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Fire protection in restaurants

Protection of people, business continuity and reputation

Restaurants are considered to be relatively critical zones in a hotel due to the various ignition sources such as candles, or cooking and frying at the table and the number of guests present. Depending on the room dimensions and the expected deceptive phenomena, smoke detectors or ASA neural fire detectors with the combination smoke/heat are recommended for monitoring restaurant areas.

In the event of a fire, alerting and evacuating all parties at risk in good time has the highest priority. A fire protection system is needed that guarantees rapid, reliable fire detection and activates both the alarm devices and the relevant fire control installations.

Early warning of a fire is essential; not only for protecting people, but also for ensuring business continuity and the reputation of the hotel. However, unnecessary evacuation activities due to false alarms must be avoided.

Content

Introduction

Highlights[1]

- Restaurants have a low to moderate fire risk

- Due to a high concentration of people, panic situations can easily arise

- One out of every 12 hotels reports a structural fire per year

Restaurants exist in all shapes and sizes, and with all sorts of furnishings. In this document the term restaurant is restricted to the room in which guests are dining.

Restaurants are used for the following occasions

- Meals for which the completed dishes are brought to the table and partly kept warm with chafing dishes

- Meals for which the dishes are cooked and grilled directly at the table

- Information events during which only snacks and drinks are served

- Parties for which the room is decorated and a large number of people celebrate exuberantly

This shows that the fire sources, the fire loads and the fire risks do not only change from restaurant to restaurant but also from event to event. This has to be kept in mind when creating an appropriate fire protection system.

Although not all fire risks can be eliminated in a restaurant, they can be significantly reduced by simple measures. These include

- Reducing the possible ignition sources to a minimum

- Turning off electrical appliances as soon as they are no longer being used

- Careful handling of open flames (candles, rechauds)

- Not leaving flammable materials close to chafing dishes and hotplates

- Using decorations made from flame retardant material

- Regularly cleaning, checking and maintaining electrical appliances

Basic conditions

Objectives

- Early alerting of people in the restaurant so they can leave the dangerous zone in an orderly and safe manner

- Preventing the fire from spreading to other hotel areas

- Preventing unnecessary alerting of guests and the fire brigade

Typical fire hazards

- An overload or short circuit of an electrical appliance such as a coffee machine, chafing dish or hotplate

- Careless handling of candles or rechauds

- Flammable materials close to open flames or electrical hotplates

Typical development of a fire

In a restaurant, there is no typical development of a fire – a fire can start with a smoldering phase or directly with an open flame.

An overload or short circuit of an electrical appliance can lead to a fire which starts with a smoldering phase and progressively generates increasing quantities of visible smoke. If such an incipient fire is detected at an early stage, it can be dealt with by simple means (e.g. by disconnecting the power supply).

If easily flammable material comes in contact with a powerful heat source or even an exposed flame, this can suddenly lead to an open fire. If such a fire is detected in time, it can often be extinguished with water, a fire blanket or with a suitable fire extinguisher.

Critical Points

- Preventing false alarms due to deceptive phenomena - for example from smoke aerosols caused by frying at the tables

- Preventing delayed fire detection - for example by fire aerosols being diluted by the airflow from the ventilation system

- Orderly evacuation of people in the restaurant (high concentration of people)

- Limiting the fire to the restaurant

Solution

In restaurants, there is a low to medium fire risk. If dishes are prepared directly at the table or hot dishes are offered at buffets, smoke aerosols and steam are produced. These deceptive phenomena can trigger unwanted alarms in fire detectors. Therefore, in such areas, automatic fire detectors must be used which not only detect an incipient fire early and reliably; but also respond robustly to steam and smoke generated by cooking at the tables. In areas where no or hardly any deceptive phenomena are expected, normal smoke detectors can be used.

In addition to the automatic fire detectors, manual call points are installed in a restaurant so that a fire alarm can also be triggered manually.

