FIRE SUPPRESSION BUYING GUIDE

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Choosing the correct fire suppression system for your organisation can be overwhelming we have created this Free Guide to give you the best advice and knowledge in order to choose the right system.

Where to begin

So you have decided to invest in a fire suppression system to protect your business/organisation, people and premises, but how do you know which system to choose?

There are many systems out there all that fit a different need. So how do you choose the right one and what factors do you need to consider?

You should ask yourself the following questions:-

- Who decided I require a Fire suppression system & why?
- Does the above person have the expertise to tell me I need a new system?
- Which other people do I need to inform?
- Who in my organisation do I need to involve?
- What type of system do I need?
- What type of detection do I need?
- What influences the type of system I need?
- What British Standards and regulations do I need to comply with?
- How do I choose the best company?
- What do I need to do once the system is fitted?

Why have a Suppression System

So you have decided you need a fire suppression system to protect your assets. The question is why?

If it is an insurance requirement then they may have specified the type of protection they want in place, or you and your organisation may have concluded that you have a specific fire risk that needs a solution that does not rely on a member of staff to alert people and extinguish the fire.

A few points to consider:

1. Your building/risk area/asset is likely to be unprotected or have no staff presence more during unoccupied hours than normal working hours.

2. The type of detection available should be considered carefully, as this is the main part of a fire suppression system.

3. Other areas of the risk should be considered, can the fire spread to other areas away from the risk.

4. What is the potential down time of the equipment/asset if there was a fire? Try and work this out in production hours lost or business interruption as well as the cost of the asset.

5. What will the system need to interface with?

6. What is my organisations' policy on agents/sustainability that could potentially be used for suppressing the fire?

7. Have you considered any clean up requirements after discharge of the agent?

8. Will I need a spare reserve of agent should the system trigger (down time for re-fill and re-charge can be up to 10 working days)?

9. What agent is suitable and could it cause damage - e.g. water is not the only solution.

10. Will I need to vent the area after discharge?

11. Does the area I am protecting have good integrity – will it retain the agent to suppress the fire?

How do Fire Suppression Systems Work?

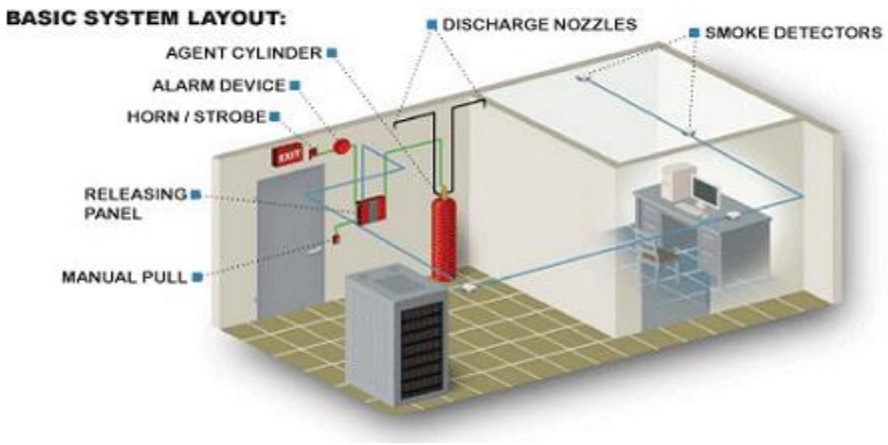
The fire is suppressed by releasing an agent onto the risk. This suppresses the fire by either reducing the oxygen (inert gases, foam, Ansul, CO2), chemical reaction with the atmosphere (synthetic gases - FM200 or HFC227eA) or cooling the fire (water mist, sprinklers, CO2)

A fire is detected by either manual detection (break glass call points) or automatic fire detection (smoke detectors, heat detectors or filament fracture bulbs). These detectors then operate the main panel which in turn releases the agent.

Detection generally has to be double knock (co-incidence) to stop the accidental release of agent which is usually the costliest part of the system. This is nearly always the case in data/server/communication rooms but may not be the case when protecting assets such as machinery, for example, with heat probes.

Its important to determine exactly what you want to achieve. In most cases the solution is down to the designer getting the correct information from you and understanding the risk. A lot of designs can be bespoke unless it's a data room - then rigid standards over and above the norm apply.

People can sometimes be ill-informed (unless a specialist fire consultant) of the requirements, risks, considerations and solutions available so don't be afraid to ask the reason why a particular solution has been specified.



