

GENT

by Honeywell



AIR SAMPLING DETECTION (ASD) SYSTEMS

A complete guide for the fire system
specifier, designer and installer

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What is the importance of early smoke detection?

Fire - never underestimate the danger

“ Experience shows that a fire can break out at virtually any time. Just because many buildings have not experienced a fire for decades does not mean that there is no risk of fire; rather, those concerned are fortunate - but they could become liable for damages in the future. ”

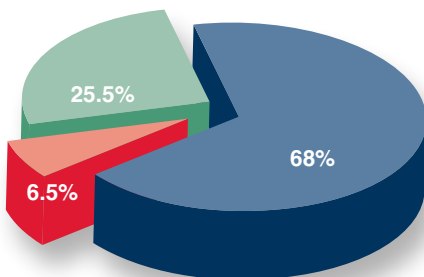
[Extract from a statement made by the Higher Administrative Court of Münster, Germany 10 A 363/86 v. 11.12.1987]



A fire can have many causes

Now more than ever before, a fire can mean the loss of supply availability, a drop in market share and even the collapse of a company. High concentrations of valuables, irreplaceable assets and increasing demand for immediate availability of goods and services therefore require appropriate fire protection solutions. Industrial development has created highly technical fire protection requirements in situations where conventional fire detectors are no longer sufficient. As fire origin statistics show, the majority of damaging fires originate as a result of prolonged smouldering fires. While conventional detectors have to “wait” until the fire has reached a detectable size, more sensitive smoke sensors identify the fire in its initial phase and therefore offer a significant time benefit for damage limitation.

Fire causes	Proportion	
Faulty electric devices and installations	25.5 %	Predominantly smouldering fires ■
Smoking	20.0 %	
Hot surfaces	8.0 %	
Welding and cutting	5.5 %	
Friction points	4.5 %	
Spontaneous combustion	3.5 %	
Radiant heat	1.0 %	
Sparks and ignition equipment	3.5 %	Smouldering fires, open fires, explosions ■
Chemical reactions	1.0 %	
Electrostatic discharges	1.0 %	
Mechanical sparks	1.0 %	
Arson	17.0 %	Predominantly open fires ■
Open flames	6.5 %	
Molten substances	1.0 %	
Lightning strikes	1.0 %	



Ref: Distribution of fire causes according to Bussenius

Introduction to ASD

Early Warning Fire Detection

ASD systems can detect fires at a very early stage, often before visible smouldering takes place, before an open fire occurs and before intense smoke develops. This early detection is vital to mission critical and high-risk applications.



The earliest possible fire detection brings significant time benefits, enabling a fast response to the first signs of smoke. ASD can detect fires significantly faster than point or beam smoke detectors.

Gent's ASD range can also be set to a sensitivity state of a traditional point detector providing greater control and flexibility to the user.

Operation

ASD systems draw air samples continuously from the monitored area through a pipe system fitted with sampling holes at regular intervals. The sampled

air is then analysed for smoke particles and an alarm is raised if smoke is present. The system is active, continually drawing air samples from the risk.

Monitored area

The sampling holes in the monitored area are arranged so that the same amount of air is drawn through each hole. Each sampling hole is therefore

allocated the same monitored coverage as a point-type smoke detector.

Cumulative effect

A cumulative effect is achieved by having multiple sampling holes in a room. Each sample hole will take in small samples of smoke as it spreads across the protected area. This cumulative smoke is therefore delivered to

the detector as the sum of each of the sample holes within the risk. This enables the ASD system to give a much earlier indication of a developing fire at the incipient stage.

High false alarm immunity

The physical separation of the detection unit from the monitoring area reduces the risk of transient faults such as those caused by condensation and electromagnetic radiation. The use of filters and the appropriate signal processing also guarantee reliable detection in dusty conditions.

Simple accessibility – minimal disruption

Maintenance and service tasks are carried out in central, easily

accessible places. This means that the monitored area does not have to be accessed. There is no longer any need to inspect individual detection points under the ceiling, as is the case with conventional fire detectors.

