

SIEMENS

Cerberus®

**Manual for the installation of fire
detection systems**

Rooms and installations

Planning

Application examples

Fire & Security Products

Siemens Building Technologies Group

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About this document

Aim and purpose

This document is designed to assist the planners and salesmen of fire detection systems. We show individual examples of how you can monitor a room, a building or a piece of equipment with a fire detection system, the problems you must take into account and where you can find extensive information on the subject.

With this document, you as planner or salesman will be able to work out a solution for the most varied situations. However, we assume that you possess all necessary manuals.

Make-up of the document

The examples state the objective with a statement on what must be achieved. This is followed by notes on possible problems as well as suggestions for solutions.

Because the document is modular in concept, it is possible to provide documentation at any time which is adapted individually to the customer's situation.

Compliance with national guidelines and regulations

Any specific requirements in laws, regulations, guidelines and standards take precedence over these planning guidelines and must be complied with.

- **National requirements:**
These must always be given precedence. The issuing bodies are insurers, the authorities, PTT, associations, customers etc. They also cover regulations for approvals which must be complied with when selecting equipment and systems.
- **Product requirements:**
These are taken from technical descriptions, service manuals etc. The technical data contained in such documents must be complied with.
- **No requirements:**
If no requirements have to be taken into consideration, the project should be executed on the basis of the Siemens Building Technologies planning guidelines which are geared to the performance of Cerberus products.



Designations such as DO11.. refer to the entire AlgoRex series, i.e. «Interactive», «AnalogPlus» and «Collective».

Important planning documents

Manual	Section	Title	Type	Document
CS11.1	3	AlgoRex Fire detection system Planning	CS1140	e1076
DS11	10	Application guidelines for interactive and AnalogPLUS AlgoRex detectors	DS11	e1225
	10	Installation guidelines for AlgoRex fire detection systems collective, AnalogPlus, interactive Planning, Realization	DS11	e1453
	3	Infrared flame detector Description, Planning, Installation, Commissioning	DF11.. WaveRex	e1673
	3	Linear smoke detector with AlgoLogic Description, Planning, Installation, Commissioning	DLO11.. BeamRex	e1276
	7	Detector heating unit Installation instructions	DBZ11.	x1432
DS24	10	Lightning and overvoltage protection for fire detection systems	DS11	e1683
	5	Air sampling smoke detection system ASD-Mono Application, Description, Data, Planning, Installation, Commissioning, Maintenance	AD1-...	e1536
	5	Air sampling smoke detection system ASD-Modular Application, Description, Data, Planning, Installation, Commissioning, Maintenance	AD2-...	e1538
	5	Air sampling smoke detection system ASD-Flex Application, Description, Data, Planning, Installation, Commissioning, Maintenance	BD5-..	e1540
	5	High-sensitivity air sampling smoke detection system Titanus 3000 Application, Description, Data, Planning, Installation, Commissioning, Maintenance	Titanus 3000	e1803
	5	High-sensitivity smoke detector Description	HSD2400	e993
	4	Linear heat detection system Description, Guidelines	FibroLaser II	e1941
CRP	2	General fire detection system planning Planning guidelines	CRP	e432
	6	Actuation of automatic extinguishing systems	CRP	e652

1 Parking garage

Objective

Early warning of persons in case of a fire.
 Quick alarming of the fire department before complete smoke logging occurs.
 Early activation of the smoke relief ventilators.
 Preventing additional persons from entering the hazardous area.
 Preventing the fire from spreading to other vehicles.
 Preventing the propagation of heat and smoke into other areas.

Critical aspects

Automobile exhaust gases, particularly in times of heavy traffic and congested lanes. Cold start, turbodiesel.
 Low ceiling height.
 Air drafts.
 Severe air contamination.
 Electromagnetic induction (EMI) by car telephones and radio transceivers.
 Vandalism.
 Quick, very strong smoke logging of the rooms down to the floor, caused by turbulences and cooling of the particles when the sprinklers are activated.
 Sprinklers are only minimally effective for extinguishing fires in parked vehicles.

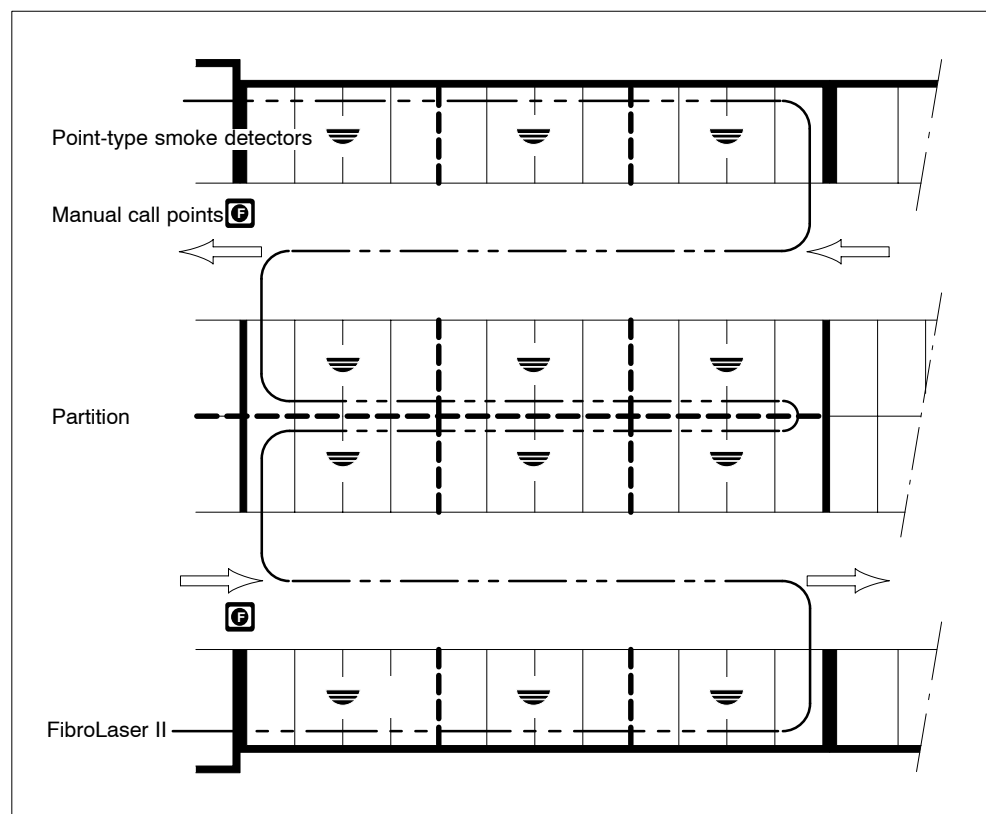
Typical fire hazards

Tailgating collisions.
 Smoldering cigarette butts or matches.
 Fuel leaks.
 Electrical fires in vehicles.
 Repairs on parked vehicles.
 Hazardous goods in parked vehicles.
 Arson.

Possible solutions

<i>Details</i>	<i>Notes</i>	<i>Technical documents</i>
Basic concept		
– Point-type smoke detectors Type: DOT1151 / DOT1152 Parameter set APS005S	Thoroughly investigate possible interference and implement counter-measures. If possibility of mechanical damage exists, install protective cage.	DS11 e1225 DS11 x1098, equipment summary
or		
– Point-type smoke detectors Type: DOT1131 Standard sensitivity	The risk of false alarm increases with this solution.	
Manual call points	Install at the entrances and exits.	CRP e432
Other possibilities		
Air sampling smoke detection system ASD Detector type: DO1151 Parameter set APS005S	If accessibility to the detection point for maintenance purposes is poor.	DS24 d1538
FibroLaser II	In open or partially open parking houses. Completely immune to all environmental influences.	DS24 e1941
Flame detectors	Only suitable for open fires.	DS11 e1673

Details	Notes	Technical documents
Detector siting		
Point-type smoke detectors	Install above parking spaces, not traffic lanes.	CRP e432, sections 5.2 to 5.4
Air sampling smoke detector system, ASD	Arrange sampling holes above the parking spaces.	DS24 e1538
Manual call points	Protect against humidity and moisture. Mechanical protection against vandalism.	CRP e432, section 5.9
FibroLaser II	Arrange above the parking spaces and traffic lanes.	
Flame detectors	Install in the corners with 45 degree inclination.	DS11 e1673
Signal processing		
Take into account at planning stage:	Multidetector zone «Multi / Garage» type.	DS11 e1225
Supportive measures		
<ul style="list-style-type: none"> - Sprinkler system. - Smoke extraction system. - Enhancement or combination with CO detection. - Escape route signalization. - Fire partitions between each third to fourth vehicle. - Pressure relief elements. - Shorter maintenance intervals due to severe contamination. - Maintenance agreement. 		CC62 e1708



2 Transformer station in building

Objective

Fire detection and extinguishing before smoke and heat create a critical situation.
Prompt shut-down of the transformer.

