FIRESAFETY
DESIGN CONSIDERATIONS FOR
HALON 1301 TOTAL FLOODING SYSTEMS

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1. GENERAL

1.01 This section provides general guidelines on the design and installation of Halon 1301 Total Flooding Systems.

1.02 Whenever this section is reissued, the reason(s) for reissue will be given in this paragraph.

1.03 The recommendations in this section are based, in general, on the Fire Codes of the National Fire Protection Association (NFPA) and the Model Building Codes. All detail features of these source documents have not been covered herein. The source documents should be reviewed for more complete details.

1.04 Where local, state, or Occupational Safety and Health Act (OSHA) regulations require higher degrees of protection, the legislated criteria should be followed.

1.05 The Maintenance and Testing of Halon 1301 Total Flooding Systems is addressed in Section 770-330-310. Appendix 1 of this section provides guidelines for conducting final acceptance, inspection, and testing of Halon 1301 Systems.

2. DEFINITIONS

2.01 ***Halon 1301:*** A colorless, odorless, electrically nonconducting gas which extinguishes fires by inhibiting the chemical reaction of fuel and oxygen.

2.02 ***Total Flooding System:*** A method of distributing sufficient quantities of an extinguishing agent into an enclosed area to provide a uniform fire extinguishing concentration of agent throughout the entire enclosure.

2.03 ***Local Application:*** The discharging of an extinguishing agent in such a manner that the

burning object is surrounded locally by a high concentration of agent. Neither the quantity of agent nor the type of arrangement is sufficient to achieve total flooding of the enclosure containing the object.

3. TOXICITY

3.01 Personnel may be exposed to Halon 1301 concentrations of 7 percent or less for up to 30 minutes without serious risk.

3.02 Bell Telephone Laboratories have examined the issue of Halon toxicity and have concluded that ***toxicity should not be a consideration*** when selecting this agent for fire suppression.

4. DESIGN CONSIDERATIONS

A. General Considerations

4.01 Halogenated extinguishing agents, eg, Halon 1301, are generally considered for protection of building contents.

4.02 Halogenated extinguishing agent systems are generally considered desirable for the following types of hazards:

- Where a clean agent is required
- Where live electrical or electronic circuits exist
- Where objects of high value are located in the area and could be seriously damaged by the application of water
- Where the area is normally or frequently occupied by personnel.

4.03 ***Halon 1301 Total Flooding Systems are not generally recommended for telephone and computer equipment areas for economic reasons.*** However, there are special circumstances involving customer services, tape libraries, and/or other critical areas which may suggest its consideration.

4.04 When a Halon 1301 Total Flooding System is considered, all cost factors, eg, installation, agent, maintenance, testing, etc, must be examined to arrive at a supportable decision. Section 007-590-302, Computer Center Physical Security and Disaster Recovery-Impact Analysis, should be reviewed for assistance in preparing this impact study.

B. Containment and Concentration

4.05 Effective fire fighting capabilities of Halon can only be achieved by maintaining a proper concentration level of agent within the protected compartment. To accomplished this, all openings into the compartment must be closed or close upon activation of the detection system prior to dumping of the agent.

4.06 Mechanical air handling systems servicing a multiple number of compartments, including the protected compartment, should be shutdown prior to dumping of the extinguishing agent. Fire dampers in the supply, return, and/or exhaust ducts must close to assure minimum leakage from the compartment.

4.07 Air handling systems, which are used only for recirculation within the area, need not be shutdown. Continued operations of these units can assist in providing uniform distribution of the extinguishing agent within the protected area.

4.08 The normal discharge time of the agent, from storage container into the room, should not exceed 10 seconds.

4.09 The minimum concentration of agent within the compartment should be 5 percent, by volume, but in no case should it exceed 7 percent. The concentration level shall be maintained, within the compartment, for a period of not less than 10 minutes.

C. Early Warning Fire Detection

4.10 An Early Warning Fire Detection (EWFD) System shall be installed within the area to be protected and shall be the primary means of activating the suppression system.

4.11 Section 760-650-100, Fire Detection Systems, should be reviewed for detail requirements for EWFD Systems including remote alarming requirements.

4.12 Two detectors, cross zoning, within the compartment must be in the alarmed condition prior to dumping of the agent.

D. Manual Pull and Abort Stations

4.13 A manual pull station shall be provided within and outside of the protected compartment to override the detection system and manually activate the suppression system.