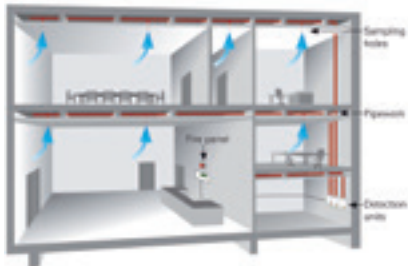
Aesthetically pleasing

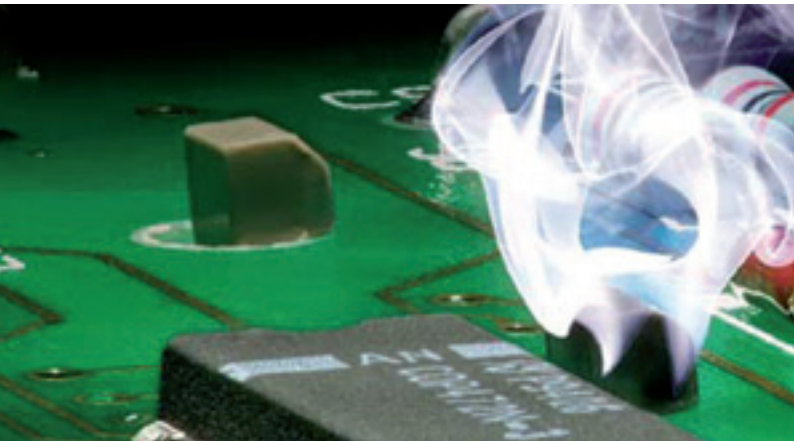
The smoke sampling holes in the ceiling can be installed so

inconspicuously that they do not interfere with the aesthetics of the building interior. This reduces the limitations on architects and planners and gives them greater freedom of design.

Deterrent against vandalism

The virtually invisible integration of the smoke sampling holes in the ceiling offers almost no target for vandals.

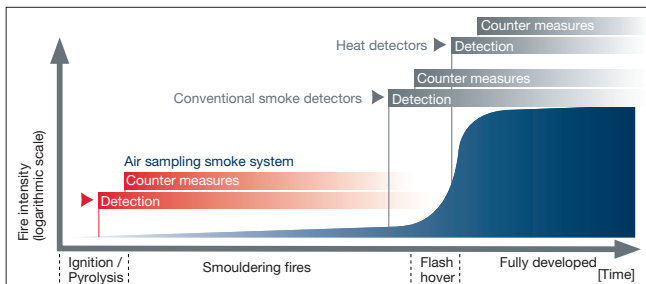




State-of-the-art fire detection

Time benefits through increased sensitivity

The earliest possible fire detection brings significant time benefits, which enable counter measures to be taken. Modern air sampling smoke detection systems are able to detect fires with a thousand times more sensitivity than point-type smoke detectors. They can also detect fires in their early phase from just 1 gram of material combustion, unlike point-type smoke detectors which are triggered at a much later stage.



Highly sensitive air sampling smoke detection systems compared to other technologies

Note* ASD is also often used to detect at the same sensitivity of a conventional detector.



Standards

The new EN54-20 European Standard

EN54 Part 20 is the new European product standard for Aspirating Smoke Detectors (ASD). From July 2009 all ASD systems installed in Europe had to fully comply with this standard. The standard encompasses both the project design and the ASD systems installed. Since ASD systems, like other detectors for fire detection systems, fall under the Construction Products Directive, compliance with EN 54 Part 20 is a prerequisite for CE marking.

Sensitivity Classes

ASD Accessories EN54-20 introduces three classes for detector sensitivity:

Class A *Very High Sensitivity* – Used where very early warning fire detection is required. Designed primarily for high-risk areas and where high levels of air conditioning and air dilution exist.

Class B *Enhanced Sensitivity* - Very early fire detection for most areas in which valuable goods and/or processes need to be protected.