Critical features

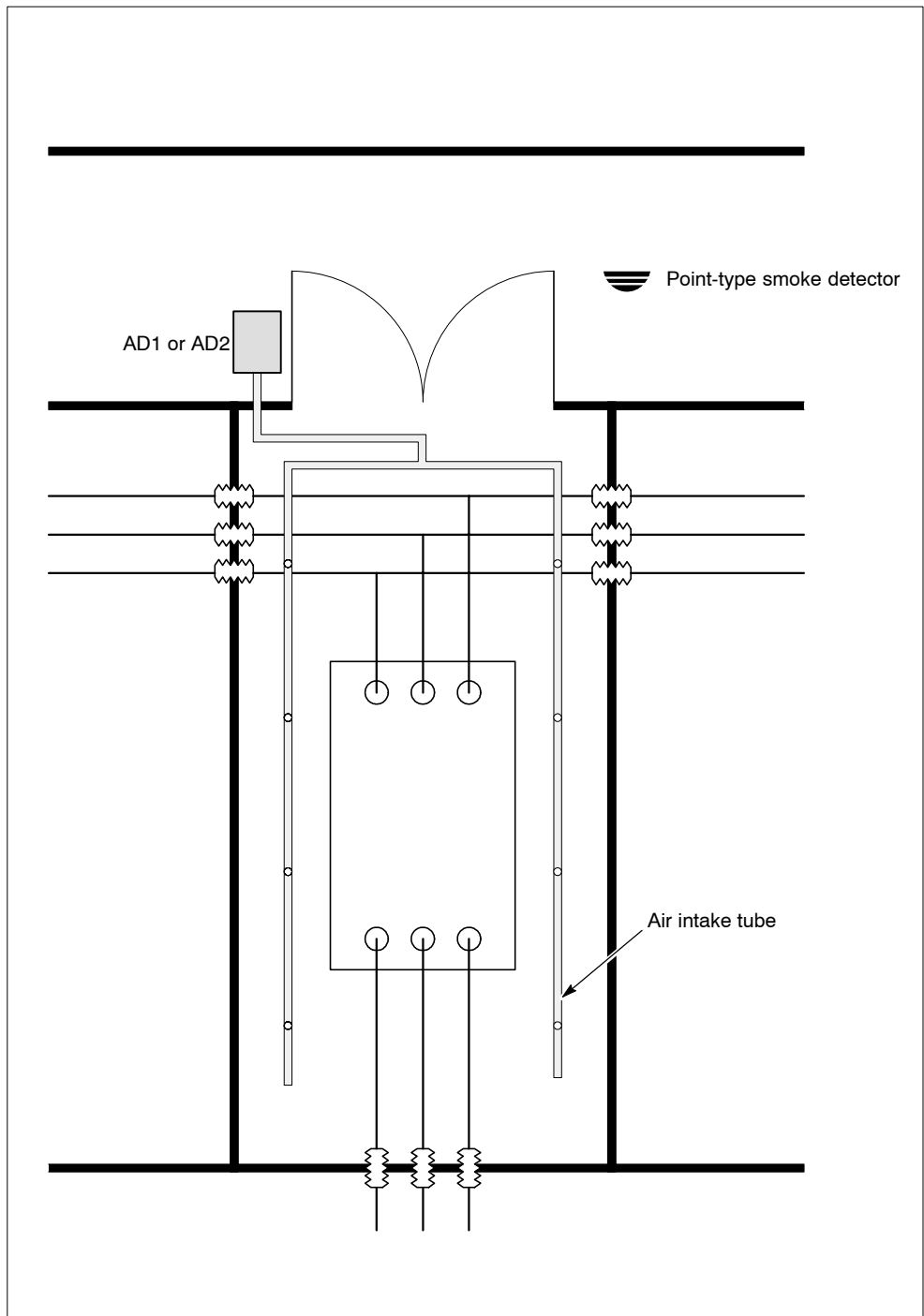
Fire-fighting impeded by live cables.
Access impeded for maintenance (high voltage).
Electromagnetic interference (EMI) during switching operations.
Danger of harm to the environment from leaking coolant.

Typical fire hazards

Overloading, short circuit, short to earth
Sabotage

Suggested solutions

<i>Details</i>	<i>Comment</i>	<i>Technical documents</i>
Basic concept		
Air sampling smoke detection system ASD Detector type: DO11..	No influence from EMI. No maintenance work necessary in the vicinity of dangerous voltages.	DS24 e1536 DS24 e1538 DS11 e1225
Manual call points		CRP e432
Other possibilities		
Point-type smoke detectors Type: DOT11.. / DOT11.. Parameter set APS006S	Only where there is easy access from outside.	DS11 e1225
Detector siting		
Air sampling smoke detection system ASD	Do not mount tubes with sampling holes above the transformer. Do not use tubes which are electrically conductive! With large units two tubes must be mounted lengthwise on both sides. Site the detection unit outside the transformer so that it is easily accessible.	DS24 e1536 DS24 e1538
Manual call points	Mount at the exits.	CRP e432, section 5.9
Signal processing		
– Provide linked detectors or cross-zoning for activation of extinguishing or – execute the automatic activation of extinguishing with multidetector logic (CS1140).		CRP e652 CS11 e1076
Supporting measures		
<ul style="list-style-type: none"> – Spray water or gas extinguishing system automatically activated – Manual call points to activate the extinguishing system – Button to block automatic extinguishing – With water extinguishing provide a sump to catch extinguishing water – Maintenance agreement. 		



Important: Comply with the relevant regulations for work on high voltage systems !

3 Deep-freeze storage rooms

Objective

Prevention of smoke and fire damage to the stored goods and the building.

Critical aspects

Low ambient air temperatures down to approx. -40°C .

The stored goods are highly sensitive to smoke.

Air velocity up to 10 m/s if the refrigeration equipment is in operation.

Fog and mist generation near the door (condensation of the outside air).

Strong ice formation on the room ceiling, particularly at the entrances and exits, and leaks in the insulation.

Special requirements applicable to the insulation material. (Specifications of the deep-freeze storage room manufacturer).

More difficult maintenance work. It is only possible to work for short periods. Special clothing must also be worn when working in freezers.

Severe fire loading due to strong insulation.

Possibility of leaks in the refrigeration lines, leaking ammonia.

Typical fire hazards

Electrical installations (short circuit, overload).

Refrigeration equipment.

Forklifts.

Repair work (welding).

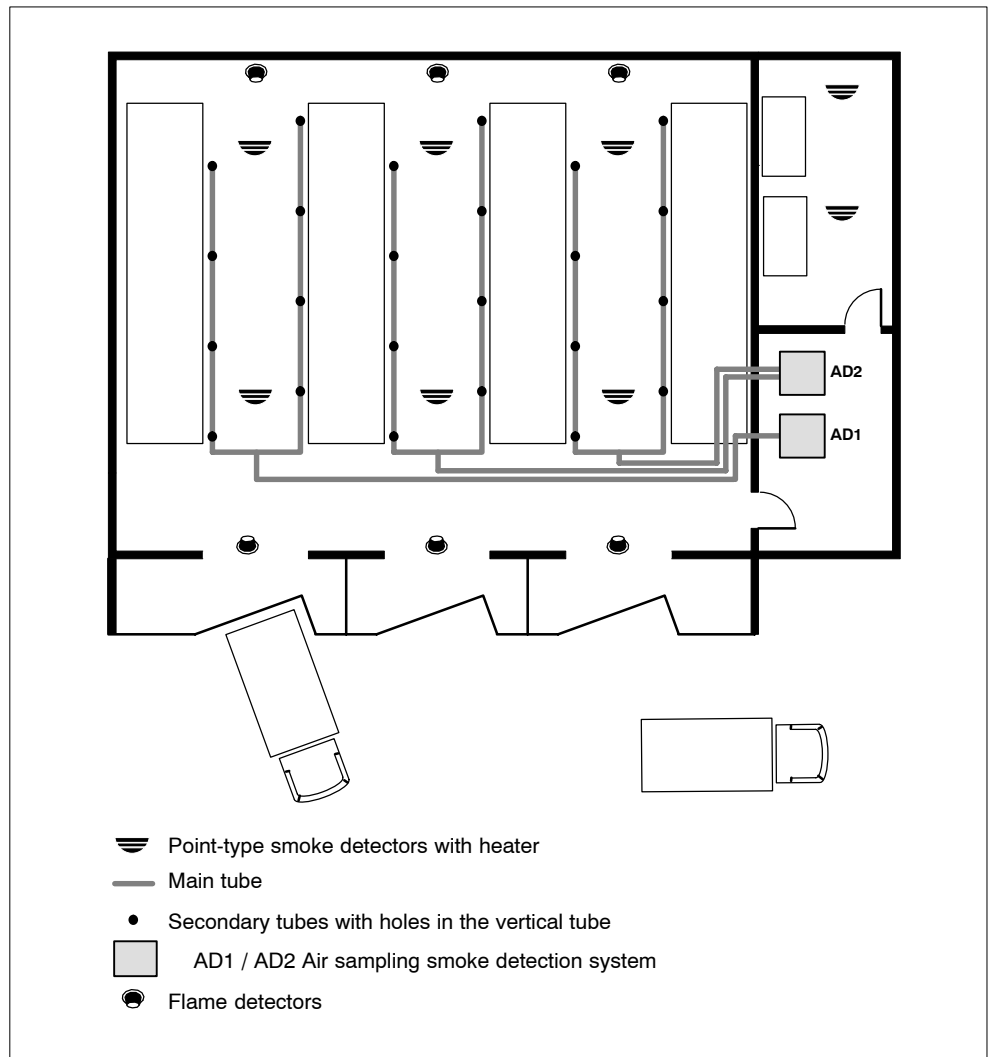
External fire hazards.

Sabotage/arson.

Possible solutions

<i>Details</i>	<i>Notes</i>	<i>Technical documents</i>
Basic concept		
Point-type smoke detectors Type: DOT1151 Parameter set APS005S	Equip detector base with a heater.	DS11 x1432 DS11 e1225
Manual call points		CRP e432
Other possibilities		
Air sampling smoke detection system ASD Detector type: DO11..	Prevent the intake ports to ice formation.	DS24 e1538 DS11 e1225
Flame detectors	Can be installed in addition to smoke detectors, if flaming fires can be expected, e.g. from easily combustible packing material. Prevent ice accretion!	DS11 e1673
Detector siting		
Point-type smoke detectors	Installation on the ceiling, no detectors near the locks and doors.	CRP e432, sections 5.2 to 5.4
Manual call points	Should preferably not be installed in the refrigerated area.	CRP e432, section 5.9
Air sampling smoke detection system ASD	Installation of the tubes against the racks in the isles. Active detector AD2 installed outside the refrigerated area in an easily accessible room.	DS24 e1536 DS24 e1538
Flame detectors	Installation on the ceiling above the stored goods, or with line of sight into the isles, with 45 degree inclination.	DS11 e1673

Details	Notes	Technical documents
Signal processing		
No special tips.		
Supportive measures		
<ul style="list-style-type: none"> - Provide smoke exhaust points (prepared knock-out points) in the ceiling structure that can be opened manually. - Object monitoring of the refrigeration equipment. - Object extinguishing for the refrigeration equipment. - Ammonia gas detector. - Rules for the behavior during repair work. - Shorter maintenance cycle due to possible ice build-up. - Maintenance agreement. 		



4 Exhibition rooms (halls)

Objective

Detection of incipient fires before smoke and soot can damage the exhibited material.
Early evacuation of the visitors and the personnel.

Critical aspects

High rooms, decorative ceilings or skylights.

For esthetic and/or technical reasons it is not possible to install discrete point smoke detectors.

Closed, illuminated glass showcases for display.

More difficult accessibility outside the opening hours (intrusion detection system)

Typical fire hazards

Hazardous overheating of objects caused by lighting fixtures.

Electrical installations (short circuit, overload).

