



SAFETY ASSESSMENT
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Guidance

Inclusion of fire suppression systems in the WSE

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CONTENTS

SITUATION 1

1. Suppressant 1

2. Container 1

3. Valve 2

4. Distribution system..... 2

GUIDANCE..... 2

SITUATION

Fixed fire suppression systems are commonplace in factories and large buildings. It is often unclear to Engineer Surveyors whether any parts of such systems should be included in the pressure systems written scheme of examination.

A typical fire suppression system comprises of the following components:

1. Suppressant

The type of suppressant used is dependent on the equipment or installation under protection but they generally comprise of three types:

- A compressed gas mixture such as INERGEN® which is made up of Nitrogen, Argon and Carbon Dioxide. Typical storage pressures can be up to 300 bar.
- A liquefied gas such as the halocarbon FM-200. The developed pressure of FM-200 at 20°C is around 4 bar absolute.
- A waterless liquid system such as Sapphire which is discharged using compressed nitrogen as the propellant. The propellant is usually in a separate cylinder.

2. Container

A bank of pressured containers are used for holding the suppressant. These are pre-filled transportable gas receptacles, TPR's (normally of the standard industrial gas bottle type). The size/number of cylinders is defined by the volume of the room to be protected from fire. Typical design standards are as follows:

- BS EN ISO 9809-1 Gas cylinders. Refillable seamless steel gas cylinders. Design, construction and testing. Quenched and tempered steel cylinders with tensile strength less than 1100 MPa.
- BS EN 1964-1 Transportable gas cylinders. Specification for the design and construction of refillable transportable seamless steel gas cylinders of water capacities from 0.5 litre up to and including 150 litres.
- BS ISO 4706 Gas cylinders. Refillable welded steel cylinders. Test pressure 60 bar and below.
- BS EN 14638 Transportable gas cylinders. Refillable welded receptacles of a capacity not exceeding 150 litres.

3. Valve

Each container is fitted to a remotely actuated valve at the outlet which is connected to the fire detection system. The means of actuation is either electrically (e.g. solenoid) or pneumatically (e.g. from a nitrogen pilot cylinder). The valve head may also incorporate a pressure gauge and pressure relief valve.

4. Distribution system

Each suppressant container is connected to a common manifold via a flexible hose. The manifold connects to the delivery pipework, running to spray/diffuser nozzles at the area under protection. The manifold and distribution pipework only become pressurised when the system is activated. There may be diverter valves in the distribution pipework if the suppression system serves more than one area.

GUIDANCE

Although the suppressant containers are part of a fixed installation they have been designed and manufactured as a transportable pressure receptacle (TPR). They will also have made at least one journey on the public highway containing a charge of fire suppressant. TPR's are specifically excluded from the PSSR. Periodic inspection in accordance with the Carriage of Dangerous Goods Regulations would only need to be considered if a container is removed for refilling and it has gone beyond its periodic requalification date as outlined in BS EN 1968. Otherwise, it should be considered under Provision and Use of Work Equipment Regulations (PUWER.). External corrosion, hose integrity, securing of the cylinders to prevent topple, etc. are all relevant things to consider in a risk assessment.

The cylinder valves should normally be covered under a maintenance schedule i.e. refurbishment or periodic replacement.

The pipework is open ended and only becomes pressurised in the rare event of the fire suppression system activating. Whilst the system is operating the pipework is likely to briefly contain a relevant fluid in the same way that a safety valve discharge pipe could contain a relevant fluid. The manifold and distribution pipework are therefore part of a pressure system but it would be reasonable to justify exclusion from a Written Scheme of Examination (WSE) on the grounds that deterioration is unlikely to give rise to danger.

Occasionally there are systems configured such that the manifold is permanently pressurised. In such cases reference should be made to SAFed guideline PSG 5 when considering inclusion in the WSE.