Class C *Normal Sensitivity* – For general fire protection applications. This sensitivity is equivalent to standard point detection.

It is vitally important that sensitivity thresholds do not change due to long-term drift and changing environmental conditions, as installations could become non-compliant over time.

These Classes now define a transparency for designers allowing system performance to be properly compared.

ASD Accessories

The standard also dictates that all accessories such as blow back equipment for maintenance, external filters and water traps have to be tested and approved with the system. It is no longer acceptable to design ASD systems with non-approved components.

British Standards

In addition to EN54-20, ASD systems should be designed and installed in accordance with the FIA Code of Practice, BS5839-1 and BS6266 where relevant.

BS5839-1 - Used when the design mimics that of standard detection. ASD systems are used to directly replace point or other conventional detection methods for practical and/or financial reasons.

BS6266 - Used when installing ASD systems with Electrical Equipment such as IT/Communication suites. Again design mimics that of conventional detection, however the use of High Sensitivity Smoke Detection (HSSD) systems are encouraged and in some cases demanded.

Maximum coverage

The maximum coverage of an ASD system is determined by the number of point-type detectors than can be replaced by an ASD device. This is a crucial factor in determining what savings can be made by installing an air sampling system. The coverage can be worked out simply by calculating how many sampling holes can be installed at a reasonable distance from each other (usually about 8 m).



ASD System Design

Designing EN54-20 Compliant Systems

If an ASD device has been correctly classified as Class A, B or C, this does not necessarily mean that it will satisfy the class specified in the project design. Labelling a device with a detection class simply indicates that a minimum project design with a single sampling hole corresponding to the specified class can be implemented. It is therefore important to check that the entire project design satisfies the desired detection class.



Fast, reliable project design

The various manufacturers of air sampling smoke detectors have found different ways of ensuring that their systems conform to the detection classes specified in EN 54-20. The majority of the project design software available needs to produce detailed system plans to be able to make a reliable statement about the conformity. It is often the case, however, that not all project design parameters are known in advance. Particularly in the case of future extension of a feed pipe or an increase in the distance between two sampling holes can lead to loss of conformity.

Gent by Honeywell's project design software PipeXpress, on the other hand, is designed to ensure that a reliable project design can be achieved in minutes - including the use of accessories. The software is based on worst-case project design and takes into account the configuration options within the scope of the defined project design

limits. The intuitive software does not require any specialist training and quickly gives exact, easy to follow results. The software produces a conformity declaration for the detection categories specified by the selected project design in accordance with EN 54-20.

Note* Every pipe fitted to Gent ASD systems must be supplied with a PipeXpress conformity declaration.

Specialist accessories

There are a number of important EN54-20 approved accessories that can be incorporated into the final project design to aid operation and maintenance.

Blow through valves – A blow through system is used to clean the pipe system and/or the air sampling points in restricted areas. The deposits which form in the pipe system in very dusty applications are blown through by means of overpressure applied via nonreturn end caps installed at the ends of sampling branches. Either a manual or automatic system can be deployed, depending how often the pipe system has to be blown through.

Filters – These can be installed in the pipework to remove dust particles from the aspirated air in order to extend the life of the system and help prevent false alarms.

Flame arresters – These in-line devices can be used to create an explosion-proof ASD system for use in hazardous areas.

Steam traps – These can be installed for the draining of condensate from the pipe system.



Steam trap



Conformity declaration



Applications

High Rack Storage Areas



- Pipe system can be easily integrated into the high rack storage construction
- Better detection due to active air sampling throughout the entire height
- No interruption of operation for service and maintenance required
- Easy access, therefore reduced costs for maintenance and service

Industrial Production



- Easy layout of the pipe system within the supporting structure of the production area
- Suitable for extreme applications with high dust and dirt contamination
- Installation of the detection unit at eye level
- Maintenance and service can be carried out without any problems even in high halls with multiple ceiling conveyors

Clean Rooms



- Safe smoke detection, even with forced air flow and high air speeds
- No air contamination within the production area due to active air sampling of the ambient air
- Maintenance and service personnel do not need to enter the clean room