The number and position of the automatic fire detectors are chosen based on the size of the room, the fixtures which prevent uniform distribution of smoke and heat, and the ventilation conditions.
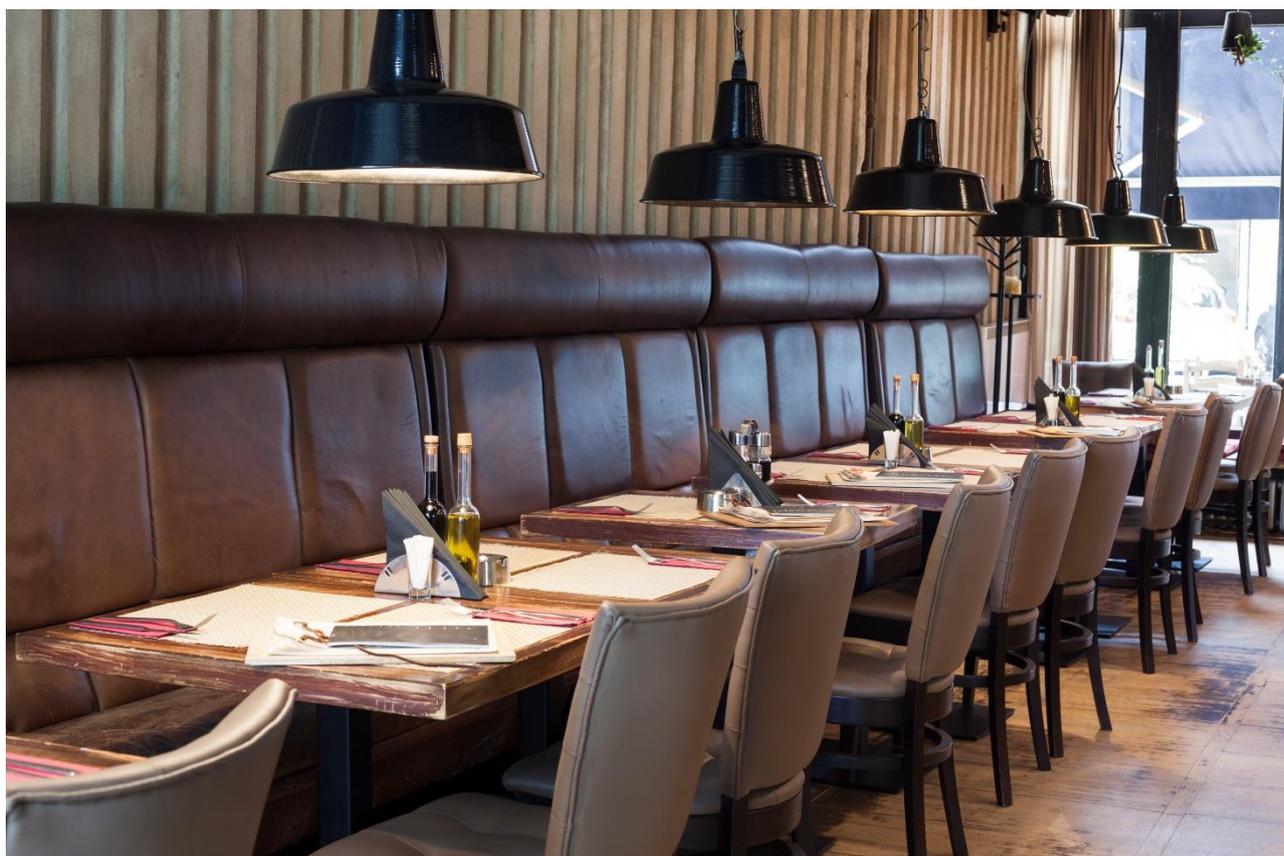
The fire detector settings are based on the fire risk, the deceptive phenomena and the conditions in the room (room height, beams, ventilation, etc.).

The basic rules are

- The higher the room, the more sensitive the detector setting (distribution of aerosols in a larger area)
- The higher the fire risk, the smaller the monitoring area per detector (fire will be detected earlier)

Appropriately positioned sounder beacons provides an effective means of alerting restaurant guests and personnel that a fire alarm has been activated. It is also essential that restaurant personnel are trained to react correctly in emergency situations (in accordance with the in-house fire protection procedures).

The solution presented in this document depicts a typical solution for a small restaurant in a small hotel. Where local codes of practice require that a voice alarm system is installed (e.g. in larger hotels), appropriate loudspeakers would be fitted in all public areas. Such systems have the advantage of delivering clear voice messages throughout the hotel. It has been proven that people react more quickly and more reliably to spoken messages than they do to audible or visual signals. This can make a significant contribution to the speed and efficiency of any evacuation procedure, if this should become necessary.

