INTRODUCTION TO FIREPRO FIRE SUPPRESSION

ENVIRONMENT/CARBON FOOTPRINT

FirePro is a certified sustainable, environmentally friendly product with a significantly lower carbon footprint by comparison to conventional pressurised gas or water mist systems. Click HERE for GEN Cert.

POST DISCHARGE ROUTINE

FirePro will remain suspended in the risk atmosphere for up to 60 minutes and may be vented to fresh air by way of forced or natural ventilation as soon as it is deemed safe to re-enter the protected space.

FirePro Systems is a Halma PLC company, and the FirePro fire suppression product range is well established in over 80 countries worldwide. The fire suppression technology is unique, as it is stored as a solid block compound, activated electrically and discharged as a nanoparticle potassium-based particulate.

As FirePro is stored as a solid it does not require a large steel cylinder to contain it. It won't leak as it is an unpressurised solid and uses a fraction of the amount of agent that a comparable gas suppression system would use.

FirePro systems are connected electrically without the need for heavy duty pipes.

Unlike water mist or sprinkler systems, the agent is dry and can be easily dispersed after a discharge. So, it will not cause damage by flooding or risk environmental harm caused by polluting a waterway. Further information about the FirePro range of products can be found in the FirePro Technical Prospectus which may be downloaded HERE.

The applications for FirePro fire suppression include (but are not limited to):

- Retrofits of obsolete/room integrity fail gaseous suppression systems.
- Electrical Power - substations, electrical distribution, diesel / biofuel generators.
- Renewable energy - Li-Ion BESS, wind, solar, turbines, CHP machinery.
- Heritage risks - void spaces, risers, poorly compartmented risks.
- All suitable rail transport network risk applications.
- Housing sector risks - risers, loft spaces, voids, roof plant, mobile networks.
- Machinery – forklift, processing, storage, reach stackers, cranes.
- Automation - picking robots, control plant cabinets.
- Cold storage, pharma, warehousing.
- ATEX rated risks.
- Construction sites - temporary storage, tool recharging areas, hot works areas.
- Marine - pleasure craft to large vessels - MCA / MED Wheel Mark.
- Offshore – platforms, lighthouses, petrochemical, various risks.
- Bespoke applications where neither water nor gas can provide a viable solution.

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SYSTEM OVERVIEW – OCCUPIED SPACE

The fire detection and alarm system should be the same as an equivalent gas suppression system. So, the detection and alarm system will be designed generally in accordance with BS7273 PT.1. However, we strongly recommend that one of the coincidence zones contains only heat detectors, UV detectors or similar but not smoke detectors, this is to prevent accidental discharges.

SYSTEM OPERATION

In manual-only mode operation of one or two detectors will only cause the first-stage sounder and strobes to operate. A relay will energise to give first stage indication to third-party equipment.

Operation of a manual release unit will cause both the first-stage sounder strobe and the second-stage sounder to operate and a second-stage relay to energise. A countdown timer will commence (normally 30 seconds). After this time, and provided there has been no user intervention, the agent will discharge into the protected risk.

In Manual and Automatic mode operation of one detector will cause the first stage sounder strobe to operate and the first stage relay to energise. Operation of a detector on another zone will cause the second stage relay to energise and for the 30 second delay timer to commence. After 30 seconds and provided there is no user intervention then the agent will discharge into the protected risk.

Due to the restriction on the power output of a fire suppression control panel, a controlled release sequence is required to limit the amount of current drawn by the condensed aerosol generators. Each FirePro condensed aerosol generator requires 0.8A to activate the discharge mechanism. The output from the control panel is normally only 1A.

To overcome this problem the actuator circuit is fitted with sequential activators, each sequential activator can control and monitor up to 2 FirePro condensed aerosol generators. Upon activation of the extinguishing circuit, the first sequential activator is operated for 2 seconds, thus causing the FirePro generators fed from it to discharge, then the next sequential activator will be energised and the FirePro generators it serves will also commence discharging. The sequential activators continue to operate in turn until all sequential activators have been operated. The number of sequential activators on an extinguishing circuit is limited to 20 to ensure that 100% of the FirePro agent is discharged within 60 seconds (as opposed to 90% of inert gas).

Each FirePro generator is fitted with an electrical actuator. When the current is applied to the actuator (from the sequential activator) the actuator undergoes an exothermic reaction that causes the solid block compound (SBK) to rapidly change state from a solid into an aerosol. The change in volume forces the agent out of the FirePro generator via the cooling compound and into the protected risk. The time between the sequential activator operating and the FirePro generator being fully discharged is between 4 and 15 seconds depending upon the size of the FirePro generator.