DIFFERENT TYPES OF SYSTEMS AVAILIABLE

➢ *Synthetic Gases - HFC227ea(FM200), Novec 1230, FE13*

These gases are stored as a liquid, with nitrogen used to pressurise it. When released the HFC227ea has a chemical reaction with the fire and extinguishes it.

Advantages

- Cost effective as the footprint of the cylinder is small – this is an advantage for data centres that charge out their rack space, and so are looking for minimal space requirements of their data room. This enables them to gain more revenue by having more floor space for servers. IG 55, 01 etc. do take up more floor space but the cylinders can be put remotely from the room.
- Stored as a liquid so takes up less space.
- Well known brand – FM200 is a brand name the agent is a chemical called HFC227ea.
- Easy to install because the cylinder is usually in the same room. Sometimes just a standpipe on top of the cylinder is required.
- No reduction of oxygen so it's safe for humans on discharge.

Disadvantages

- FM200 does not travel well (because of the pressure) or is rarely cost effective over inert gases if it's a large room or the gas requires diverting to different areas/rooms. Cylinders must be stored as close to the application as possible.
- Some companies are saying it's a potential future banned gas as it's a hydro fluoride chloride (HFC).
- Pipe work design has to be accurate. A slight change of pipe run in distance or length can mean the design calculations have to be changed and a potential major costs change. Because of this, don't use FM200 if you cannot guarantee the pipe run design and installation will remain the same.

Applications

- Electrical Data Processing (EDP Areas)
- Data rooms/halls
- Switch rooms
- UPS rooms
- Communications rooms
- Substations
- Archive rooms/stores
- Some small cabinet protection applications (with no leakage)

➢ ***Inert Gases - IG55, IG01, Inergen, Argonite, Pro-inert***

Stored as a pressurised gas, inert gases are usually a mix of nitrogen, argon and sometimes added Co2.

Advantages

- Travels long distances because of the high pressure.
- Easily diverted to separate rooms using diverter valves and pilot cylinders. Large cost saving as you only need enough gas to protect the largest room.
- More cost effective with larger systems.
- Environmentally friendly. Argon and Nitrogen are a natural gases so it just gets released back into the atmosphere.

Disadvantages

- Larger pipe sizes required along with more pipe work and associated fabrication.
- More cylinder space required, although this can be placed a distance away from the risk or even outdoors if protected.
- Damper relief required, because more gas is going into the room and over pressurisation occurs.
- Media such as photos and video tape when burning can create an oxidising effect where more oxygen is given off from a fire. This means inert gases which reduce the oxygen volume cannot be used as the original calculation would be incorrect. It is not possible to calculate how much reduction would be required, so in these circumstances synthetic gases should be considered first. However other solutions are possible.

Applications

- Electrical Data Processing (EDP areas)
- Switch/Communication Rooms
- Archives/Stores
- Cabinet/Enclosure Protection

➢ ***Rack Mounted Suppression System – Wagner, Redatec***

This is a 1 – 3u rack mounted system that simply slots into a rack to protect the rack cabinet. The system has a miniature air aspirating system (highly sensitive smoke detection or HSSD) and a small cylinder inside it (usually filled with FM200).

When a fire is detected through the detection the gas is discharged into the cabinet.

Applications

• EDP racks.

➢ ***Static Systems***

There are several types of static system but the following are the most common.

Automatic Fire Extinguisher - A cylinder which hangs upside down in the room at high level. The valve has a heat fracture bulb (same as a sprinkler) which when triggered releases the agent in the room. This is usually powder as it covers all fire types (ABC). In layman's terms it's an extinguisher that hangs upside down with a sprinkler head attached to it.

Powder bomb – a package that's left on the floor, shelf or in the risk. It has a fuse so if there is a fire the fuse is ignited and the agent explodes, releasing the powder over a large area.

There is also a hand grenade powder bomb version, this is the same concept as above but the fuse can also be lit by hand and the bomb thrown into the risk.

There are many other designs for static systems. If this is a requirement then we suggest further consultation is provided to ensure the best solution if offered.

Applications

• Test Cells

• Machine Spaces

• Transport

➢ ***Carbon Dioxide System***

Mainly used for local application or cabinet protection where room integrity cannot be guaranteed or is uneconomical. This is a heavier than air gas so ensure if there are any off shoot low level ducts or voids where the gas may leak to, these areas are covered for warning of discharge. It's not uncommon for these areas to be separate or a distance away from the risk.

