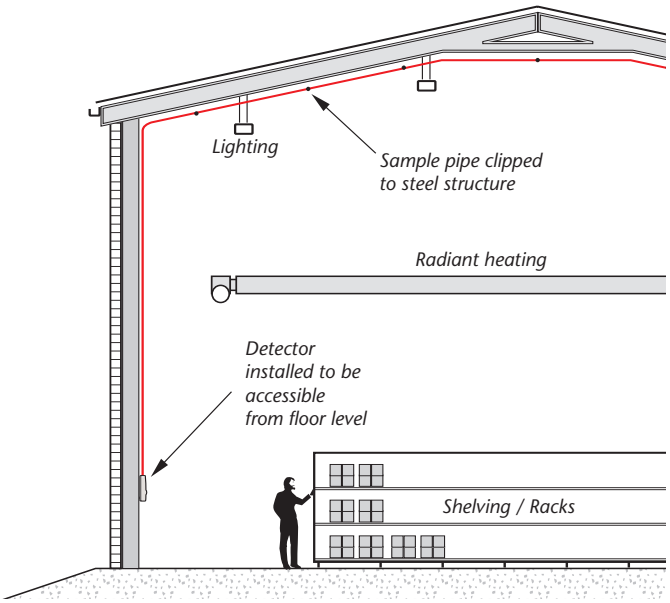
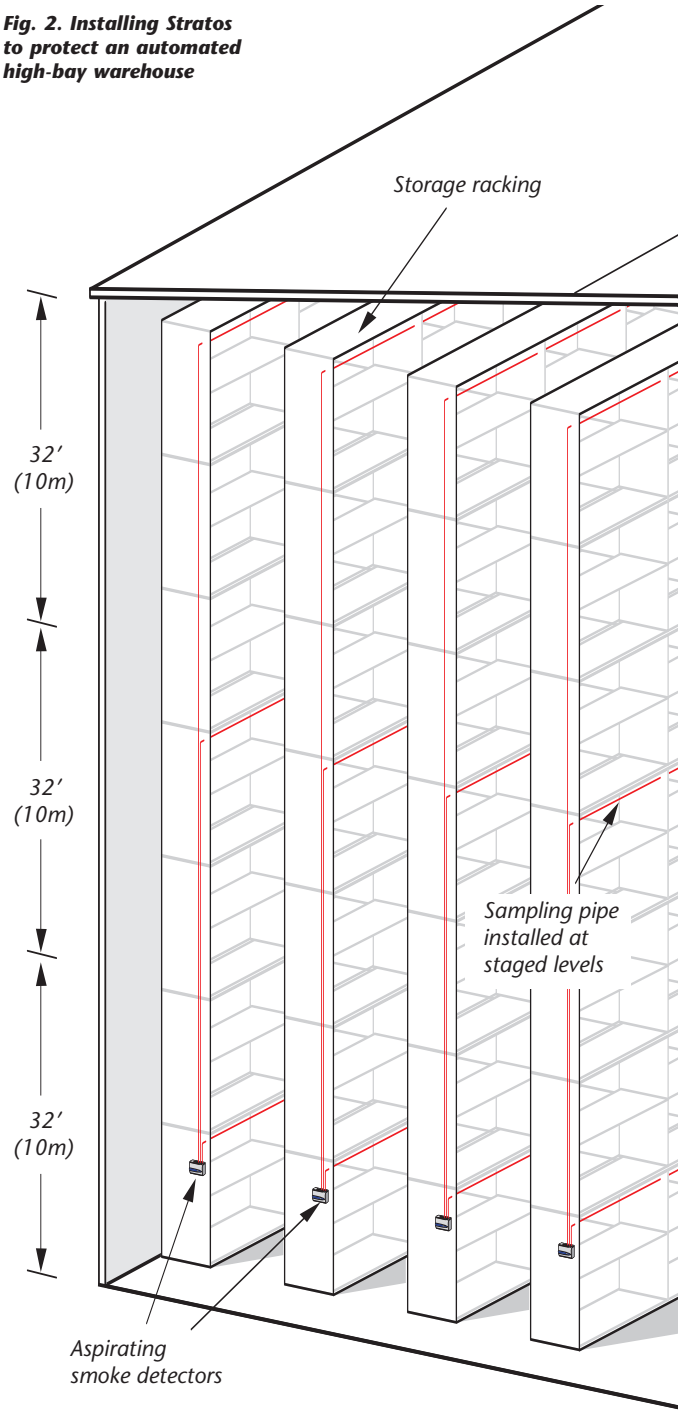


Fig. 2. Installing Stratos to protect an automated high-bay warehouse



Some successful worldwide installations for warehouse protection:

- ***Amazon.com - Milton Keynes, UK***
- ***Computer Center - Hatfield, UK***
- ***J Sainsbury - Waltham Cross, UK***
- ***B&Q - Doncaster, UK***
- ***QGPC - Ras Laffan, Qatar***
- ***Lever Industries - Sacavem, Lisbon***
- ***Shanghai Tobacco - China***
- ***New Straits Times - Malaysia***
- ***El Corte Ingles - Bilbao, Spain***
- ***Scania - Oskarshamm, Sweden***
- ***Foschini Lefic - Cape Town, SA***

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