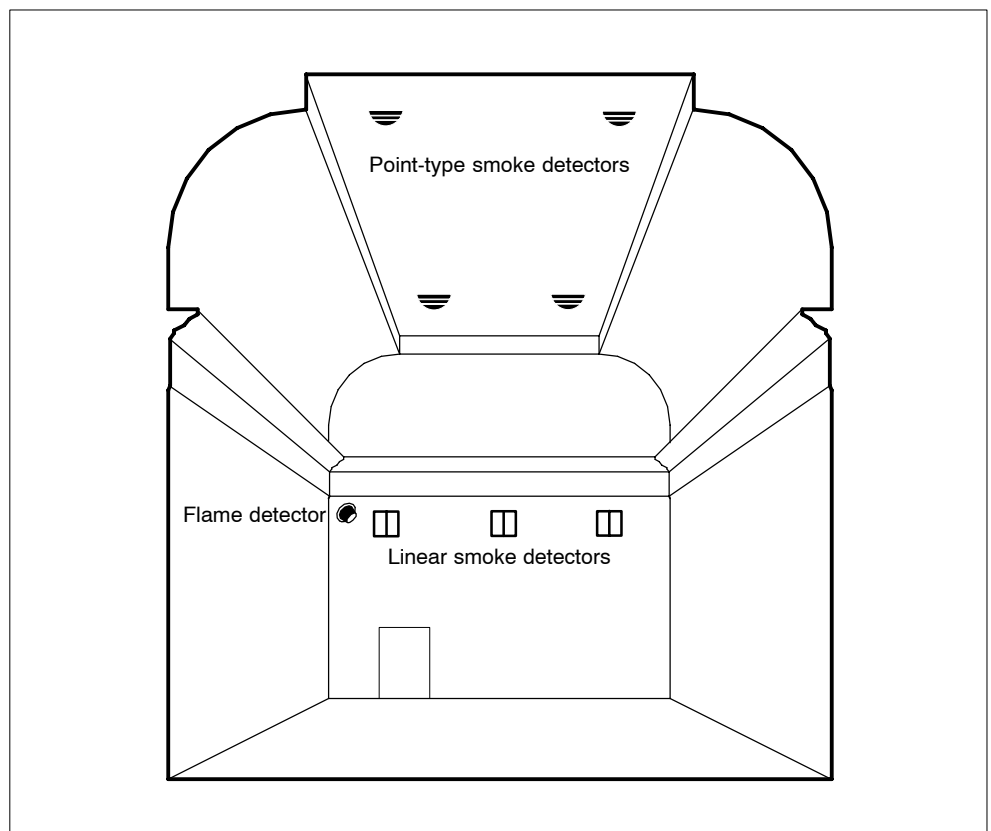
Discarded cigarette butts or matches.

Arson attack with paper or liquid fuels.

Possible solutions

<i>Details</i>	<i>Notes</i>	<i>Technical documents</i>
Basic concept		
Point-type smoke detectors Type: DO11.. or DOT11..	For open, smoke generating fires.	CRP e432 DS11 e1225
Linear smoke detector Type: DLO11..	Detection of smoldering fires. Also usable in places where no discrete point smoke detectors can be installed for esthetic and/or architectural reasons.	DS11 e1276
Manual call points		CRP e432
Air sampling smoke detection system ASD Detector type: DO1153	Show case monitoring, room surveillance in aesthetically demanding applications.	DS24 e1536 DS24 e1538 DS11 e1225
Other possibilities		
Flame detectors	Fast response to arson attacks.	DS11 e1673
High-sensitivity smoke detector Titanus or HSD24..	Room surveillance in combination with point-type smoke detectors in installations with high value concentrations and/or irreplaceable exhibition goods.	DS24 e1803 DS24 e993
Detector siting		
Point-type smoke detectors	Installation on the ceiling, if this is permitted by structural or esthetic considerations.	CRP e432, sections 5.2 to 5.4
Linear smoke detector DLO11..	Installation at approx. 2/3 room height for detecting smoldering fire smoke that does not rise up to the ceiling.	DS11 e1276
Air sampling smoke detection system ASD	Concealed installation of the tubes in the ceiling. Small tubes (diameter 6mm) penetrating through the ceiling serve as sampling holes. Decorative rosettes may possibly be used. Installation of the active detector AD1 / AD2 in an easily accessible room.	DS24 e1536 DS24 e1538
Manual call points	To be installed at the passages between or exits from the exhibition rooms.	CRP e432, section 5.9

<i>Details</i>	<i>Notes</i>	<i>Technical documents</i>
Detector siting (cont.)		
Flame detector	Installation in the corners of the room, as high as possible above the exhibited goods, with 45 degree inclination.	DS11 e1673
High-sensitivity smoke detector Titanus or HSD24..	Install the tubes fitted with sampling holes in front of the exhaust air opening of the ventilation system, or in any other suitable location.	DS24 e993
Signal processing		
<ul style="list-style-type: none"> - Display each detector type separately. - Individual addressing permits fast intervention. 		
Supportive measures		
<ul style="list-style-type: none"> - Enforce absolute no smoking rule. - If possible, install access barriers in front of important exhibition goods to reduce risk of arson attack. - Install intrusion detection system. - Maintenance agreement. 		



5 Storage yard

Objective

Early detection of flaming fires also under difficult ambient conditions such as climatic influences and smoke evolution.

Critical aspects

Direct climatic influences such as rain, snow, fog, cold, heat, etc. on the detectors and the installation.

Interferences such as solar irradiation, heat sources, useful fires, etc. can influence the detectors and trigger nuisance alarms.

Large distance between the source of the fire and the detector.

Propagation direction of the smoke and heat of convection unpredictable.

Typical fire hazards

Electrical installations.

Accidents with transport and loading equipment.

Arson / sabotage.

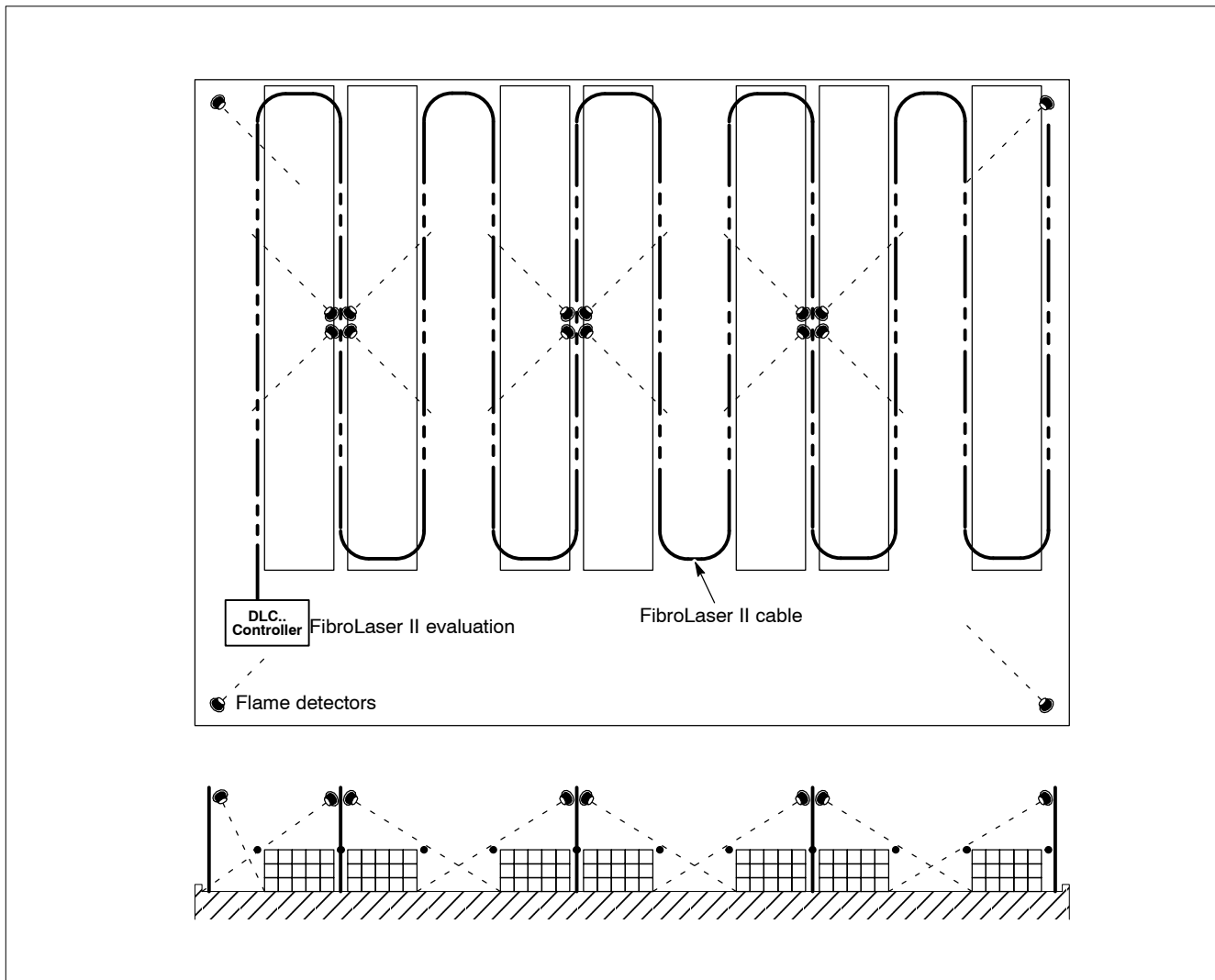
Spark generation.

Lightning.

Possible solutions

<i>Details</i>	<i>Notes</i>	<i>Technical documents</i>
Basic concept		
Flame detectors	Infrared radiation is detected even through smoke.	DS11 e1673
Manual alarm buttons		CRP e432
Other possibilities		
Linear heat detection system Fibro-Laser II	Accurate, dynamic indication of the source of fire. Only effective if the cable can be attached to racks or other supporting structures. Insensitive to external influences.	DS24 e1941
Detector siting		
Flame detectors	Install the detectors at sufficient height where a view of the isles between the storage bays is possible. Avoid dead angles. Install on vibration absorber with 45 degree inclination on sturdy poles or similar structures. Install rain hood. Ensure easy accessibility for maintenance work.	DS11 e1673
Manual call points	Install at easily accessible locations within the storage yard, preferably along escape routes and at hose cabinets.	CRP e432, section 5.9
Linear heat detection system Fibro-Laser II	The cable must be attached to the supporting structure in such a way that it is exposed to the heat of convection.	DS24 e1941
Signal processing		
No specific tips.		

Details	Notes	Technical documents
Supportive measures		
<ul style="list-style-type: none"> - Stationary extinguishing system (spray water, light foam, powder, etc.). - Fencing of the storage yard. - Perimeter monitoring with access control. - Maintenance agreement. 		



6 EDP cassette library system «Storage Tek»

Objective

Prevention of damage by smoke and fire caused by mechanical or electrical defects that result in loss of data.

Ensuring the availability (99.6%) of the EDP system.

Critical aspects

The cassette library (Library Storage Module, LSM) is only accessible after the safe door has been turned off.

While the EDP system is in operation the module must not be switched off.

High availability is mandatory (24 hour operation).

Peripheral devices of the module, i.e. cartridge drive (CD), library control unit (LCU), control unit (CU) and library management unit (LMU) cannot be monitored with discrete point smoke detectors (lack of space).

The robot arm causes turbulences within the module, the smoke propagation is unpredictable.

Built-in smoke switch very difficult to access for maintenance purposes.

