

CONDENSED AEROSOLS


- What are They?
- What do they look like externally?
- What do they consist of?
- What do they look like on actuation?
- How do they work?
- Where can they be used?
- Advantages and Disadvantages.



Definition per NFPA 2010 Standard on Aerosol Fire-Extinguishing Systems

3.3.2 Aerosol.

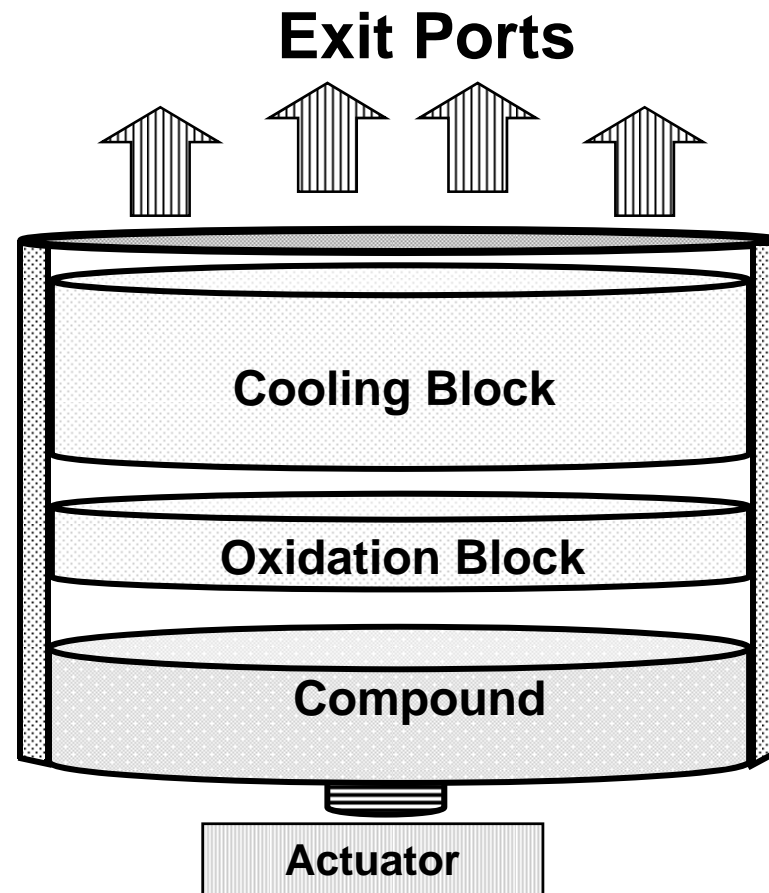
3.3.2.1 *Condensed Aerosol.* An extinguishing medium consisting of finely divided solid particles, generally less than 10 microns in diameter, and gaseous matter, generated by a combustion process of a solid aerosol-forming compound.



WHAT DO CONDENSED AEROSOL SYSTEMS LOOK LIKE EXTERNALLY?



WHAT DO CONDENSED AEROSOL SYSTEMS
LOOK LIKE INSIDE?



WHAT DO THEY LOOK LIKE ON ACTUATION?

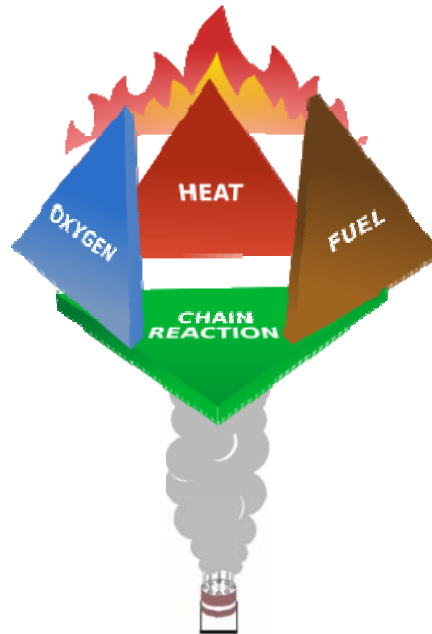
They have an appearance similar to a thick fog and exhibit gas like distribution characteristics.