Mechanical and electrical heavy duty locks are required to ensure any person going into the risk area has to put the system in manual only mode or isolate the system. This is to avoid discharge whilst a person is in the room or area, which could be fatal.

Ideal for local application as the gas discharge can be over a 3-4 minute period and have additional discharges afterwards. This avoids an initial high pressure and short blast (synthetic gases - 10 seconds, inert gases - 60 seconds to propel the whole amount) which could potentially blow the enclosure apart and enables a longer discharge to avoid issues with gas leaking from holes/gaps in the cabinet.

Advantages

- Ideal for open areas with no or low room integrity. Heavy gas permeates lots of areas so ideal for printing machines and other machinery.
- Economical and can be used in large areas.
- No major effect on pipe work design or size.

Disadvantages

Can quickly cause asphyxiation.

- Locking devices may be required on all entry and exit doors to protect staff.
- Bad press – some systems have caused death so are being replaced by inert gases. Some people are nervous about the health and safety aspects of using this gas, but when designed properly it presents minimal risk.
- Though CO2 is a non-toxic gas, it does have an occupational exposure limit assigned to it under the Control of Substances Hazardous to Health Regulations (COSHH).

Applications

- Machine Spaces
- Switch Rooms
- Transportation
- Cabinets
- Generators (local application)
- Fryers and Ovens (local application)

➢ ***Water Mist System***

Water mist systems are becoming more commonly used to replace sprinklers in big data rooms, other large areas and local applications.

These systems can be used for flammable liquids and electrical rooms – the mist evaporates and causes mainly a starving of oxygen effect rather than cooling. NOTE – it's a common misconception that this happens for all water-mist systems BUT the fire needs to be at a high temperature for the mist to evaporate and reduce oxygen. If the fire is not hot enough it would be suppressed but by cooling, hence possibly causing damage.

Open head – a nozzle which simply propels the water out. This is usually triggered by automatic fire detection (AFD).

Closed head – has a heat fractured bulb which when fractured acts like a valve and releases the water, just like a sprinkler.

Cylinder systems – usually applied for smaller risks, the cylinders (a mix of water and nitrogen) are placed in or near the room and small pipe work is then run to the nozzle position.

Tank/pump systems – usually used in larger systems. These systems work in a similar way to a sprinkler system where a large amount of water is supplied by the in-house water supply. It has to have surplus spare and be able to be re-filled within a certain period. Tank and pumps must comply to BS/EN 12845.

The pumps may also need a high voltage supply with a back up or Uninterrupted Power Supply (UPS), possibly even a generator.

Valves – these act as taps and let the water flow to the particular areas of cover.

Advantages

- Doesn't require automatic detection as the heat fracture bulbs (frangible bulb) can be used to detect a fire.
- Agent is cheap or free so it's not expensive to cover a large area, and it's also quick and easy to replace after discharge.
- No mess and flooding – when compared to chemical kitchen fire suppression and sprinklers.
- No large water storage or pump power requirements – when compared to sprinklers that need large pumps (sometimes with back up) and tank reservoirs.
- No large amounts of pipework infrastructure required when compared to sprinklers for large sites. Local application cylinder based systems can be used on a large site rather than installing a large network to deliver water to all areas.
- Rapid cooling below re-ignition temperatures.
- Small pipe gauge – easier to install.
- Can be triggered by any normal fire suppression system or detection, giving greater flexibility over sprinklers.
- Can be triggered in separate zones by the related detection and valve in that area.
- Can be released manually from break glass call points – sprinklers cannot.
- Can be used for kitchen fire suppression

Disadvantages

- No British Standards apply and there are few manufacturers and distributors. (NOTE - a draft development was introduced in late 2011.)
- Still not widely recognised as an alternative to sprinkler and gas.
- Could cause water damage if triggered falsely.
- Pump systems (not cylinder) may need a high voltage power supply and back up which can add to the cost.

Applications

- Machine Spaces
- Electronic Data Processing (EDP)
- Cabinets & Generators (Local Application)
- Fryers & Ovens
- Test Cells/Facilities
- Archives
- Spray Booths

➢ ***Foam Deluge Systems***

Mainly used on large applications where water or gas cannot be used. These tend to be external such as transformers, oil tanks and oil storage silo's.

A simple sprinkler open deluge type application with the heads (usually open) spread around the risk, a foam concentrate is mixed with the water to provide the typical expanding agent (the same as with extinguishers).