HOW FIREPRO WORKS

FirePro removes the flame-free radicals and extinguishes fire without depleting oxygen.

FirePro condensed aerosol extinguishes fire predominantly by inhibiting the chain of chemical reactions present in combustion on a molecular level.

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In a typical fire, atoms and fragments of unstable free radicals react between them in the presence of oxygen. This continues until the burning fuel is depleted or the fire is extinguished by other means.

On activation of the FirePro Condensed Aerosol Generator Unit, it's solid compound is transformed into a rapidly expanding condensed aerosol consisting mainly of Potassium salt-based K2CO3, H2O (vapour), N2 and CO2.

The gas type 3-D properties of the condensed aerosol particles facilitate their even and fast distribution as well as their flow into the natural convection currents of combustion.

The solid particles of Potassium salts, a few micrometres in size are suspended in an inert gas and display an extremely high surface to reaction mass ratio that increases efficiency thus reducing the quantity of material required.

When the condensed aerosol reaches and reacts with the flame, Potassium radicals (K*) are formed mainly from the disassociation of K2CO3.

The K*s bind to other flame-free radicals (hydroxyls- OH-) forming stable products such as KOH. This action extinguishes fire without depleting or absorbing the ambient oxygen content.

KOH reacts further in the presence of CO2 and forms K2CO3.

This causes a perpetual chain reaction until the fire is extinguished.

There is a negligible pressure spike created 450 Pascals for less than 1 second at the time of discharge so no pressure relief is required.

As the agent is non-toxic there is no need for a gas extract system however, we would recommend one to aid with the removal of the agent after discharge.

Pressure relief dampers will not be required.

KEY PROUDUCT SUPPORTING INFORMATION

The manufacturer's operating & maintenance manual may be downloaded HERE. Our basic guidance notes covering cabinet or room flood requirements also end user, and stakeholder life cycle details are HERE Please ensure these are read and understood prior to proceeding with the required works.

FIREPRO FIRE SUPPRESSION PRODUCT ADVANTAGES

Simple Installation

FirePro does not require storage tanks, pipes, cylinders or over pressure venting. If the need arises, FirePro may be removed from one risk and re-utilised in another, with the assistance of a trained installer. Compact and lightweight - FirePro is wall or ceiling mounted within the risk itself, meaning no wasted footprint for cylinders. Shipping and transportation costs are minimal as there are no special handling measures required.

Service Life

The life cycle of FirePro generators is independently certificated for 15 years. The minimal servicing requirements are defined in both the respective standards and manufacturer's operating manuals.

Minimal Oxygen Content Change

FirePro has minimal impact on oxygen content reduction. It has been listed as safe to use in occupied spaces by EPA. FirePro fire suppression systems may be engineered for in-cabinet or room flood applications.

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ROOM INTEGRITY TESTING

To ensure the fire is extinguished and will not reignite it is important to hold the fire suppression agent at the required concentration for a period of nominally 10 minutes. This is known as the hold time.

There are two major factors that affect the hold time:

1. If the protected enclosure has any openings, then this will allow the fire suppression agent to leak out of the room and cause dilution of the remaining fire suppression agent.
2. The density of the fire suppression agent. The heavier the agent the quicker it will leak out of the room.

FirePro is a low-density agent, so it will remain in the protected space far longer than the equivalent high pressure gaseous system.

For this reason, unless there are any obvious leakage sites or un-closable openings, then the requirement to conduct a room integrity test is no longer recommended.

If there are excessive openings, then it may be possible to compensate for this using additional agent or the FirePro Leakage Prevention System.

SOURCE FIRE PROTECTION

FirePro is completely modular and will protect inside the smallest fire risk enclosure at source either as completely stand alone or linked to a main building fire detection and alarm system. Activation may be achieved via a range of options best suited to the specific risk, such as bi-metallic strip, sprinkler bulb or automatic fire detection.

FAIL SAFE

FirePro has a failsafe self-activation feature when local temperatures exceed 300C.

TOTAL COST OF OWNERSHIP

With no mechanical elements, and a fifteen-year life cycle, both capital and operating costs versus conventional pressurised gas or water mist systems is expected to be in the order of 15-20% lower with FirePro, the LPCB certificated product.