Deep Freeze Storage



- Better detection of slow smoke at low temperatures due to active air sampling
- Detector unit can be installed directly into cold stores (down to -40°C)
- Iced sampling points can be blown free no heating elements required

Electrical Cabinets



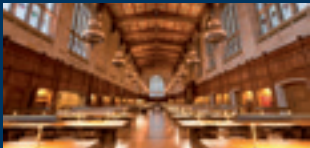
- Optimum detection even with heat cushion due to active air sampling out of the cabinet
- Possible monitoring of several cabinets with one air sampling smoke detection system
- No switch-off for servicing required, since the detection unit is located outside the monitored area

Lift Shafts



- Installation of the detection unit outside of the danger area
- No interruption during maintenance required
- Easy access for services and maintenance

Historic Architecture



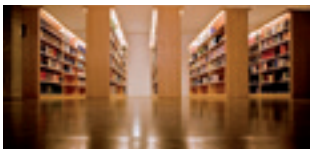
- No damage of elaborate ceilings
- Hidden installation of the pipe system
- Control unit hidden at accessible location
- Individually adjustable sensitivity for each room
- Silent running ASD provides unobtrusive detection where low ambient noise levels are demanded

EDP Facilities



- Ideal solution for air-conditioned EDP devices
- Reliable detection by air sampling conduction to the detection unit
- Adaptable to every cabinet and computer room design

Libraries & Archives



- Highly sensitive fire detection technology for very early smoke detection
- Staged alarms for protecting unique valuables
- Almost invisible technology of the ASD systems as the air sampling is installed at the book shelves
- Silent running ASD provides unobtrusive detection where low ambient noise levels are demanded

Saunas



- Detection possible even up to temperatures up to 110°C
- Reliable detection even with heat cushion under the ceiling
- No false alarms caused by condensate of water or ethereal oils
- Almost invisible fire detection system

Conveyor Belts



- Layout of the pipe system at the frame construction of the conveying belt
- Safe detection due to active air sampling throughout the entire length
- Reliable detection even with changing ambient conditions
- Insensitive against dust, dirt and humidity

Paper Mills & Recycling



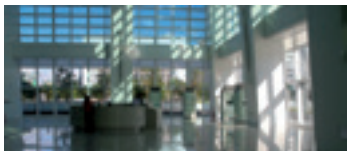
- No false alarms caused by dust or condensate
- No soiling of the detection unit
- No operation interruption during maintenance

Floor Voids



- No risk of system damage during cable distribution in the floor void
- Applicable even for small heights of the floor void
- System installed in accessible location for easy service and maintenance

Steel/Glass Architecture



- Almost invisible pipes installed within the frame elements of the ceiling construction
- Reliable detection even with heat cushion under the glass dome
- Wide planning freedom for architects

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Product Range

Smoke detection for any situation

The performance, flexibility and functionality of the Gent by Honeywell ASD product range mean they are used in a wide range of applications, from areas where traditional point detection is considered through to specialist installations where only air sampling solves the fire detection requirement.

COMPACT ASD

Compact and cost effective ASD for monitoring small to medium-sized spaces and equipment. With optional ROOM•IDENT, the unit can monitor up to 5 rooms and identify the source of the alarm.





ALL-SPEC *ASD*

Cost effective, universal air sampling solution for a broad range of applications. The modular device can have up to 2 independent detector modules for double knock detection and includes a range of accessories.

HI-SPEC *ASD*

High specification, fully featured air sampling system for a broad range of applications. The unit has graded alarms and a smoke level bar graph display. The modular device has up to 3 alarm levels, up to 2 independent detector modules for double knock detection and a range of accessories.





The Advantages

Field proven ASD technology

Thanks to their outstanding reliability, sensitivity and false alarm immunity, Gent air sampling smoke detection systems have been tried and tested in a wide variety of applications and are the first choice for many fire system designers and consultants. Advanced and unique features across the family ensure the Gent ASD solution is available for every smoke detection requirement.