4.14 Manual pull stations should be of the break glass type to minimize the potential for accidental discharge of agent. A toggle- or button-type manual device is not recommended.

4.15 A nameplate shall be provided immediately to the manual pull station identifying its operation.

4.16 A manual abort station shall be provided, within the compartment only, to override the detection system and abort discharging of the extinguishing agent.

4.17 There shall be an automatic 30-second recycle feature when in the abort mode to return control to the EWFD System in case of accidental activation.

4.18 The manual abort station should be of the button type.

4.19 A nameplate shall be mounted immediately adjacent to the manual abort station identifying its operation.

E. Audible and Visual Alarms

4.20 There shall be audible and visual alarms within and outside of the compartment.

4.21 The alarm sequence generally recommended is as follows:

(a) Audible and visual alarms within the compartment are activated when the first detector head goes into an alarmed state.

(b) Visual alarm outside of the compartment is activated when the second detector head goes into the alarm state.

(c) Audible alarm outside the compartment is activated when agent is dumped and continues to sound until manually silenced at the control panel.

(d) All alarms sound when manual pull station is activated.

(e) Manual abort does not silence alarms. Alarms must be cleared for silencing at the control panel.

4.22 There shall be an alarm on the failure of any supervised equipment.

F. System Operation

4.23 A recommended sequence of operation for the activation of the fire suppression system is outlined below. However, local conditions or codes may require some variation in this control sequence.

G. Manual Operation of Suppression System

4.24 Manual pull station is activated.

(a) Agent is immediately dumped.

(b) Audible and visual alarms within and outside of the compartment are immediately activated.

(c) Delay feature shall not be operable in the manual mode.

H. Automatic Operation of Suppression System

4.25 Compartment detectors are activated.

(a) First detector head alarms and activates audible and visual alarms within the compartment.

(b) The second detector head alarms activating the 30-second delay feature. The visual alarm outside of compartment is activated.

(c) Manual abort shall override detection system, when activated, in this mode. Provisions shall be included to automatically restore the EWFD System as the primary control feature after 30 seconds.

(d) Agent dumps, a maximum of 30 seconds after the second detector head alarms, unless manually aborted

(e) Audible alarm outside of compartment is activated as the agent is dumped.

4.26 Powering down of EDP or other processor equipment is not required from a fire protec-

tion standpoint. However, the tenant may request this feature for protection of records. Where this feature is provided, it should be a manual operation not automatic.

I. Power Supply

4.27 The electrical power supply for the fire detection system and fire extinguishing agent release devices are as important as the power source is to the equipment being protected. As such, the power supply for these systems should be on the primary essential service (standby power).

4.28 Provisions should be provided for dc battery power supply for the fire detection and extinguishing systems.

J. Halon 1301 Storage

4.29 The amount of Halon 1301 storage required shall be equal to that required for the compartment to be protected.

4.30 Storage containers should be located as close to the compartment being protected as possible and protected from damage.

4.31 The specific location for the storage containers should be based on access for inspection, testing, recharging, and routine maintenance.

4.32 The locating of storage containers outside the building should be avoided whenever possible.

4.33 Should physical conditions require locating the Halon storage containers outside of the building, then weather protection and security of the area is necesary.

K. Reserve Supply

4.34 A reserve supply of the extinguishing agent is only provided and is only intended to protect the area during that period between the time the main supply of agent is dumped until it can be replaced.

4.35 A reserve supply of the extinguishing agent is not generally recommended. However, should replacement of the main supply of agent present a problem, then a reserve supply may be considered. Also, local authorities and/or codes may require a reserve supply when total flooding systems are used.

4.36 When a reserve supply is provided, it shall be equal to the main supply.

4.37 Where a reserve supply is provided, it should be permanently connected to the main supply piping and arranged for easy changeover.

5. FINAL ACCEPTANCE, INSPECTION, AND TESTING

5.01 No system shall be placed in service until it has been through a final acceptance inspection and testing.

5.02 The final inspection team should consist of representatives from the architect/engineer, building engineer, building operating force, contractor(s), and an M&MPC representative.

5.03 Appendix 1 provides a recommended guide for performing final acceptance inspection and testing of total flooding.

5.04 Prior to or immediately after occupation of the area by the tenant, a complete review of system operation, agent toxicity, alarm sequence, alarm response, and evacuation procedures shall be reviewed with the occupants of the protected compartment.