

COMMON FIRE EXTINGUISHING AGENTS

- Water
- Carbon dioxide
- Dry chemical
- Multipurpose dry chemical
- Halon 1301
- Halon 1211

WATER

- Removes heat
- Effective on Class A fires
- Inexpensive
- Plentiful
- Non-toxic

Disadvantages:

- Conducts electricity
- May spread Class B fires
- Freezes in cold climates
- May carry pollutants as run-off water

CARBON DIOXIDE (CO₂)

- Reduces oxygen to less than 15%
- Effective on Class B and C fires
- No residue
- Relatively inert

Disadvantages:

- Generally >35% concentration by volume required for total flooding systems
- Toxic to humans at >4% by volume
- Not the best agent for smoldering deep-seated fires (maintain concentration for >20 minutes)
- Dissipates rapidly - allows reflash
- Has a cooling/chilling effect on some electronic components
- Vapor density = 1.5 (collects in pits and low areas)

DRY CHEMICAL

- Interrupts chemical reactions
- Sodium bicarbonate (baking soda)
- Very effective on Class B and C fires
- Not considered toxic

Disadvantages:

- Leaves a residue
- Obscures vision
- Not good on deep-seated Class A fires
- Absorbs moisture and may "cake" within container
- May be irritating
- Nozzle pressure may cause burning liquids to splash

MULTIPURPOSE DRY CHEMICAL

- Interrupts chemical reactions
- Ammonium phosphate
- Effective on Class A, B, and C fires
- Non-conductive

Disadvantages:

- Obscures vision
- More irritating than ordinary dry chemical
- Nozzle pressure may cause burning liquids to splash

HALON TERMINOLOGY

Halon 104: Carbon tetrachloride (CCl₄)

Halon 1211: Bromochlorodifluoromethane (CBrClF₂)

Halon 1301: Bromotrifluoromethane (CBrF₃)

C	F	Cl	Br
1	0	4	-
1	2	1	1
1	3	0	1

HALON 1301

- Interrupts chemical reactions
- Bromotrifluoromethane
- Effective on Class A, B, and C fires
- Not acutely toxic at <10% by volume
- Generally used at <7% by volume
- No residue
- No chilling effect on electronic parts and components

Disadvantages:

- Acutely toxic at >10% by volume (anesthetic and cardiac effects)
- Delayed effects and effects of chronic exposure not well known
- Toxic decomposition products are generated by fire
- Vapor density = 5 (collects in pits and low areas)
- Production restricted per Montreal Protocol due to depletion of ozone layer

HALON 1301 DECOMPOSITION PRODUCTS

- Hydrogen fluoride (HF)
- Hydrogen bromide (HBr)
- Bromine (Br₂)
- Carbonyl Fluoride (COF₂)
- Carbonyl Bromide (COBr₂)

HALON 1211

- Interrupts chemical reactions
- Bromochlorodifluoromethane
- Effective on Class A, B, and C fires
- No residue
- May be sprayed (Boiling Point = 25°F)
- Used in portable fire extinguishers

Disadvantages:

- Acutely toxic at >4% by volume (dizziness, impaired coordination and cardiac effects)
- Must be used at >5% by volume
- Toxic decomposition products are generated by fire
- Vapor density = 5.7 (collects in pits and low areas)
- Production restricted per Montreal Protocol due to depletion of ozone layer

HALON 1211

DECOMPOSITION PRODUCTS

- Hydrogen bromide (HBr)
- Hydrogen chloride (HCl)
- Hydrogen fluoride (HF)
- Bromine (Br₂)
- Chlorine (Cl₂)
- Fluorine (F₂)
- Carbonyl bromide (COBr₂)
- Carbonyl chloride (COCl₂)
- Carbonyl fluoride (COF₂)