Typical fire hazards

Electrical installations (short circuit, overload)

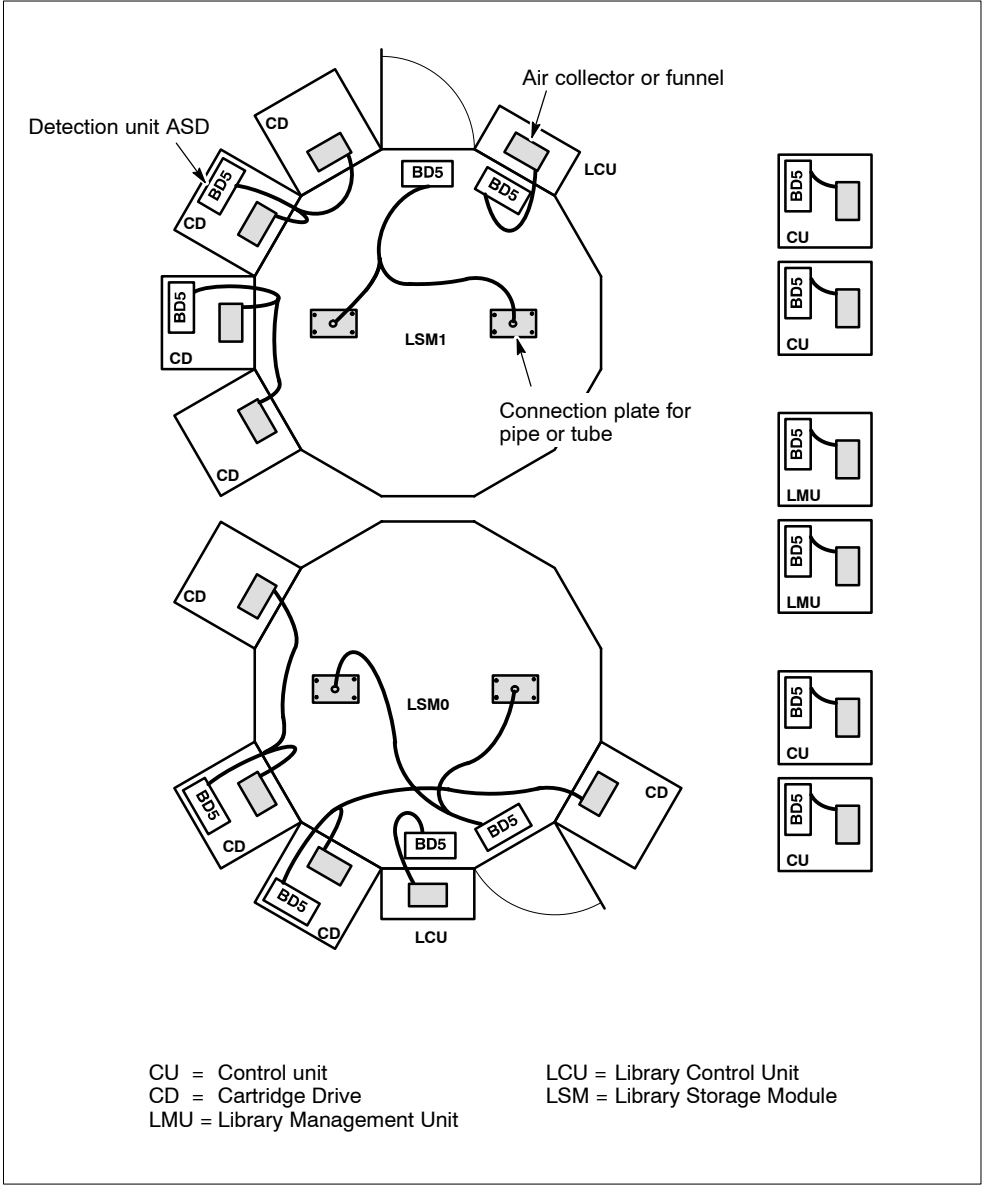
Mechanical friction between the moving parts.

Overheating of the robot system.

Possible solutions

<i>Details</i>	<i>Notes</i>	<i>Technical documents</i>
Basic concept		
Air sampling smoke detection system ASD (BD3 / BD5) Detector type: DO11..	Monitoring of the cassette library and the peripheral devices is necessary to achieve the required availability.	DS24 e1540 DS11 e1225
Other possibilities		
Point-type smoke detectors Type: DO11..	Only if easily accessible from the outside without the need for opening the door, or if this solution is required by the ventilation concept.	DS11 e1225
High-sensitivity smoke detector Titanus or HSD24..	For room surveillance, without equipment monitoring. More difficult to localize the source of the fire.	DS24 e1803 DS24 e993
Detector siting		
Air sampling smoke detection system ASD (BD3 / BD5)	Installation of a detection unit on the LSM. Insert the suction tubes via screwed fittings directly into the module. The screwed fitting is installed in the mounting plate of the previously removed smoke switch. Two CDs can be monitored with one detection unit. The other peripheral devices are to be equipped with one detection unit each.	DS24 e1540
Smoke detectors	The smoke detectors are installed in place of the smoke switches.	
Signal processing		
De-energize each individual module based on detector cross-zoning		CRP e432, section 5.1.2

Details	Notes	Technical documents
Supportive measures		
<ul style="list-style-type: none"> - Room surveillance of the EDP center and the adjacent rooms. - Inhibition device for automatic de-energizing, important when service work is performed on the fire detection system. - Dry extinguishing system. - Access control system to EDP area. - Maintenance agreement. 		



7 Escalators

Objective

- Early warning of persons before smoke emerges from the escalator.
- Prevention of panic.
- Quick alarming of the fire department before complete smoke logging occurs.
- Early activation of smoke relief ventilators.
- Preventing other persons from entering the critical area.
- Activation of an automatic equipment extinguishing system.
- Preventing the spread of fire to adjacent escalators.

Critical aspects

- Hollow spaces contaminated by refuse and lubricants.
- Air contamination, air turbulences.
- Cramped spaces, installation of a fire detection system and service access are difficult.
- Electromagnetic interference (EMI) caused by drive motor and controls.
- Escalator operation may not be hampered by service work on the fire detection installations.
- The extinguishing agent must be harmless to persons and equipment.

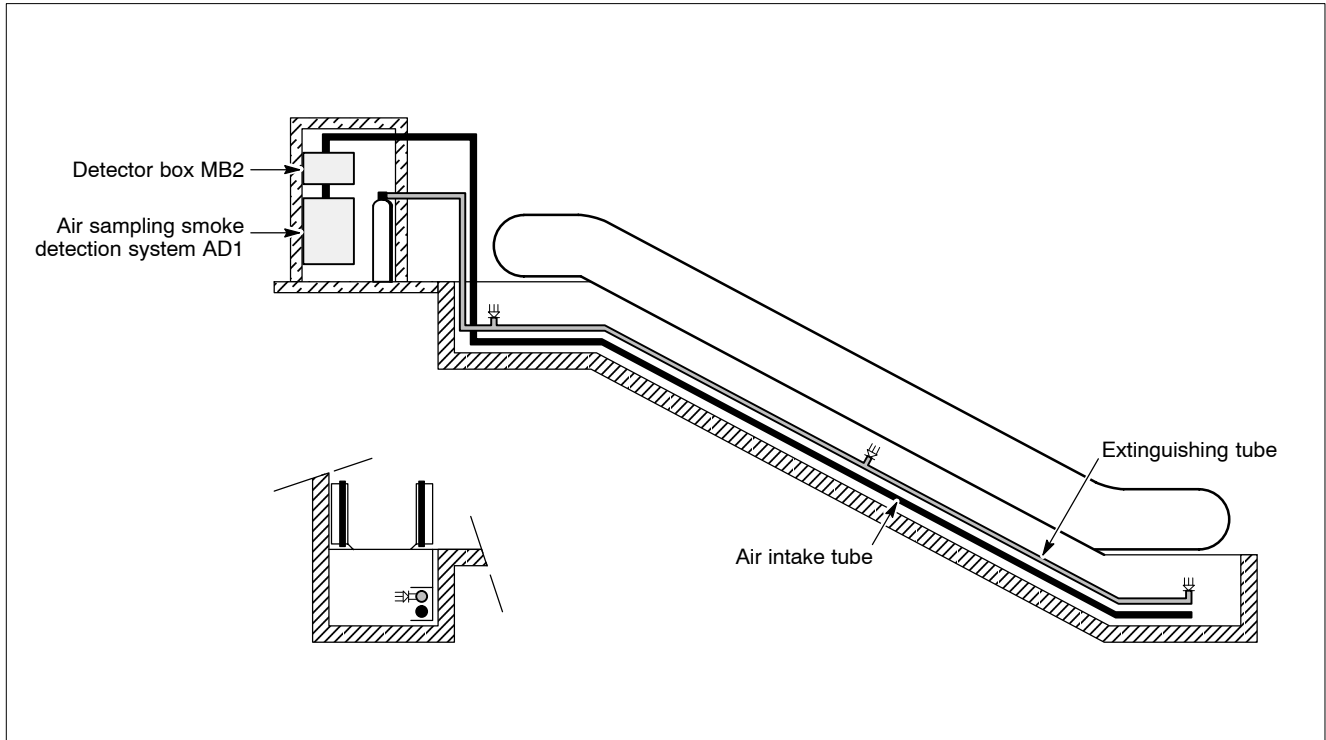
Typical fire hazards

- Motor damage, electrical fire.
- Discarded cigarette butts and matches.
- Overheated mechanical components.
- Vandalism, sabotage.
- Maintenance work on the escalator.

Possible solutions

<i>Details</i>	<i>Notes</i>	<i>Technical documents</i>
Basic concept		
Air sampling smoke detection system ASD Detector type: DO11..	Install filter in sampling tube.	DS24 e1536 DS11 e1225
Other possibilities		
Point-type smoke detectors Type: DOT11..	Only recommended if the available installation site presents no problems with respect to accessibility and contamination.	DS11 e1225
Detector siting		
Air sampling smoke detection system ASD AD1.. & detector box MB2	Install the sampling tube (25 mm external diameter) in the hollow space of the escalator. Max. sampling hole interval 2 m. Install the AD1 & MB2 in an easily accessible room, or in a lockable cabinet next to the escalator.	DS24 e1536
Point-type smoke detector	Install the detector in the motor room and at the highest point of the escalator cavity.	CRP e432, sections 5.2 to 5.4 DS11 e1225
Signal processing		
<ul style="list-style-type: none"> – Assign each detector to a separate display. – Cross-zoning or multidetector logic for alarm actuation and automatic activation of the extinguishing system. – Automatic shutdown of the escalator. 		<ul style="list-style-type: none"> CRP e432 CRP e432, section 5.1.2 CRP e652 CS11 e1076

Details	Notes	Technical documents
Supportive measures		
<ul style="list-style-type: none"> - Spray water or gas extinguishing system, automatically activated. - Separate adjacent escalators with a fire-proof partition. - Manual alarm buttons for activating the extinguishing system installed in a tamper-proof cabinet. Not accessible to unauthorized persons. - Push button for inhibiting automatic extinguishing. - Shorter maintenance cycles due to severe contamination. - Maintenance agreement. 		