.Details	Comments/Notes
Areas without deceptive phenomena Smoke detectors	Early detection of smoke-generating fires - Ceiling height <4m: Parameter set with standard behavior - Ceiling height >4m: Parameter set with sensitive behavior
Areas with deceptive phenomena ASA neural fire detectors	Early detection of all types of fire and robust behavior toward deceptive phenomena such as steam - Ceiling height <4m: Parameter set with balanced detection behavior - Ceiling height >4m: Parameter set with a high sensitivity
Manual call points MCPs	- Single or double action (depending on local regulations)
Warning devices Sounder beacons	Provides visual and acoustic warning for restaurant guests and personnel
Positioning of system elements (see Figure 1)	Automatic fire detectors - On the ceiling - At least 0.5m from the wall - Away from the airflow of the HVAC system (heating, ventilation and air conditioning) Manual call point - Next to the fire exits - At a height of 1.4m ± 0.2m Sounder beacon - Wall-mounted in a clearly visible position

Related measures

- Fire blanket and fire extinguisher for Fire Categories A and B (solid/liquid substances)
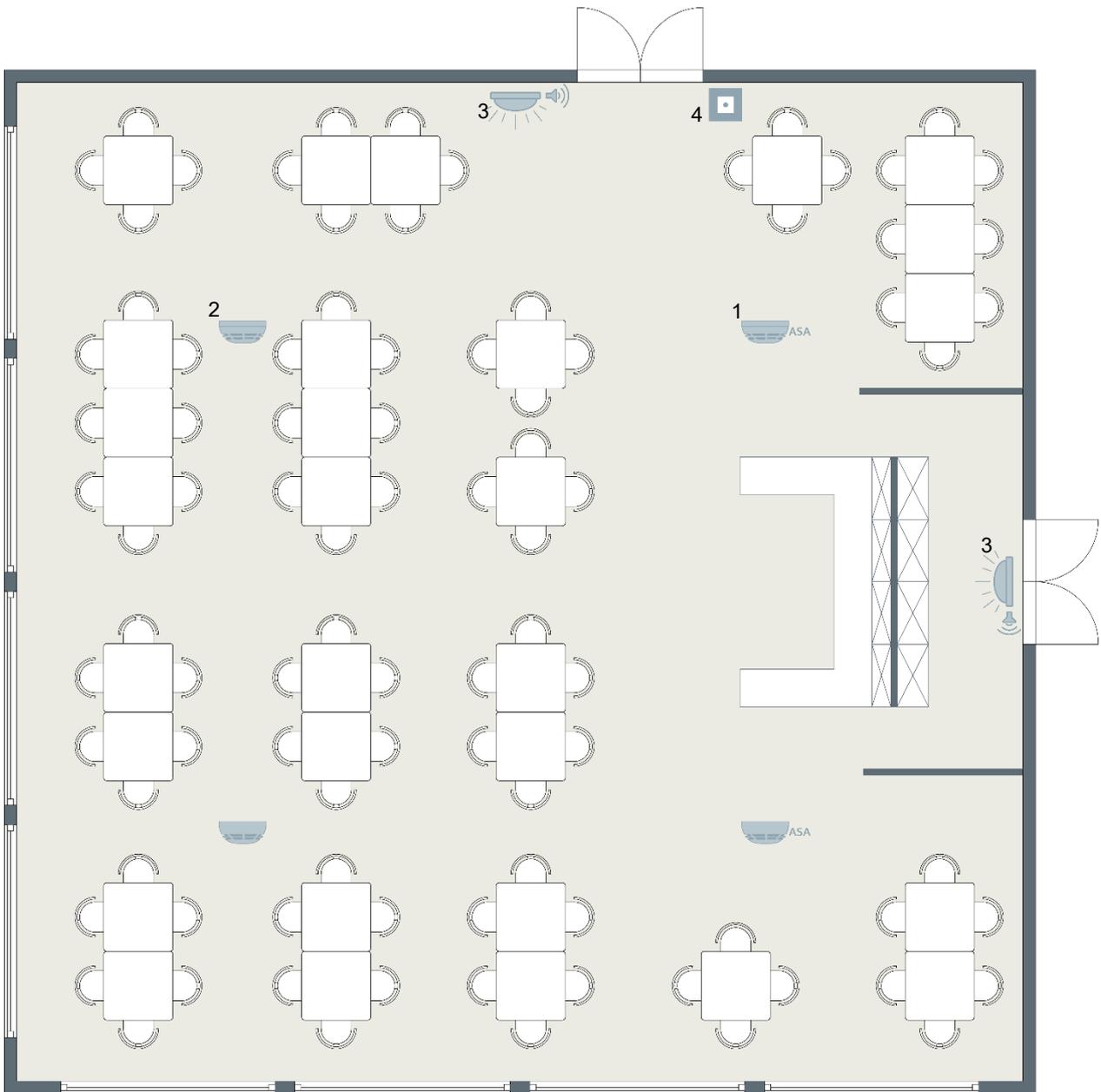- Sprinkler system

