HALON 1301 SYSTEMS

INTRODUCTION

National Fire Protection Association (NFPA) documents describe a level of fire protection agreed on by persons representing a variety of interests. The guidance in these documents does not reflect unique conditions or special considerations, such as system performance under adverse conditions. Nor does NFPA guidance reflect the increased system reliability that AXA XL Risk Consulting recommends for high valued properties.

This PRC Guideline takes a position on the provisions of NFPA 12A that AXA XL Risk Consulting believes require clarification or changes. To understand the position, this PRC Guideline must be read with a copy of NFPA 12A. The provisions of the NFPA document are not repeated.

Due to international concern about the involvement of Halon 1301 as a stratospheric ozone depleter, AXA XL Risk Consulting has not recommended installing Halon 1301 systems since 1989. Alternative means of extinguishment must be considered. No discharge tests of Halon 1301 systems are to be conducted regardless of the test agent used. However, existing systems are to be maintained to the highest degree possible.

POSITION

General

On November 25, 1992, the Montreal Protocol was amended by international consensus to curtail halon production by January 1, 1994. Productions of halobromofluorocarbon (HBFC) replacements were phased out on January 1, 1996. Halochlorofluorocarbon (HCFC) production is to be phased out by January 1, 2030.

The NFPA Technical Committee on Halogenated Fire Extinguishing Systems is promoting reclaiming, recycling and reuse of Halon 1301. New installations are reserved for “essential use” only. The essential uses as defined by the EPA are “applications involving the protection of public safety or national security; telecommunications or computer related equipment related to public safety or national security; life support functions; and for explosion inertion/suppression with flammable liquids and gases.”

If halon is used, the system design must avoid complex piping systems, multiple enclosures, and obstructed enclosures, because there is no way to confirm agent distribution without a full discharge test.

Facilities planning to remove halon systems from nonsprinklered areas should first install sprinkler protection in all hazard enclosures over 3 ft (1 m) high. Any facility contemplating removing halon or

replacing it with another gaseous agent should contact their local extinguishing system servicing company to obtain appropriate reclaiming and recycling procedures.

Contact AXA XL Risk Consulting for guidance concerning alternate protection. Most Halon 1301 applications have been in computer room occupancies. Acceptable minimal protection consists of wet pipe sprinkler systems; a smoke detection system conforming to NFPA 72 and PRC.11.1.1.0; power system interlocks, where appropriate; and an underfloor gaseous system such as carbon dioxide system See NFPA 12 and PRC.13.3.1. In some cases, carbon dioxide may be required inside equipment enclosures.

- Even though Halon 1301 use has diminished, the NFPA Technical Committee on Halogenated Fire Extinguishing Systems has reissued this edition of the standard with emphasis on the maintenance, testing and decommissioning of existing Halon 1301 systems.

Use And Limitations

Halon 1301 does not suppress fire by the usual methods such as cooling or smothering. Instead, halon thermally decomposes near the flame front at temperatures above 900°F (482°C). Halon extinguishes fire as a result of chemical interaction with the fire by-products. In a properly designed system, the decomposition products of halon are insignificant. However, if the halon concentration is insufficient to extinguish the fire or if the extinguishment time is prolonged, potentially harmful amounts of corrosive and toxic by-products, including hydrogen fluoride and hydrogen bromide, may be released. Halon must not be used on continuously energized high energy electrical equipment hazards or hot surfaces such as ovens and on equipment with internal combustion engines.

The following are some typical occupancies in which Halon 1301 systems have become commonplace. Sprinklers alone can protect these applications or sprinklers combined with other appropriate extinguishing systems.

- Computer room underfloor spaces;
- Flight simulators;
- Telephone equipment or telecommunication rooms;
- Totally enclosed flammable or combustible liquid hazards;
- Archival storage of media and documents;
- Tape vaults;
- Enclosed electronic equipment with an extended discharge;
- Computer rooms without combustible accumulations;
- Cable rooms or tunnels;
- Aircraft under construction or undergoing maintenance;

Unsuitable Applications

The following are additional locations where Halon 1301 use is not suitable:

- Local application (non-enclosed hazards);
- Computer rooms that can be properly protected by other means;
- Hot surfaces, such as ovens and furnaces operating above 700°F (371°C);
- Transformer and switchgear rooms. Continuing arcing will result in harmful quantities of Halon 1301 decomposition products. To minimize decomposition products, interrupt electric power to the protected area before agent discharge occurs. Carbon dioxide is a suitable alternative.

A Halon 1301 flooding system is unacceptable in occupancies where a deep-seated or burrowing fire may occur, such as areas containing bulk storage of paper, cardboard, or fiber products. Halon 1301 is most effective on surface fires, such as those involving flammable or combustible liquids or open arrays of solid combustibles. Sprinklers or other appropriate extinguishing agents can extinguish most of these fires.

Unnecessary Exposure

Although normal extinguishing concentrations are not harmful, needlessly exposing people is discouraged. Concentrations over 7% can induce cardiac sensitization in some people. If the concentration is high enough to displace sufficient oxygen, the atmosphere will become lethal.

Prohibit smoking in the area after the system operates until the room has been purged of halon. Inhaling residual halon through burning smoking materials creates strong acids that can be ingested.

Because Halon 122 (Freon 12) is toxic, provide self-contained breathing apparatus to all persons entering enclosures where Halon 122 is being used as a test gas.

Safety Requirements

Provide ventilation systems to exhaust the agent, its decomposition products, and combustion products. Design the exhaust system for 3 cfm/ft² (0.15 m²/min/m²) of floor area in computer rooms, or 4 cfm/ft^2 (0.20 m^3/min/m^2) in underfloor areas and magnetic tape vaults. Interlock the exhaust system so it cannot operate during the discharge and soak periods.

Container Test

In essence, testing consists of examining the outside of the container, unless more than five years have elapsed since the container has been recharged. To avoid getting moisture in the container, hydrostatic testing is only performed when the container shows signs of damage.