Innovative Detection Technology

Traditional ASD systems use an expensive laser light source to detect smoke in the detection chamber. When smoke particles are present the laser light scatters and is detected by light receivers in the chamber. Gent ASD products use a similar concept except that the expensive laser is replaced by a lower cost High-Power LED Light Source (HPLS). This approach is equally as sensitive and provides high quality detection to EN 54-20. However, cost benefits mean that ASD can be used in a much wider range of applications.

False alarm immunity

LOGIC•SENS is an advanced signal processing technology that analyses the smoke sample and provides the earliest possible smoke detection whilst safely eliminating false alarms such as theatrical special effects smoke and diesel fumes.

Reliable operation

PIPE•GUARD is a unique monitoring system that detects if a sampling hole is blocked, a pipe is ruptured or if the air sampling unit has failed. This feature is used in inaccessible areas where access is restricted and identification of individually blocked sampling points is essential.

Wide operating temperature

Gent's ASD systems are approved for use in cold storage units at temperatures as low as -40 °C. The upper temperature limit for installations can be as high as +60 °C.

Addressable smoke detection

The COMPACT ASD can be fitted with ROOM•IDENT to provide individual detection of up to 5 rooms or areas. The source of the fire can be identified providing cost effective replacement for addressable point detection for demanding environments and smoke detection applications.

Discrete air sampling

Gent's capillary sampling hole can be mounted in a false ceiling, remotely from the sampling pipe. This ensures that smoke detection is discrete and does not distract from the décor. Areas such as detection cells also benefit from this discrete approach where conventional detection equipment has to be additionally protected against vandalism.

Silent running

Gent's HI-SPEC and ALL-SPEC ASD products can be fitted to produce a totally silent running system for applications such as domestic premises and offices where ambient background noise is low.



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PIPE GUIDE - HINTS AND TIPS

Standards

All Aspirating Pipe and Fittings supplied by Gent are produced under a strict quality control system approved to EN ISO 9001.

In addition, all Aspirating Pipe Products have been tested by LPCB to EN 54-20 Clause 5.7, and EN 61386-1 Class 1131. LPCB Test Report No-TE250773.

Material Specification and General information

ABS Pressure Pipe Systems - General Information

ABS (Acrylonitrile Butadiene Styrene) is a homogenous material with good chemical resistance and high impact strength.

Other beneficial features are its suitability for use at low temperatures (-40°C) and its ease of jointing.



Individual products are in accordance with the appropriate British Standards:

- Fittings (Metric) Din 8063, Kiwa 549, ISO 727
- Pipe BS 5391 EN 61386-1 Class 1131
- Adhesive BS 4346 Part 3

Colour

All ABS products supplied by Gent are manufactured in red.

Temperature range

ABS is suitable for use over a wide temperature range from -40°C to 70°C

Clips and Bracketing

Pipe brackets need to be made with the inside diameter of the bracket marginally larger than that of the pipe outer diameter. This allows for free lineal movement of the pipe, and avoids inhibiting expansion or contraction. They should also be smooth, to avoid damage to the outer surface of the pipe.

Plastic pipe clips meet all these requirements, and are strong, durable against temperature, Ultra Violet light and can also be used in corrosive or otherwise adverse environmental conditions.

Pipe clips are adaptable and can be fixed in the normal way or be screwed onto M6 or M8 threaded bar by inserting the respective nut into the side of the clip. They can also be fitted to the side of M6 or M8 threaded bar by utilising a rod adaptor.

Bracket Spacing Intervals

Plastic pipe lines require regular support, and the spacing of clips or brackets depends on the pipe used, temperature, and density of the liquid carried.

The following tables show the centre to centre measurement between brackets.

