INTRODUCTION

Small enclosures, detailed within this document include the following examples:

- Electrical enclosures (distribution, control, and communication)
- CNC machines
- Wind turbine electrical cabinets

Such enclosures can present a particular problem where faulty equipment and/or damaged wiring increase the risk of a fire. Other applications that fall within the system certification criteria can be considered for protection.

It can be difficult to identify when there is a fire in an enclosed volume until it is too late to take action. This is the case in well sealed enclosures where there is limited egress of combustion products and heat from the enclosures.

The GEM® SAPPHIRE® COMPACT Fixed Fire Suppression System provides protection inside the enclosure and discharges at the heart of the fire, ensuring that it is suppressed.

An important characteristic of SAPPHIRE COMPACT systems is that they stop the migration of the fire from the enclosure where the fire starts to neighbouring enclosures, significantly reducing consequential losses and disruption.

The SAPPHIRE COMPACT Fixed Fire Suppression System is specifically designed to protect small enclosures in accordance with LPS 1666 (Loss Prevention Standard) - Direct Low Pressure (DLP) Application Fixed Fire Suppression Systems using Heat Sensitive Pneumatic Detection Tube for the Protection of Small Defined Volume Unoccupied Enclosures.

PRINCIPLES OF OPERATION

Upon flame impingement or high ambient temperature, the pressurised detection tube, connected to a container holding the suppression agent, ruptures with a burst at the hottest point. The agent then discharges through the burst hole at the heart of the fire.

Each SAPPHIRE COMPACT Fixed Fire Suppression System can protect one of up to four enclosures, each up to 2 m^3, with one system. Each enclosure may be multi-compartmental.

FIGURE 1
E000947

⚠ WARNING

Damage to the detection tube may lead to inadvertent system discharge.

SUPPRESSANT

The SAPPHIRE COMPACT systems detailed in this document are used with 3M™ Novec™1230 Fire Protection Fluid, an electrically non-conductive clean agent. A Material Safety Data Sheet is available upon request.

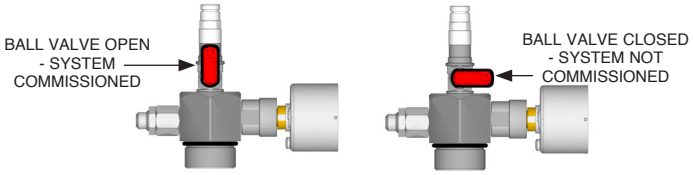
Novec 1230 fluid is applied as a gas but is a liquid at room temperature. It vapourises upon discharge due to its low vapourisation heat and has a larger heat capacity than air alone. Novec 1230 fluid absorbs enough heat to suppress the fire and requires the concentration of agent within the enclosure to be maintained for a sufficient duration. If discharged, it inflicts no damage to electronic equipment or the data stored on it. Novec 1230 fluid is an environmentally stable solution that does not damage the ozone layer.

VISUAL INSPECTIONS

The responsible person should carry out visual inspections of all SAPPHIRE COMPACT systems regularly. These visual inspections should be carried out at least once a month. Complete the following visual inspections:

- The operating instructions of each system are clean and legible.
- The valves on each system are open and have not been closed. Where the valve lever is in the vertical position on the standard valve and downwards on the monitored valve, the ball valve is open and the system is commissioned – see Figure 2.

Standard Valves
(Part No. 302150006 and 302150007)



Valves with System Isolation Monitoring
(Part No. 302150008 and 302150009)

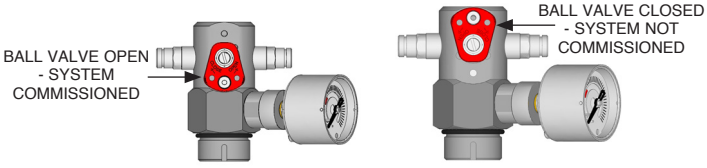


FIGURE 2
E000973

- Each system has not been operated and is not damaged or has any missing parts.
- The reading of any pressure gauge or indicator fitted to a system is within the operational and safety limits (15 Barg) – see Figure 3.
- The locking screw of each system is not broken or missing, where applicable – see Figure 4.

VISUAL INSPECTIONS (Continued)

END OF LINE COMPLETE WITH GAUGE
(PART NO. 304150010)

PRESSURE GAUGE -
1 SWITCH CONTACT FOR LOW
PRESSURE MONITORING
(PART NO. 302150001 AND 302150002)

PRESSURE GAUGE -
2 SWITCH CONTACTS FOR LOW
PRESSURE AND DISCHARGE MONITORING
(PART NO. 302150003 AND 302150004)
(PART NO. 302150010 AND 302150011 - LIQUID
FILLED PRESSURE GAUGE)

FIGURE 3
E000835

VALVE LEVER
LOCKING SCREW

FIGURE 4
E000938

The responsible person should record the results of these visual inspections and arrange for corrective action, where necessary, by a competent person. If in doubt, the responsible person should arrange for a competent person to examine the system.

IN THE EVENT OF A FIRE

In the event of a fire, the SAPPHIRE COMPACT Fixed Fire Suppression System is designed to operate automatically.

Any pressure switches fitted and their integration with other equipment and any subsequent actions, including alarm, equipment isolation, and evacuation, are determined by the local requirements, and should be referred to.

Follow all other local specific fire emergency procedures.

SYSTEM REPAIR AND MAINTENANCE

If at any time a system discharges, loses pressure, or appears abnormal in any way, contact Johnson Controls to request a review of the system. The responsible person should complete the details on the SAPPHIRE COMPACT Cabinet Caution Sign (Part No. 314150013). See Figure 5. Use the warning sign to notify users that the system is fitted.

FIGURE 5
E000953

PLANNED SERVICE

The system should be serviced annually by Johnson Controls or an approved Johnson Controls distributor. See the details in the latest revision of the SAPPHIRE COMPACT manual (Part No. 14A-50G).