Figure 1 Positioning of system elements

1. ASA neural fire detector

2. Smoke detector

3. Sounder beacon

4. Manual call point

Practical experience

Fire detection

In accordance with VDE 0833-2, point-type smoke detectors (that comply with EN 54-7) may be used to monitor a maximum of 80 m² in rooms with a height of 12 m. This maximum monitoring area can be selected if the risk to people and objects is deemed to be very low.

In restaurants, there is a low to medium fire risk. As there can be many people in such a room, however, the risk to persons should be considered to be medium. Consequently, the monitoring area per detector should be limited to 60 m².

Provided that no (or few) deceptive phenomena can be expected in a restaurant, purely optical fire detectors can be used. In areas where deceptive phenomena cannot be excluded, fire detectors should be chosen which detect fires early and also respond robustly to deceptive phenomena.

Deceptive phenomena

Aerosols and increased temperature are the fire characteristics which are detected by a multi-sensor fire detector (optical and thermal). Boiling water, frying meat or melting cheese creates steam or smoke-aerosols and a certain temperature increase.

Practical experience has shown that the ASA neural fire detectors can differentiate very well between real fire characteristics and aerosols caused by cooking and frying, thanks to its signal processing with **ASA***technology* (ASA = Advanced Signal Analysis). If such detectors are operated with the correct setting, the risk of unwanted alarms can be practically excluded.

Interference from the HVAC system

To guarantee reliable fire detection, the fire detectors must be mounted away from the airflow of the HVAC system so that, in the event of a fire, the smoke is not diluted in the vicinity of the detectors.

Alarming and evacuation

Being able to alert persons in the area both audibly and visually, a sounder beacon automatically increases the awareness of a warning in a noisy environment. In such applications, however, well trained staff with a good knowledge of the building layout have an important role to play in dealing with any emergency situation in a calm and efficient manner.

Hotels that are equipped with a voice alarm system frequently use these systems to broadcast background music in various public areas. In the event of a fire alarm being activated, such transmissions would be immediately curtailed and replaced by informative messages. Should an evacuation become necessary, appropriate evacuation instructions could also be broadcast directly from the fire-brigade panel via a microphone.

ASA*technology*

For intelligent, reliable fire detection with genuine alarm guarantee

ASA*technology* is a unique technology from Siemens that converts signals into mathematical data which is compared with programmed values in real time using intelligent algorithms. The special signal analysis process is very reliable in preventing false alarms caused by deceptive phenomena, such as steam, tobacco smoke or exhaust emissions. Find out more about **Sinteso** or **Cerberus PRO** fire detectors with **ASA***technology*.

Everything you need for comprehensive fire protection

Incorporated in a concept tailored to your customers´ requirements, Siemens and its Solution Partner network provide:

- Early and reliable fire detection solutions, offering an unrivalled financially backed "Genuine Alarm Guarantee".
- Fully forwards and backwards compatible systems, to ensure any system provided is equipped to integrate the latest technology Siemens has to offer.
- Clear and fast alerting and evacuation processes.

All these aspects are at the core of comprehensive fire protection. Only when these are fulfilled can you be assured that people in your buildings are safe and assets and business operations are protected.

In order to offer your customers peace of mind, Siemens and its Solution Partner network have a variety of service and solution offerings that can be tailored to an individual client's needs. To find out more about this, please visit our Web site at **siemens.com/firesafety-markets** or contact your local Siemens organization through the **online contact form.**

Share the experience

With our dedicated program for consulting engineers, you can benefit from our extensive application know-how and complete portfolio. With Siemens, you can offer your customers comprehensive fire safety for any application and environmental condition. Your customers will appreciate this as it enables them to reliably protect people, assets and business processes from fire.

Backed by more than 160 years of experience in the field, our offerings for early detection, reliable alarming, orderly evacuation and safe extinguishing are based on innovative and unique technologies. They provide you with convincing arguments like maximized life safety or environmental friendliness, and open the door to strong, long-term customer relationships. And with Siemens, you gain a reliable partner at your side and benefit from our smart tools, in-depth trainings and personal support – wherever you are, wherever you go.

For more information please visit our dedicated **consultant page.**

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