HOW DO CONDENSED AEROSOL SYSTEMS EXTINGUISH FIRES?

Fire Tetrahedron

Primary Extinguishing
Mechanism:
Aerosol free radicals react
with flame free radicals
interfering with chemical
reactions taking place
in the fire



Huge population of
suspended aerosol
particles producing a large
surface area interaction
Making fire suppression
very fast and effective,
Absorbing some heat.

Dilution of Oxygen as a result of carrier gases -
predominantly N₂ at the flame front

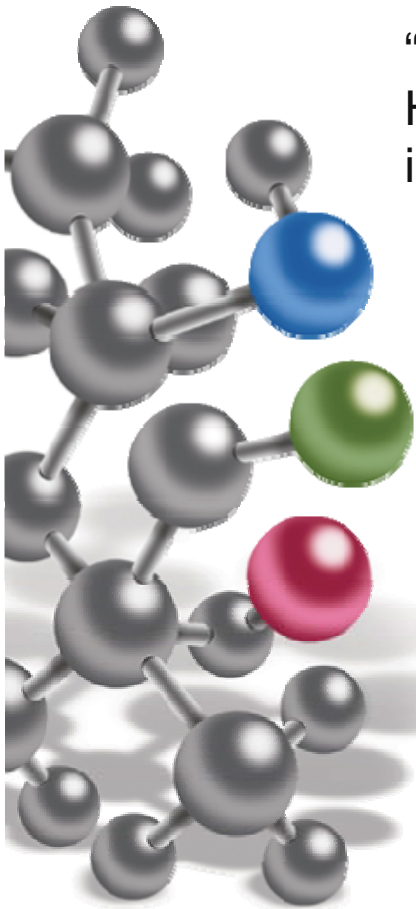
Chemical Interaction

“Free Radicals,” are essential to the propagation of a fire - (OH, H & O). Aerosols suppress the fire primarily by chemical interference with these “free radicals” within the fire zone.

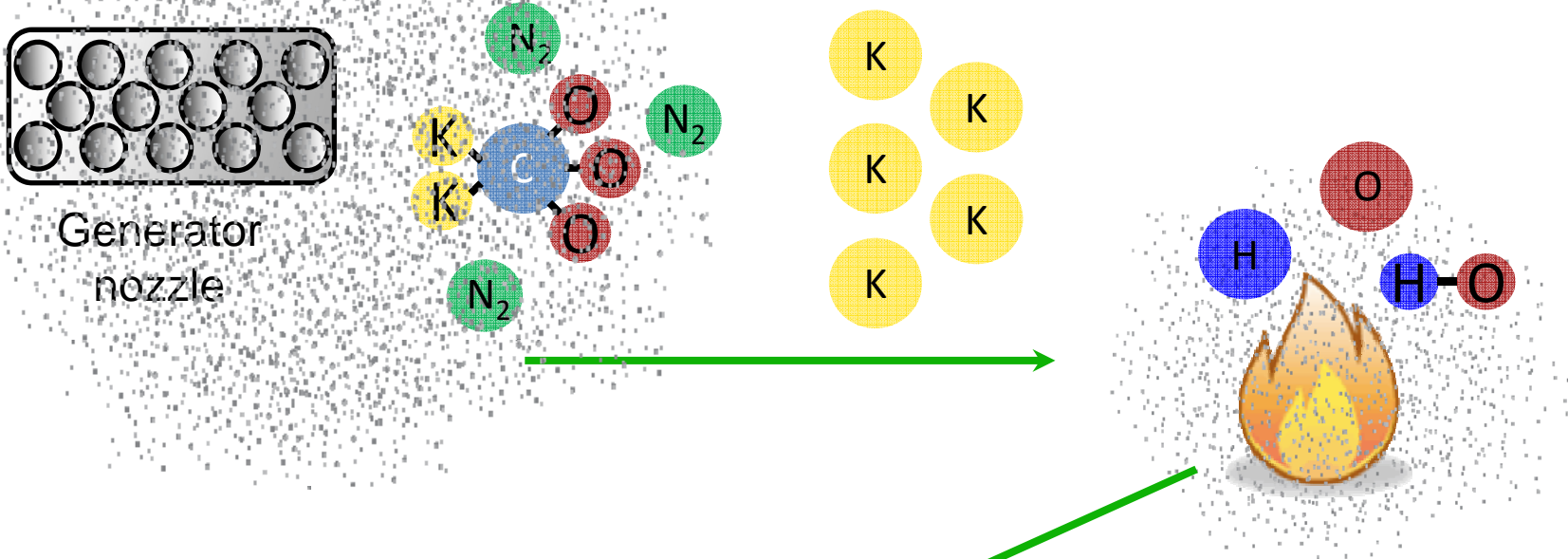
➤ Free radical – an uncharged molecule (typically highly reactive and short-lived) having an unpaired valence electron.