8 Aircraft hangar

Objective

Early warning of a fire outside the aircraft before they and other equipment can be damaged.

Critical features

Very high rooms. Only open fire can be detected.

Parked aircraft obstruct the spread of smoke and heat radiation.

Powerful electromagnetic interference is caused when transmitter, radar, navigation and similar equipment are tested.

Considerable deceptive phenomena caused by maintenance and repair work (welding, exhaust gas from tractors, forklift trucks, aircraft etc.)

Headlights from moving vehicles

Detectors on the ceiling are not easily accessible or are even impossible to reach for servicing.

De-icing of tail plane.

Typical fire hazards

Electrical wiring (short circuit, overloading)

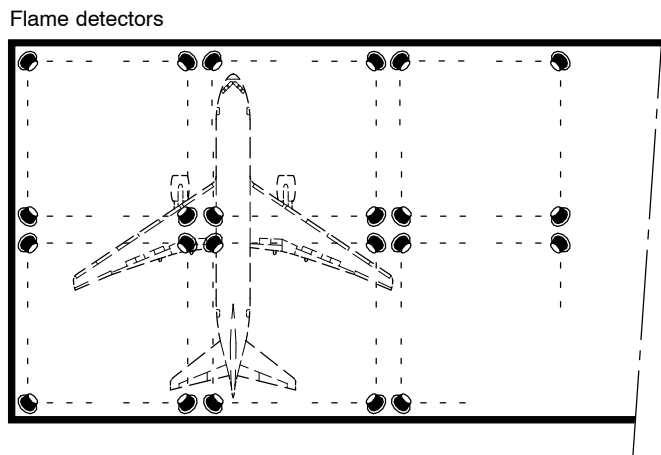
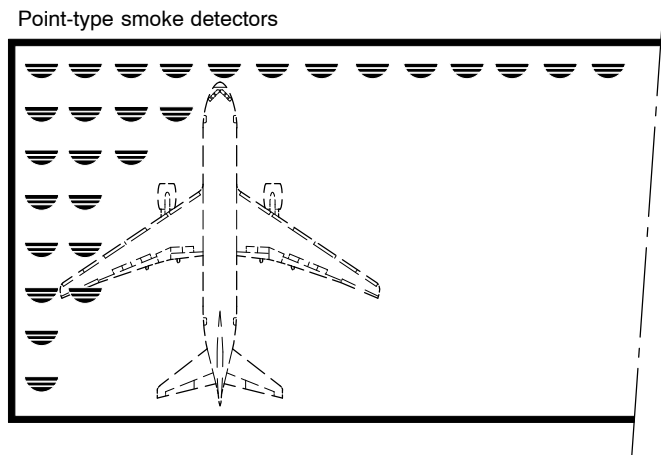
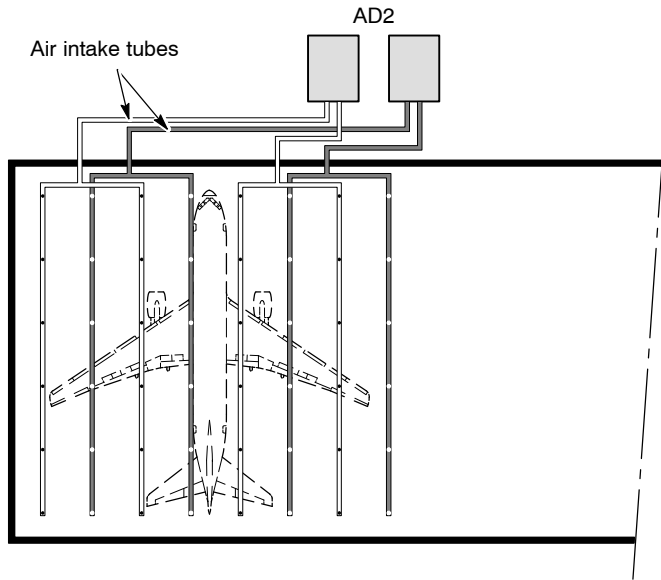
Repair work on parked aircraft

Leaking fuel or solvents

Suggested solutions

<i>Details</i>	<i>Notes</i>	<i>Technical documents</i>
Basic concept		
Point-type smoke detectors Type: DO11.. or DOT11..	For open, smoke-forming fires. Carefully check out deceptive phenomena present.	CRP e432 DS11 e1225
Flame detectors	Rapid response to fires involving liquids.	DS11 e1673
Air sampling detection system ASD Detector type: DO11..	The sampling chamber with the smoke detector can be mounted at an easily accessible site for testing and maintenance. High immunity to EMI.	DS24 e1538
Manual call points		CRP e432
Other possibilities		
Linear smoke detectors DLO11..	Additional level of detection above the aircraft cabins. Only recommended with solid building construction and easy accessibility.	DS11 e1276
Detector siting		
Point-type smoke detectors	Mount on the ceiling providing the construction and accessibility permit. Allow enough distance between detector and ceiling because of cushions of heat.	CRP e432, sections 5.2 to 5.4
Flame detectors	Mount on the hangar ceiling and on the walls so that all areas above and below the aircraft can be monitored. 45° inclined.	DS11 e1673
Linear smoke detectors DLO11..	Mount approx. 2 m above the highest possible aircraft fuselage. Only mount on rigid building construction. If possible install reflectors.	DS11 e1276

<i>Details</i>	<i>Notes</i>	<i>Technical documents</i>
Detector siting (cont.)		
Air sampling smoke detection system ASD	Mount the tubes on the ceiling structure. Maintain a distance between detector and ceiling as for point-type detectors. With suspended ceilings, the tube network above the ceiling and T-junctions can monitor the air in the hangar. Remember spacing! The void above the ceiling can be monitored both with point-type smoke detectors and ASD. Mount the active detector AD2.. in an easily accessible position.	DS24 e1538
Manual call points	Mount in corridors and at exits as well as at hose cabinets.	CRP e432, section 5.9
Signal processing		
<ul style="list-style-type: none"> - Individual addressing enables location of a detector in alarm or fault condition. - Detector cross-zoning for extinguishing activation. 		
Supporting measures		
<ul style="list-style-type: none"> - Automatic or manually activated extinguishing system (spray water, light foam) - Monitoring of all adjacent rooms with smoke detection system - Installation of a sprinkler system in adjacent rooms - Use of mobile smoke detection systems in aircraft, possibly even HSD. - Total ban on smoking. - Maintenance agreement. 		



9 Hospital ward

Objective

To alert personnel before harmful smoke gas arises and before a dangerous situation develops.

Prompt evacuation of patients and personnel.

Critical features

Smoking in spite of a ban (patients and visitors)

Steam emitted from the bathroom/shower into the ward

Air current and rarefaction of smoke by air conditioning system

Patients are immobile (post-operative patients, patients under the influence of medicine)

In some cases evacuation is very difficult.

Electromagnetic fields of interference caused by staff-paging systems and mobile therapy equipment.

Typical fire hazards

Smoking and careless handling of fire (candles)

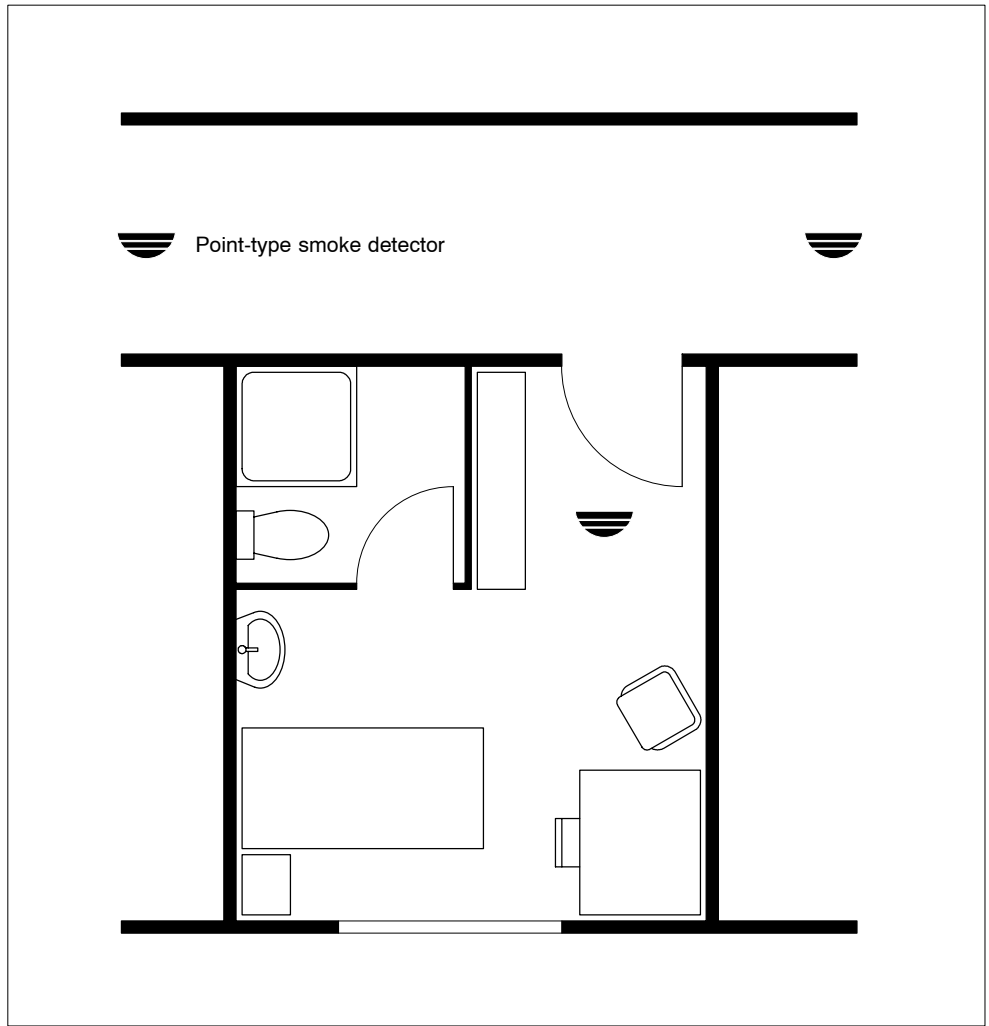
Electrical wiring and equipment (short circuit and/or overloading to television sets, therapy equipment etc.)

