

# Halon 1301: Evaluating Choices for Fire Extinguishing Agents for New and Existing Installations

In the mid 1980s, scientists discovered a hole in the earth's protective layer of ozone over the Antarctic. Further investigation revealed that the cause of this breach was the action of chlorofluorocarbons (CFCs) on the ozone. The importance of the ozone layer as a shield against ultraviolet light became a topic of immediate concern to environmental scientists and government officials. An international response was required in order to protect ourselves and the environment from the adverse effects of the CFCs. The scientific community realized that a ban on the production and use of CFCs would be needed to preserve the ozone layer. Representatives of major industrial nations met to plan the structure for an international effort to eliminate the production of CFCs.

## The Montreal Protocol

In 1987, the United States, the European Economic Community, and twenty three other nations signed the Montreal Protocol, an agreement that restricts the *production* of Halon and other ozone-depleting chemicals, including the entire family of CFCs. The worldwide production phase out date for Halon 1301 was January 1, 1994. Approximately 100 nations have so far become signatories to this important international treaty.

## United States Regulatory Response

In response, Congress passed in 1989 the Omnibus Budget Reconciliation Act, with an effective date of January 1, 1994. Under this legislation, all *virgin* Halon 1301 held for sale will be taxed. This tax, which will increase over time, is designed to serve as a strong deterrent for future buyers. In 1994 the tax was \$43.50 per pound; it rose to \$53.50 per pound in 1995, and will be \$58.00 in 1996 and \$62.50 in 1997. The tax affects only *virgin* Halon, not recycled Halon or Halon already in existence.

## Halon 1301

Halon 1301 is the most commonly used halogenated extinguishing agent used in fire protection today. Halon 1301 is used in fixed fire protection systems to protect water sensitive contents. Museums, EDP (electronic data processing) centers, libraries, telephone exchange rooms, and electrical storage rooms are examples of areas typically protected by Halon 1301.

Halon 1301 is recognized in the fire protection community as a superior halogenated agent. The benefits of Halon 1301 are:

- fast and effective suppression
- clean (no residue)
- non-corrosive

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- compact (does not require large storage volumes)
- non-conductive
- colorless (no obscuration)

### Halon 1301: Questions and Answers

Q. What should building owners with *existing* Halon 1301 fire extinguishing systems do to deal with the detrimental effects on the ozone layer, the restriction on production, and the tax on virgin Halon 1301?

- A. Most building owners are opting to hold onto their *existing* Halon 1301 fire extinguishing systems for the following reasons:
1. There are currently no requirements to remove existing installations. In addition, there are no known or pending taxes or fines on Halon 1301 held in, or discharged from existing systems.
  2. There is an abundance of *recycled* Halon 1301. The Montreal Protocol initiated measures to recycle and bank existing supplies of Halon. Therefore, recycled Halon 1301 can legally be used to recharge an existing system. (State regulations may vary.)
  3. The current cost of recycled Halon is \$25 per pound. The agent can usually be purchased, delivered, and recharged within a reasonable period of time. The Halon Recycling Corporation (HRC) was established as a clearing house to maintain a list of buyers and sellers of recycled Halon 1301. (The telephone number for HRC is (703) 524-6636.)
  4. Currently, there are no new *drop-in* agents (an agent that can simply be placed into the existing piping configuration without making any changes to the system) which can satisfactorily replace Halon 1301. Two typical problems are 1) incompatibility of the

new agent with existing gaskets and seals, and 2) the greater quantity of alternative agent required. The additional agent necessitates more storage cylinders, larger pipe sizes, and different nozzles.

5. Halon 1301 is a superior fire extinguishing agent.

Q. What fire suppression options acceptable to The Hartford exist to protect water sensitive contents (e.g., an electronic data processing center) for a *new facility* or for a facility being completely *renovated*?

A. Many fire suppression options are available to protect this type of occupancy. Because occupancies differ in susceptibility, fuel load, and values, a thorough review of the proposed area to be protected is highly recommended, prior to deciding which fire suppression option is best suited. The following are fire suppression alternatives for a new facility or for a facility being completely renovated:

1. *Clean extinguishing agents*, formerly known as *Halon alternatives*, are electrically non conducting, volatile, or gaseous fire extinguishants that do not leave residue upon evaporation. A *clean extinguishing agent* must first be accepted by the Environmental Protection Agency (EPA) and included on EPA's Significant New Alternative Program (SNAP) list. Next, the clean extinguishing agent must be recognized by NFPA 2001, *Standard for Clean Agent Extinguishing Systems*, as a viable agent. After the agent has been recognized by the EPA and NFPA, the agent and the fixed extinguishing system (the delivery system that includes storage cylinders, piping, nozzles) are tested and evaluated by Factory Mutual (FM) or Underwriters Laboratories (UL). Systems that pass the respective evaluation are designated *FM Approved* or *UL Listed*. (see table)

#### Extinguishing Systems Listed by Underwriters Laboratories and Approved by Factory Mutual (As of February, 1999)

COMPANY	COMMERCIAL NAME	EQUIPMENT	UNDERWRITERS LABORATORIES	FACTORY MUTUAL
Ansul Fire Protection	INERGEN	Ansul Fire Protection	✓	✓
DuPont	FE-241	Fireboy Systems		✓
Great Lakes Chemical	FM-200	Fike Protection Systems	✓	✓
Great Lakes Chemical	FM-200	Argus Fire Control, Inc.		✓
Great Lakes Chemical	FM-200	Kidde-Fenwal Inc.	✓	✓
3M Fire Protection Systems	CEA-410	Fike Protection Systems	✓	
3M Fire Protection Systems	CEA-410	Pem Protection Systems	✓	✓

2. One of the following fire extinguishing systems can also be used, provided it fully meets the referenced NFPA code:
  - Pre-Action Sprinkler Systems (Reference: NFPA 13)
  - Carbon Dioxide Systems (Reference: NFPA 12)
  - Water Mist Sprinkler Systems (Reference: NFPA 750)

## Summary

There has been substantial controversy over the continued use of Halon 1301. However, it is environmentally acceptable and economically feasible to use recycled Halon for *existing* fire extinguishing systems. For owners who are installing *new* fire extinguishing systems it is important that clean agent extinguishing systems be UL Listed or FM Approved. Pre-action sprinkler systems, carbon dioxide systems, and water mist systems can also be used.

## References

1. American Insurance Services Group, Inc. “Clean Agent Extinguishing Systems.” *Engineering and Safety Service Fire Protection Report*, No. 23.02, November 1995.
2. American Insurance Services Group, Inc. “The Ozone Layer, Recycling Halon, and Alternative Agents (EPA SNAP & NFPA 2001 Lists).” *Engineering and Safety Service Fire Protection Report*, No. 23.01, October 1995.
3. Leedy, Joan M. “Choosing An Alternative To Halon: What To Consider.” *Industrial Fire World*, vol. 10, no. 6, November/December 1995, pp. 6-7, 31.
4. Seaton, Michele. “Halon: Searching for Solutions.” *NFPA Journal*, vol. 89, no. 6, November/December 1995, pp. 46-53.
5. *Standard for the Installation of Sprinkler Systems* (NFPA 13). Quincy, MA: National Fire Protection Association.
6. *Standard on Carbon Dioxide Extinguishing Systems* (NFPA 12). Quincy, MA: National Fire Protection Association.
7. *Standard on Clean Agent Fire Extinguishing Systems* (NFPA 2001). Quincy, MA: National Fire Protection Association.
8. *Standard on Water Mist Fire Protection Systems* (NFPA 750). Quincy, MA: National Fire Protection Association.

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