Potassium radicals (K) are the main active component in Aerosol

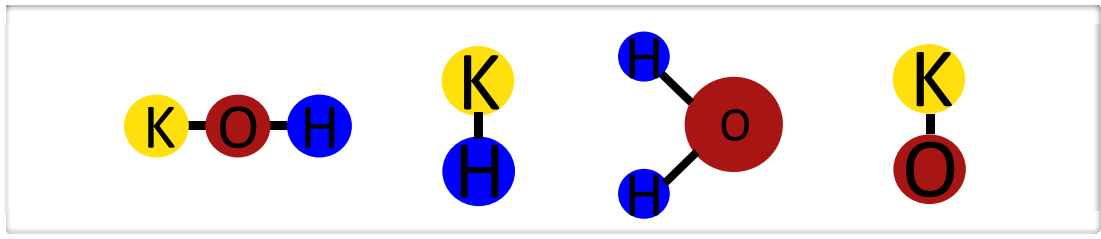
These potassium radicals react with the radicals of the flame.



The Chemical bit !!

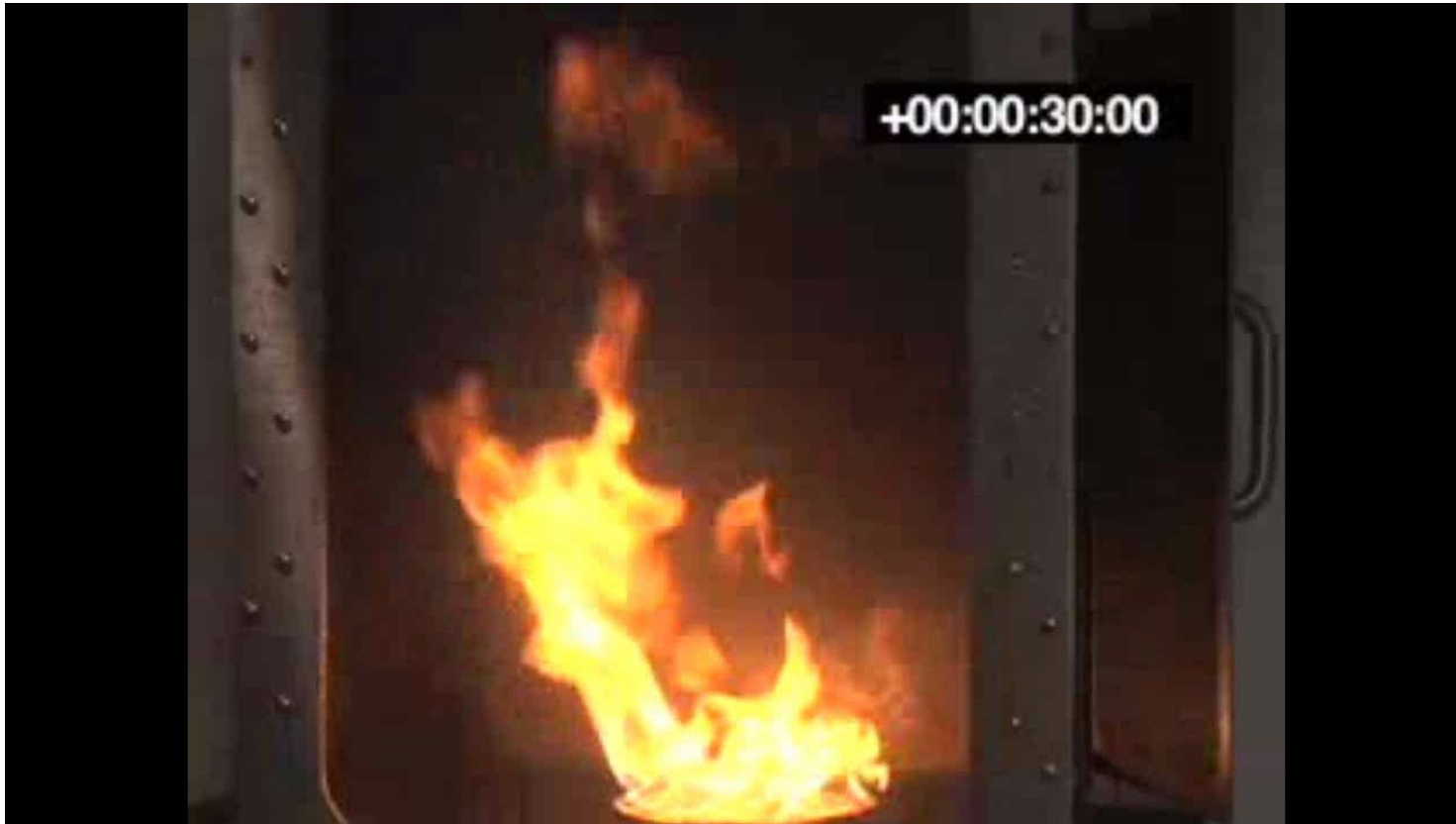


Stable Molecules = Fire Suppression



CONDENSED AEROSOLS

Extinguishing





Where can they be used?

**Normally
Unoccupied Areas**

Enclosures

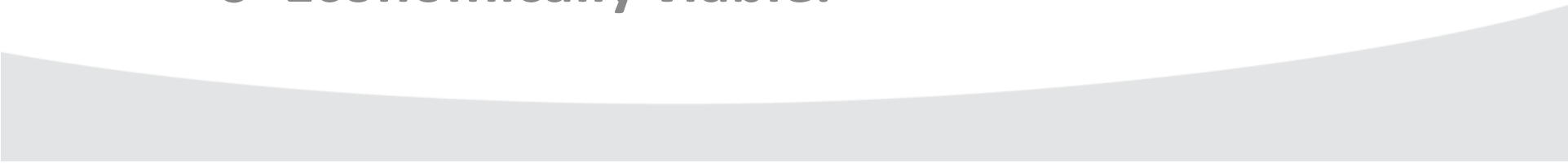


Where are they being used?

- **Plant and process**
- **Transport**
- **IT and Comms Rooms**
- **Marine**
- **Switch/UPS/Transformer rooms**



Some advantages as compared to conventional gaseous systems

- **Compact**
 - **Lightweight**
 - **No pipework required**
 - **Environmentally friendly**
 - **Long hold times**
 - **Ease of installation.**
 - **Long service life.**
 - **High extinguishing efficiency.**
 - **Economically viable.**
- 

Disadvantages

- **Obscuration – should not be used in occupied areas.**
- **Can, without care , cause a clean up requirement.**
- **Some unscrupulous manufacturers.**
- **False claims of abilities and embellishment of capabilities.**
- **Some poor quality and consistency from some manufactures.**

Standards and Approvals of Note

- NFPA 2010 Standard on Aerosol Fire Ext Systems
- UL 2775 Fixed Condensed Aerosol Extinguishing System Units.
- UL 2127 Inert Gas Clean Agent Extinguishing Systems.
- CEN/TR 15276-1:2009
- Marine & Coast Guard Agency



Thanks