Accidents with easily combustible liquids

Smoke spread via air conditioning system.

Suggested solutions

<i>Details</i>	<i>Notes</i>	<i>Technical documents</i>
Basic concept		
Point-type smoke detectors Type: DO11.. or DOT11	Provide a DBZ1195A acoustic detector base activated by the smoke detector. Take steps to avoid EMI.	CRP e432 DS11 e1225 DS11 e1683
Other possibilities		
none		
Siting detectors		
Point-type smoke detectors	Mount on the ceiling, away from likely smoking areas and wet spots. Distance from wall to ceiling approx. 0.5 m. Do not mount in front of the intake of the air conditioning system.	CRP e432, sections 5.2 to 5.4
Signal processing		
<ul style="list-style-type: none"> – Individual addressing enables selective alarm and rapid intervention. – Floor-by-floor alarm – The activation of fire doors and dampers to prevent smoke logging. 		
Supporting measures		
<ul style="list-style-type: none"> – Sprinkler system – Point-type smoke detectors in the corridors and the other rooms (complete monitoring) – Manual call points along escape routes and at exits and entrances – Escape route signalling – Loudspeaker system to enable orderly evacuation (Calming patients, visitors and personnel) – Activation of fire doors and smoke vents with control centre STM/STE2400 – Maintenance agreement. 		



10 Intensive care units

Objective

To alert personnel before harmful smoke gas can arise and before a dangerous situation can develop.

Prompt evacuation of patients and personnel.

Critical features

Air currents and the rarefaction of the smoke by the air conditioning system

Patients are immobile (post-operative patients, patients under the influence of medicine)

Extremely difficult evacuation

Electromagnetic interference fields from staff-paging systems and medical and therapy equipment.

Erschwerter Zugang für Servicepersonal.

Typical fire hazards

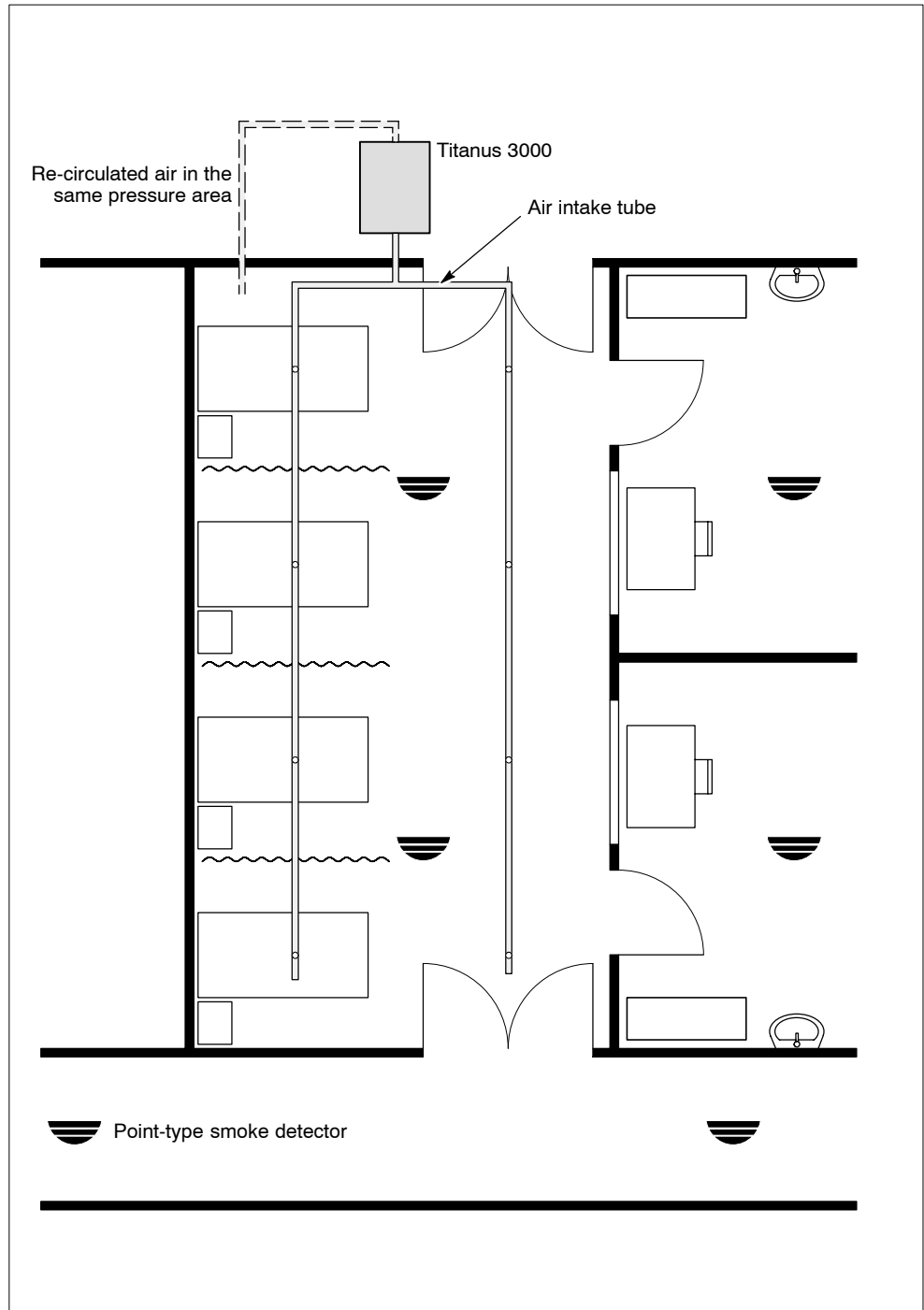
Electrical wiring and equipment (short circuit and/or overloading to medical and therapy equipment)

Accidents with easily combustible liquids and gases

Danger of explosion.

Suggested solutions

<i>Details</i>	<i>Notes</i>	<i>Technical documents</i>
Basic concept		
Point-type smoke detectors Type: DO11.. or DOT11.. Parameter set APS007S	Measures to counteract EMI.	CRP e432 DS11 e1225
Other possibilities		
Air sampling smoke detection system Titanus, with smoke detector DO1161A	No electromagnetic influence.	DS24 e1803
Siting detectors		
Point-type smoke detectors	Mount on ceiling. Do not install in front of the intake of the air conditioning system.	CRP e432, sections 5.2 to 5.4
Air sampling smoke detection system Titanus, with smoke detector DO1161A	Install the sampling tube in the room, or if there is an air conditioning system in front of the sampling holes.	
Signal processing		
<ul style="list-style-type: none"> – Individual addressing enables selective alarm and rapid intervention. – Floor-by-floor alarm. – Activation of fire doors and dampers to prevent smoke-logging. 		
Supporting measures		
<ul style="list-style-type: none"> – Sprinkler system – Point-type smoke detectors in the corridors and other rooms (complete monitoring) – Manual call points along the escape routes and at exits and entrances – Escape route signalling – Loudspeaker system to allow an orderly evacuation (calming) – Activation of fire doors and smoke vents with control centre STM/STE2400 – Lifts automatically sent to the ground floor – Maintenance agreement. 		



11 Hotel bedrooms

Objective

To alert the guest in the room concerned and personnel before harmful smoke gas arises and a dangerous situation develops.

Prompt evacuation of guests and personnel.

Prevention of unnecessary alerting of the fire department.

Critical features

Smoking in the bedroom

Steam emitted from the bathroom/shower into the bedroom or anteroom

Draughts and rarefaction of the smoke in the air by an air condition system

Guests under the influence of alcohol and the like

Evacuation of guests especially in high-rise buildings

Cooking with makeshift facilities

Electromagnetic fields of interference caused by staff-paging systems and mobile telephones.

Typical fire hazards

Smoking and careless handling of fire

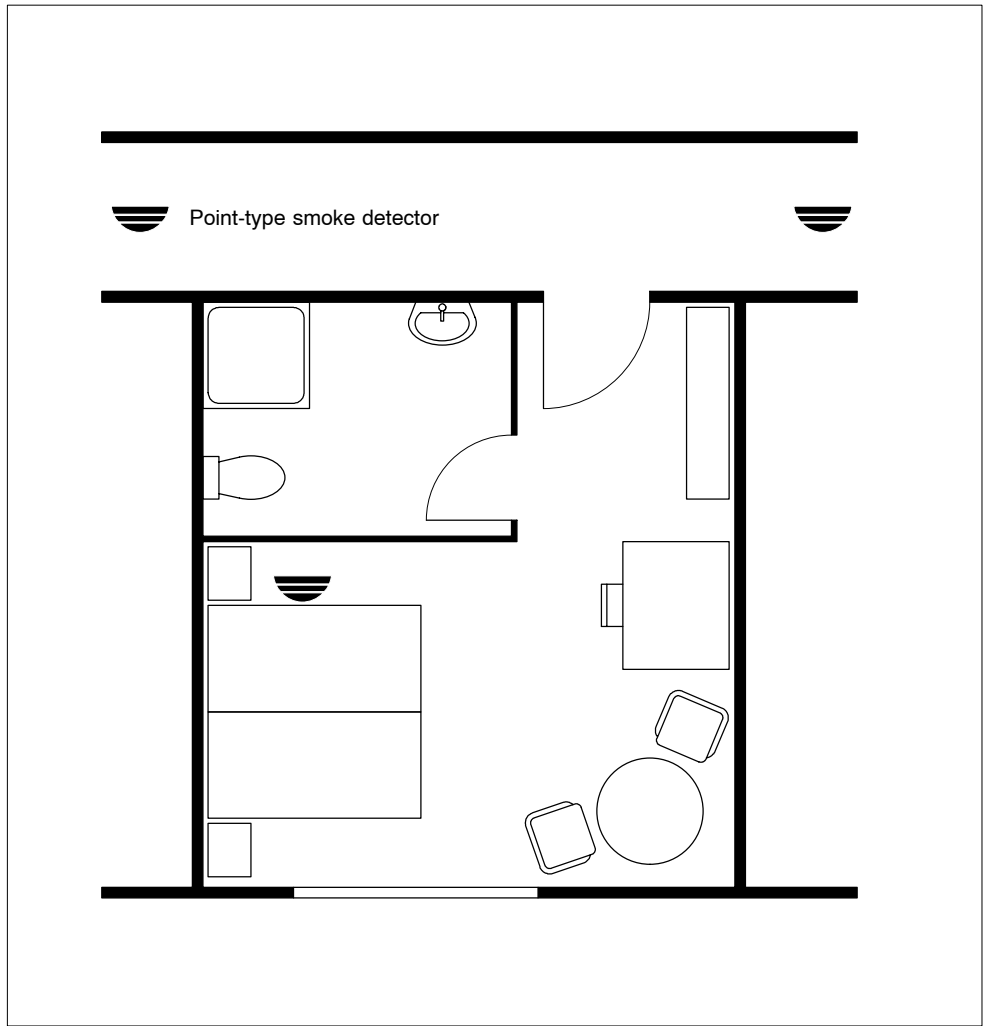
The discarding of cigarettes etc in containers with combustible material

Short circuit and/or overloading of electrical wiring and equipment (refrigerators, TV, ironing machines etc.)