Will need a large amount of fabrication work to support the pipe work, valves and heads to and around the risk.

Advantages

- Good for external areas.
- Covers large areas.
- Protects flammables liquids – airports, aircraft hangers, oil storage.

Disadvantages

- Wet agent so electrical risk needs to be considered.
- Messy – clean up required.
- Same disadvantages as sprinklers for water and pump supplies, although because of the expanding effects of foam this sometimes means not as much water is required.

Applications

- Machine Spaces
- Tunnels
- Switch rooms
- Transportation
- Generators (Local app)
- Fuel Stores
- Aircraft Hangars
- Storage silos
- Machines/process that are outdoors

➢ ***Reacton Tube***

A very simple, cost effective and easy to install solution, this is entry level equipment for fire suppression.

Basically an extinguisher with a valve and a length of reacton tube which acts as the detection and propellant feed for the agent to be used.

When a flame or temperature reaches a certain level around the pipe it blows a hole in the pipe (a very small pressurised hole) which then propels the agent directly onto the risk.

Ideal for boats, vehicles, small machinery, electrical switch cabinets, fume cupboards and areas with no room integrity.

Advantages

- Small amount of agent required as it's assumed it will attack the fire at smouldering stage or at the beginning of a fire.
- No moving or electrical parts – low install cost and low maintenance cost.

- No room integrity required.
- Can install in small intricate areas such as machinery.
- Can use many gases – HDC 227 ea, Co2, IG55.
- Cost effective all round - small amount of agent required, no pipe work, special design.
- Can be operated from AFD – this would operate a valve with a nozzle.
- Mobile – can take out and install elsewhere.

Disadvantages

- Cannot guarantee it will work if the fire is large.
- No standards to design/install to.
- Not a high spec solution.
- Difficult to cover large area (high ceilings, rooms).
- Large bend radius in pipework.

Applications

- Machine Spaces
- Boats, lorries, cars
- Switch rooms
- Transportation
- Cabinets (Local app)

➢ ***Kitchen Fire Suppression - Chemical foam (Ansul, Amerex etc.)***

This is being specified more by insurance companies as they recognise that a kitchen in a building is one of the major risks of a fire/disaster and a potential large claim.

Flammable liquids, gases, food, oil and ignition sources are a major concern for insurance companies, and owners of hotels and restaurants are now recognising this risk.

This system sometimes needs interfacing with duct work dampers to stop the fire spreading through the building.

Nozzles placed under the cooker canopies and over each risk propel a water-based agent with a chemical foam type mix over the risk. This is usually triggered by a heat link (a thermal link fixed to a wire which breaks and then releases the valve) or a manual pull switch.

Other systems are triggered from automatic fire detection and back to a fire extinguisher panel. The detection and most equipment in this area needs to be stainless steel to avoid corrosion and the damage/effects of heat.

The agent is usually situated near the risk in a box. This is basically a large fire extinguisher. Pipework from the nozzles terminate at this point and a valve operates the release. Once the system is triggered the agent is propelled from this valve/cylinder to the nozzles.

The agent is a water-based chemical which acts like a foam extinguisher. This is to ensure any flammable liquids are covered by the foam to avoid a boil over from any oven/fryer that may be still switched on, and stops the oil from re-igniting.

Watermist systems can be used for kitchens and can be a more cost-effective solution to Ansul systems and other water chemical systems. However, careful design is needed and approval from insurers.

It's important to remember that unapproved companies cannot install or even source Ansul fire suppression equipment, so you must ensure the company you deal with are fully approved. Ansul are also now employing inspectors to perform random audits of Ansul system installations to ensure specifications are met and they are only approving the most credible and reliable companies as designers and installers.

Advantages

- Easy to use.
- No damage.
- No electronics/electrical work on most systems.
- No large cylinder storage requirements – goes next to risk in a box

Disadvantages

- Usually has to be installed late at night when kitchens not working – some kitchens take hours to cool down.
- Need to fit install round kitchen staff.
- Expensive compared to water mist.
- Can be messy and take longer to clean up compared to water mist systems.
- Have to use stainless steel pipe-work and fittings.
- No British Standards to work to.

Applications

- Fryers and Ovens, grease making appliances (Local app)

Should you have any further questions, or require specific guidance in any area of fire safety please call us on **0844 567 5394** or email us at **service@proactivefire.co.uk** and we will be happy to help you.