ABS Pipe 15 Bar (217 Psi) Class E, Inch Sizes

PIPE SIZE		BRACKET SPACING IN METRES					
INCH	METRIC	20°C	30°C	40°C	50°C	60°C	70°C
3/4	25	1.00	0.95	0.85	0.75	0.75	0.60





Joints per Litre of Cement

As a rule of thumb we estimate that 170 joints can be made per 250ml of solvent cement when jointing 25mm ABS fittings and pipe.

Expansion and Contraction

Expansion or contraction of plastic pipe is caused by temperature change occurring within the pipe wall. When the operating temperature of a pipe is greater than when it was installed, then the pipe will expand. If the operating temperature is lower, then it will contract.

There are two factors to consider when calculating expansions or contractions in pipes.

- ambient temperature of the (air temp) environment when installing the pipe
- change of temperature of pipe contents or environment

Any change of the above factors will affect the mid-wall temperature of the pipe thus causing either expansion or contraction.

Please note that most pipework systems are installed between 5°C and 25°C.

Jointing 'Don'ts'

- a) Don't make joints in rain or wet conditions
- b) Don't use dirty brushes or cleaning rags, which are dirty or oily.
- c) Don't use the same brushes with different solvent cements.
- d) Don't dilute or thin solvent cements with cleaner.
- e) Don't leave solvent cement tins open. The contents will evaporate and the cement performance will be weakened.
- f) Don't use near naked lights, or smoke whilst jointing. Solvents are highly inflammable.
- g) Don't make joints in a confined space. Solvents emit hazardous vapours, which are dangerous.

Technical - Jointing guidelines

Solvent cement is specially formulated to chemically weld pipes and fittings together. The solvent cement chemically melts the two surfaces to be joined, so that when they are fitted together they form a homogenous mass, which then cures to form a weld. Note that this is not a glued joint. It is therefore important to choose the correct type of adhesive as another type may be detrimental to the integrity of the system.

- 1) Cut the pipe at right angles to its axis, and to the required length using the correct cutting shears.
- 2) Dry fit the pipe to the socket of the fittings. When the pipe is fully home in the socket, draw a line around the pipe at the edge of the socket. Where this is not possible (perhaps on larger fittings) measure the socket depth and draw a line at the corresponding point along the pipe. This will give a visual indication, to ensure that the pipe is fully pushed home in the socket.
- 3) Apply the solvent cement with a suitably sized brush or the brush provided in the adhesive lid. Ensure that the area of the pipe up to the visual indicator is completely covered with an even layer of cement. This part of the operation must be done quickly and neatly, as the solvent must still be wet when the pipe and fitting is pushed together.
- 4) Push the pipe and fittings together and hold in place for up to 30 seconds. When the joint is made, a bead of solvent cement will form around the outer joint of the pipe and socket. This excess cement should be wiped away leaving the outer part of the joint clean.

PARTS AVAILABLE (RED 25MM ABS FITTINGS)

	90 Degree Bend	RED90
	90 Degree Elbow	RED90ELB
	45 Degree Bend	RED45
	Socket Union	REDUN
	Pipe Clip	REDCLIP
	Joining Socket	REDSOC
	T Piece	REDTP
	End Cap	REDENC
	Pipe 3 Metres	RED3MP
	Flush Sampling Kit	REDFSK
	Conical Sampling Kit	REDCSK
	Discrete Sampling Kit	REDDSK
	Pipe Cutters	REDPIPC
	Cement 250ml	REDCEM

Please note: All the above parts are also available in white

Flexibility

Gent's ASD system provides a flexible pipeline 'topology' giving designers the opportunity to maximize the number of sampling points that can be sampled by a single detector in a given area. The options available are:

	MAX PIPE LENGTH	MAX SAMPLING POINTS
I PIPE	100	12
U PIPE	140	20
M PIPE	180	21
DOUBLE U PIPE	190	24

Please note that the ALL-SPEC and HI-SPEC units can support two detector modules doubling the above pipe work layout options from a single device therefore maximizing the area coverage from a single ASD unit. Note* each pipe layout must be supported by a PipeXpress Certificate of Conformity ensuring that the protected area meets the system classification to EN54-20 (A, B or C)

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