Smoke spread via air conditioning systems.

Suggested solutions

<i>Details</i>	<i>Notes</i>	<i>Technical documents</i>
Basic concept		
Point-type smoke detectors Type: DOT11..	Provide a DBZ1195A acoustic detector base in each guest room of at least 80 dB, activated by the smoke detector. Take steps to avoid EMI.	CRP e432 DS11 e1225
Other possibilities		
none		
Siting detectors		
Point-type smoke detectors	Mount on the ceiling as far as possible from likely smoking areas and wet spots. Distance from wall to ceiling approx. 0.5m. Do not mount in front of the intake of the air conditioning system.	CRP e432, sections 5.2 to 5.4
Signal processing		
<ul style="list-style-type: none"> – Individual addressing enables selective alerting in the guest rooms and rapid intervention by personnel. – Activation of fire doors and dampers to prevent smoke logging. 		
Supporting measures		
<ul style="list-style-type: none"> – Sprinkler system – Point-type smoke detectors in the corridors and other rooms (complete monitoring) – Manual call points along escape routes and at exits and entrances – Automatic telephone connection between the porter's lodge and the bedrooms – Loudspeaker system to allow an orderly evacuation (calming guests and personnel) – Escape routes signalling – Lifts automatically sent to the ground floor – Maintenance agreement. 		



12 Cable and energy ducts

Objective

Early alarm in the event of overheated electrical cables and/or insulated pipes for liquids before impermissible amounts of harmful gases and smoke are generated.

Critical features

Restricted access for fire-fighting (long, low, usually narrow ducts)

Electromagnetic influence (EMI)

High humidity (condensation)

Dust, dirt

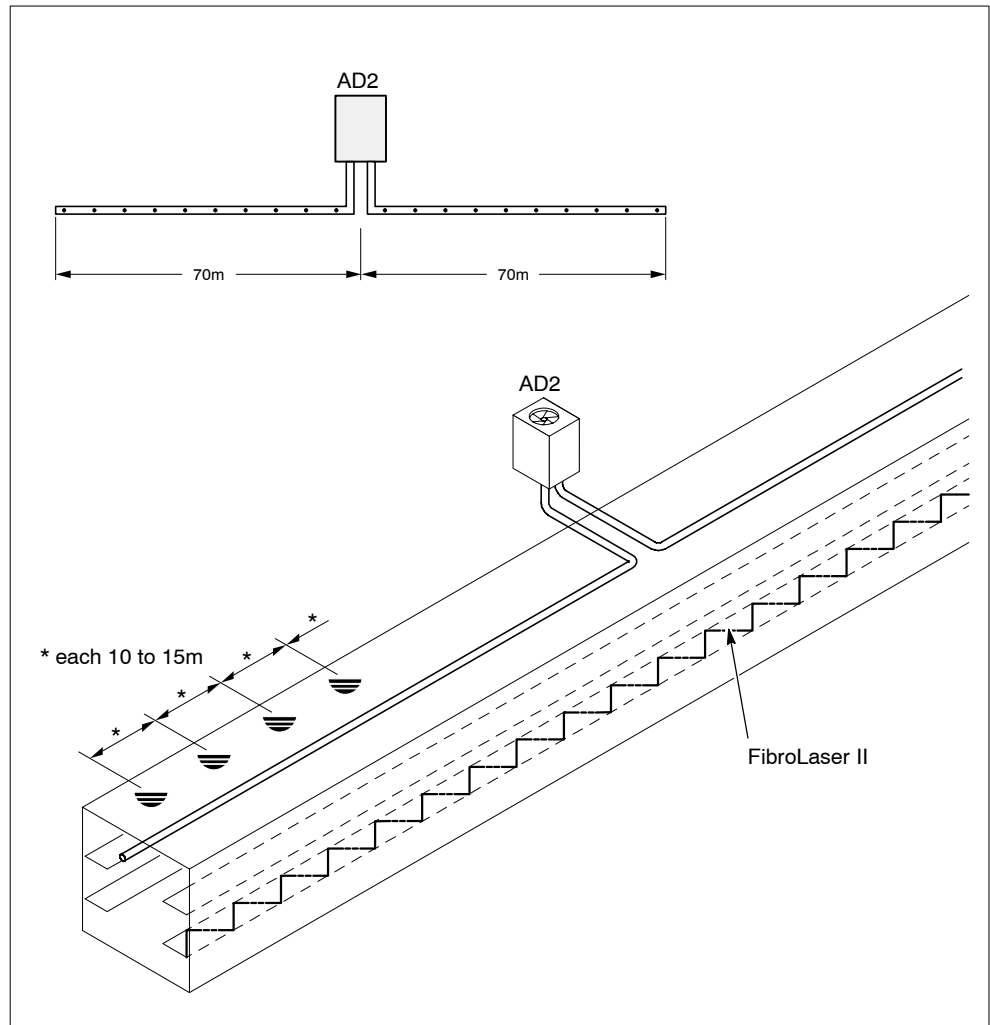
Absence of fire compartments

Typical fire hazards

Overloading, short circuit, short to earth in cable and/or switchgear, spontaneous combustion of oily rags and similar objects.

Suggested solutions

<i>Details</i>	<i>Notes</i>	<i>Technical documents</i>
Basic concept		
Point-type smoke detectors Type: DO11.. or DOT11..	Only if ambient influences permit (EMI, humidity).	DS11 e1225
Manual call points	One call point at least every 100 m.	CRP e432
Other possibilities		
Air sampling smoke detection system ASD Detector type: DO11..	No electromagnetic influence.	DS24 e1538 DS11 e1225
Linear heat detection system Fibro-Laser II	Providing the heat required for activation does not cause impermissible emission.	DS24 e1941
Linear smoke detector DLO11..	In clean, straight fire compartments where firm installation is possible.	DS11 e1276
Siting detectors		
Point-type smoke detectors	Mount on the ceiling. Mount adapter base.	CRP e432, sections 5.2 to 5.4
Manual call points	In easily visible positions, especially at exits and corridors in the fire compartments. Protect against humidity (cable entry from below).	CRP e432, section 5.9
Air sampling smoke detection system ASD	Mount tubes with the sampling holes at the highest point in the duct.	DS24 e1536 DS24 e1538
Linear heat detection system Fibro-Laser II	Mount in smaller ducts on the ceiling. In large ducts mount above cable raceways in a zig-zag pattern.	DS24 e1941
Linear smoke detector	Mount on the ceiling. Distance from transmitter to receiver 50m to 70m.	
Signal processing		
	Provide linked detectors or cross-zoning for extinguishing activation.	CRP e652
Supporting measures		
<ul style="list-style-type: none"> – Provide smoke vents – Spray water extinguishing system activated automatically or manually – Separate manual call points to activate the extinguishing system – Button to block automatic extinguishing – Fire-proof seals at shortest possible intervals – Shorter maintenance cycle if humidity is strong. – Maintenance agreement. 		



13 Prison cell

Objective

To alert prison personnel before a dangerous situation can develop.
 Guarantee fire alarm in spite of vandalism by the prisoners.
 Prompt evacuation of prisoners.

Critical features

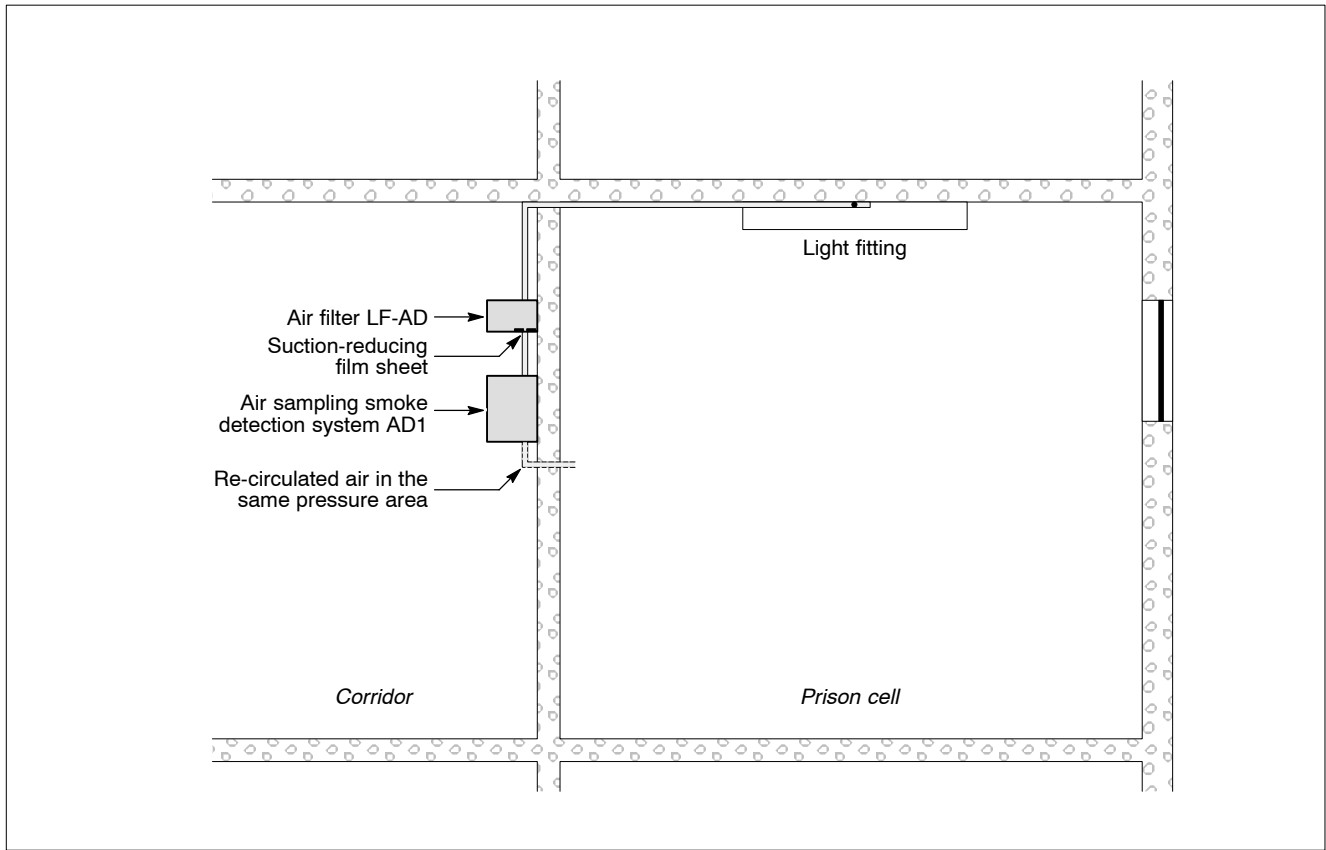
Deliberate damage to the system by prisoners.
 Sabotage of the smoke detection system (by blocking the smoke entry holes, or destroying the detector).
 Mischievous activation of the fire detection system.
 Smoking is permitted in the cells. Critical if a number of prisoners share one cell.
 Doors closed from the outside means no possibility of escape for the prisoners unless the cell doors are opened by warders.
 Impeded evacuation.

Typical fire hazards

Arson by prisoners.
 Smoking.
 Disposal of cigarettes etc. in containers with combustible materials, on mattresses etc.
 Electrical wiring and equipment (short circuit, overloading, sabotage).

Suggested solutions

<i>Details</i>	<i>Notes</i>	<i>Technical documents</i>
Basic concept		
Point-type smoke detectors Type: DOT11..	Only recommended if the detector is sabotage-proof or mounted outside the cell.	DS11 e1225
Other possibilities		
Air sampling smoke detection system ASD Detector type: DO11..	Covered, sabotage-proof arrangement of the sampling tube and the sampling point.	DS24 e1538 DS11 e1225
Siting detectors		
Point-type smoke detectors	Mount on the ceiling, protected by a firm, fine-mesh, or in a suitable recess box with protective perforated metal sheet, possibly outside the cells.	CRP e432, sections 5.2 to 5.4
Air sampling smoke detection system ASD	Install tubes concealed in the ceiling. The air sampling point should be in a recess box (approx. 300 x 300 x 80mm) covered by 2mm thick perforated metal sheet (hole 2.5mm dia.). Use special safety screws. The air sampling point can also be mounted at other locations (e.g. light fittings, used air vents), providing smoke has access.	DS24 e1538
Signal processing		
Plan a separate display for each cell for rapid intervention.		
Supporting measures		
<ul style="list-style-type: none"> – Point-type smoke detectors in the corridors and the other rooms (complete monitoring). – Manual call points along the escape routes at the exits and entrances. – Maintenance agreement. 		



14 Rooms and warehouses with polypropylene containers

Objective

The early detection of flaming and smouldering fire in empty containers, or containers filled with non-combustible material.

Critical aspects

Smoke detectors do not react well to polypropylene fires.

Combustion is slow with a small flame and almost invisible fumes, therefore optical smoke detectors react later than ionization detectors.

The material can be ignited at cut edges with a match.

Visible fumes arise due to incomplete combustion, i.e. when there is a shortage of oxygen and as a result of overheating from extraneous heat.

Liquidized polypropylene falls in burning drops and can cause further fires.

Risk of false alarm when using forklift trucks (diesel) for stacking and retrieving.

Typical fire hazards

Arson, sabotage.

Hot metal castings in the containers.

The disposal of smoking materials in containers with combustible material.

Electrical installations and equipment (short circuit, overloading, tampering).

Repair work (welding, splitting, grinding).

Possible solutions

<i>Details</i>	<i>Notes</i>	<i>Technical documents</i>
Basic concept		
Point-type smoke detectors	Both an open fire (invisible fumes) and a smouldering fire must be expected.	DS11 e1225 CRP e432
Flame detectors		DS11 e1673
Manual call points		CRP e423
Other possibilities		
Air sampling smoke detection system Titanus or HSD24..	Provided the invisible smoke must also be detected. Increased risk of false alarm.	DS24 e1803DS24 e993
Siting detectors		
Point-type smoke detectors	Detector arrangement according to the guidelines for the corresponding type of warehouse, room geometry, room height etc.	CRP e432, sections 5.2 to 5.4
Flame detectors	Arrange the flame detectors so that they have line of sight to the material stored.	DS11 e1673
Air sampling smoke detection system	Mount tubes on the ceiling and if necessary in the racks.	DS24 e993
Manual call points	Install at the exits and protect against mechanical damage.	CRP e432, section 5.9
Signal processing		
No specific tips.		
Supportive measures		
<ul style="list-style-type: none"> – Sprinkler system. – Smoke extraction system. – Maintenance agreement. 		

<i>Details</i>	<i>Notes</i>	<i>Technical documents</i>
Alternatives		
Reduce the fire risk by using non-combustible materials or storage containers that are flame-resistant.		

15 Paper machine, drying end

Objective

The early detection of flaming fire at the bearings of the drying cylinders and burning paper beneath the machine.

Critical aspects

High air temperatures occasionally around 100°C.

Humidity above 98% rel.

Room height, accessibility to detectors.

Vibration.

Typical fire hazards

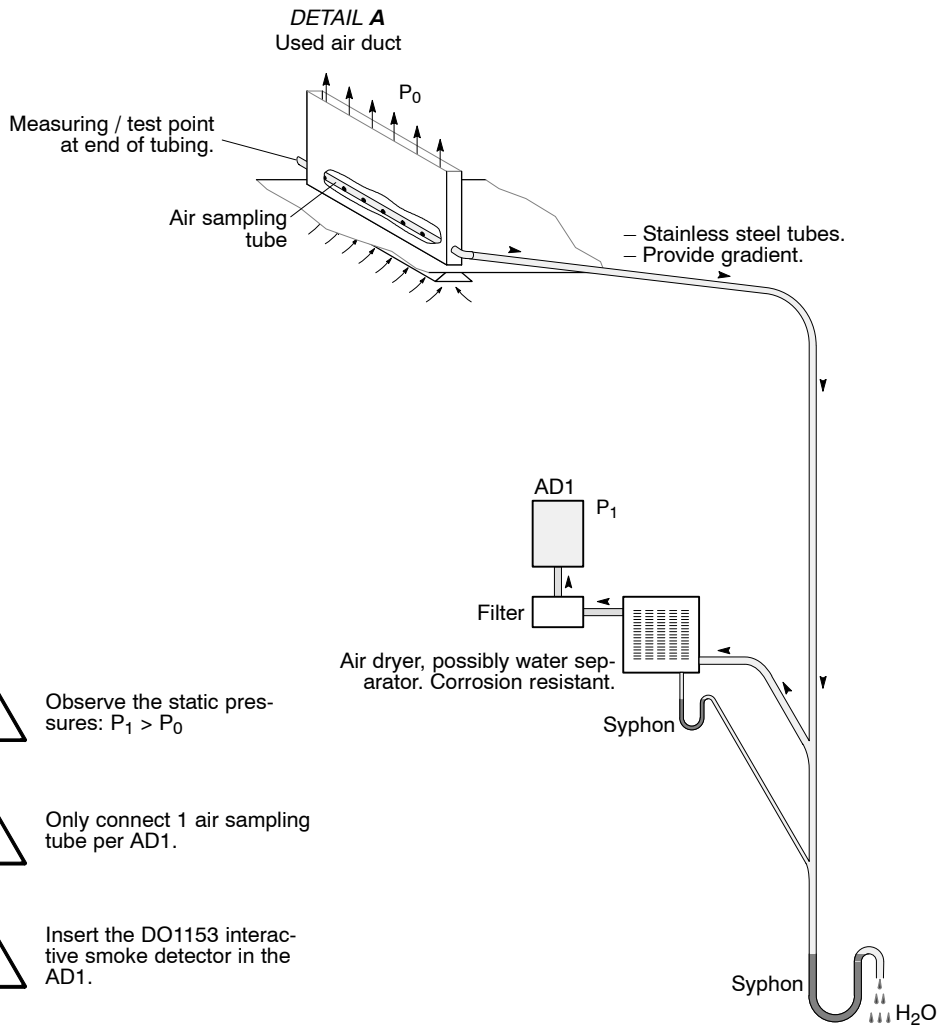
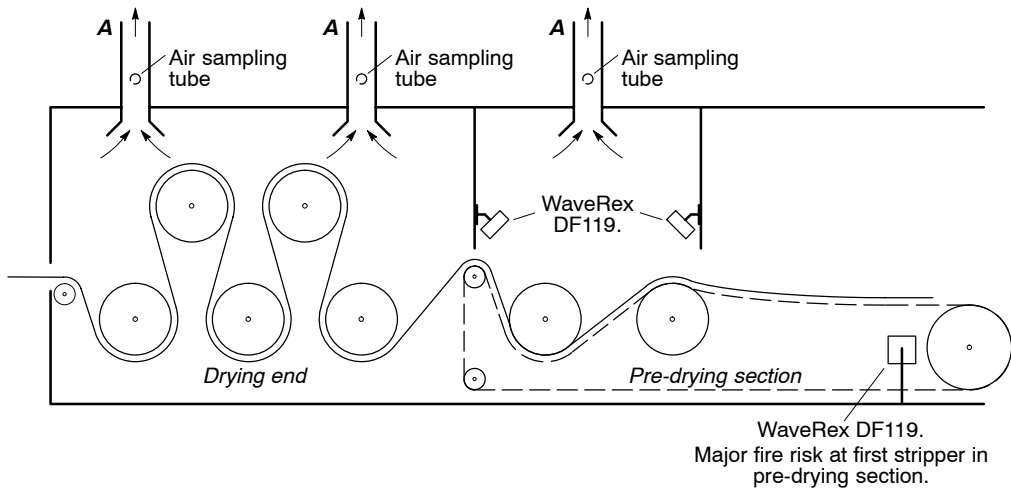
Torn paper at the drying end.

Hot bearings.

Leak in a cooling oil pipe, ignition of oil mist by hot bearings.

Possible solutions

<i>Details</i>	<i>Notes</i>	<i>Technical documents</i>
Basic concept		
Air sampling smoke detection system ASD Detector type: DO11..	In order to dry, cool and purify the extracted air, an air dryer (condenser) with a corrosion resistant radiator core and a filter must be installed in front of the AD1.	DS24 e1538
Flame detectors	Mount outside zones with a temperature of over 70°C.	DS11 e1673
Other possibilities		
Linear heat detection system Fibro-Laser II	Activating temperature 120°C. Choose cable for ambient temperature >110°C.	DS24 e1941
Siting detectors		
Air sampling smoke detection system ASD	Install the sampling tube made of stainless steel (no copper) in the used air ducts or on both sides of the machine. Space the air sampling drill holes at a maximum distance of 1m.	DS24 e1538
Flame detectors	Install the flame detectors so that they have line of sight to the bearings.	DS24 e1673
Signal processing		
Possibly activate extinguishing, dependent on the ASD-Modular and flame detectors.		
Supporting measures		
<ul style="list-style-type: none"> – Sprinkler system. – Gas extinguishing system as unit protection, activated manually or automatically. – Maintenance agreement. 		



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