Stages of Fire Detections and Extinguishants

From Ginge-Kerr Danmark A/s

&

BMTT Corporation S/B

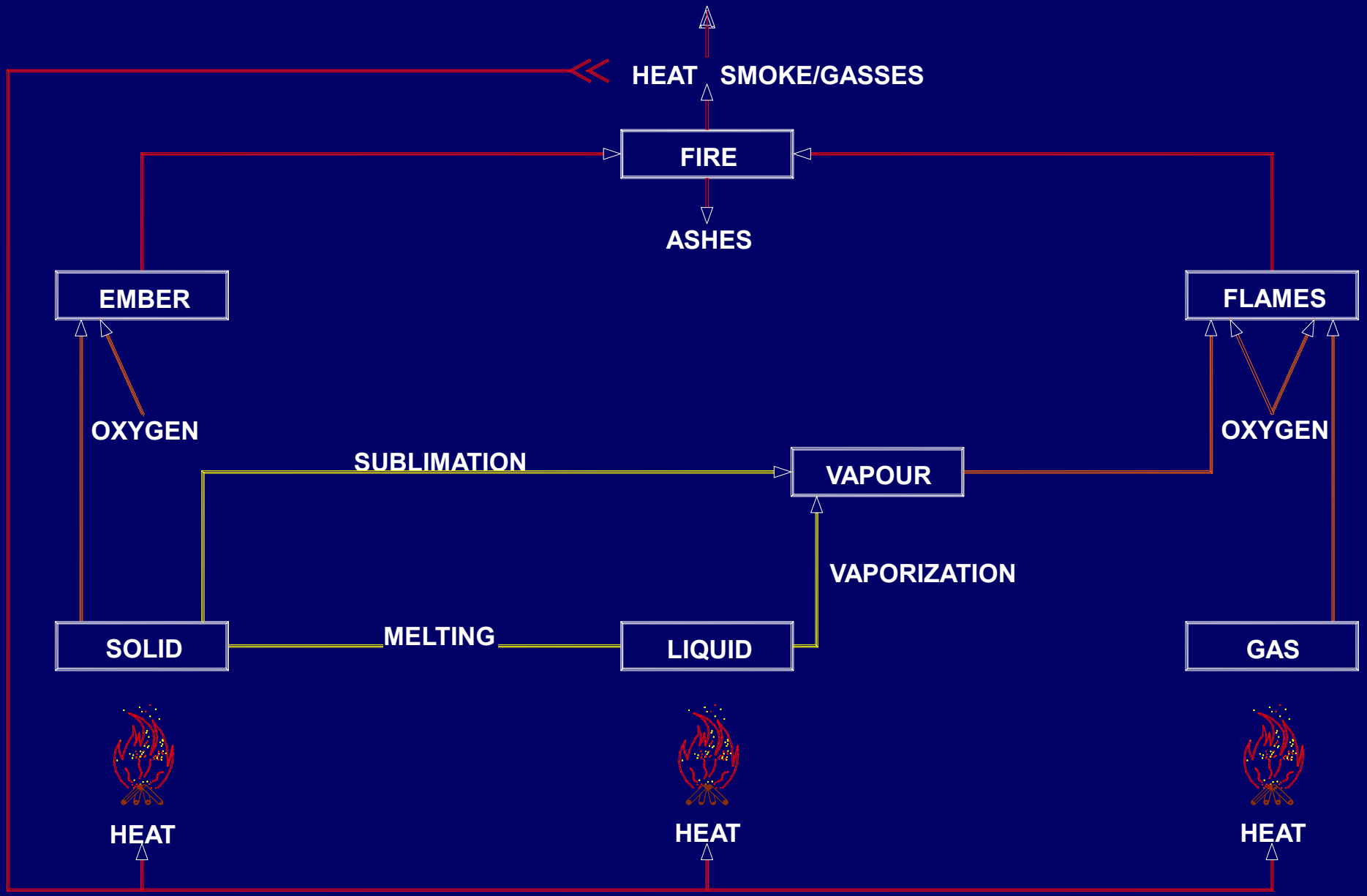
(www. ginge-kerr.com)

What is a fire ?

- A fire is a chemical process out of control where flammable material supported by oxygen decompose to combustion gases and ashes during heat development

Fire triangle

- The Fire triangle illustrate the three ingredients needed for a fire


HEAT
SMOKE/GASSES
FIRE
ASHES
EMBER
FLAMES
OXYGEN
OXYGEN
SUBLIMATION
VAPOUR
VAPORIZATION
SOLID
MELTING
LIQUID
GAS
HEAT
HEAT
HEAT

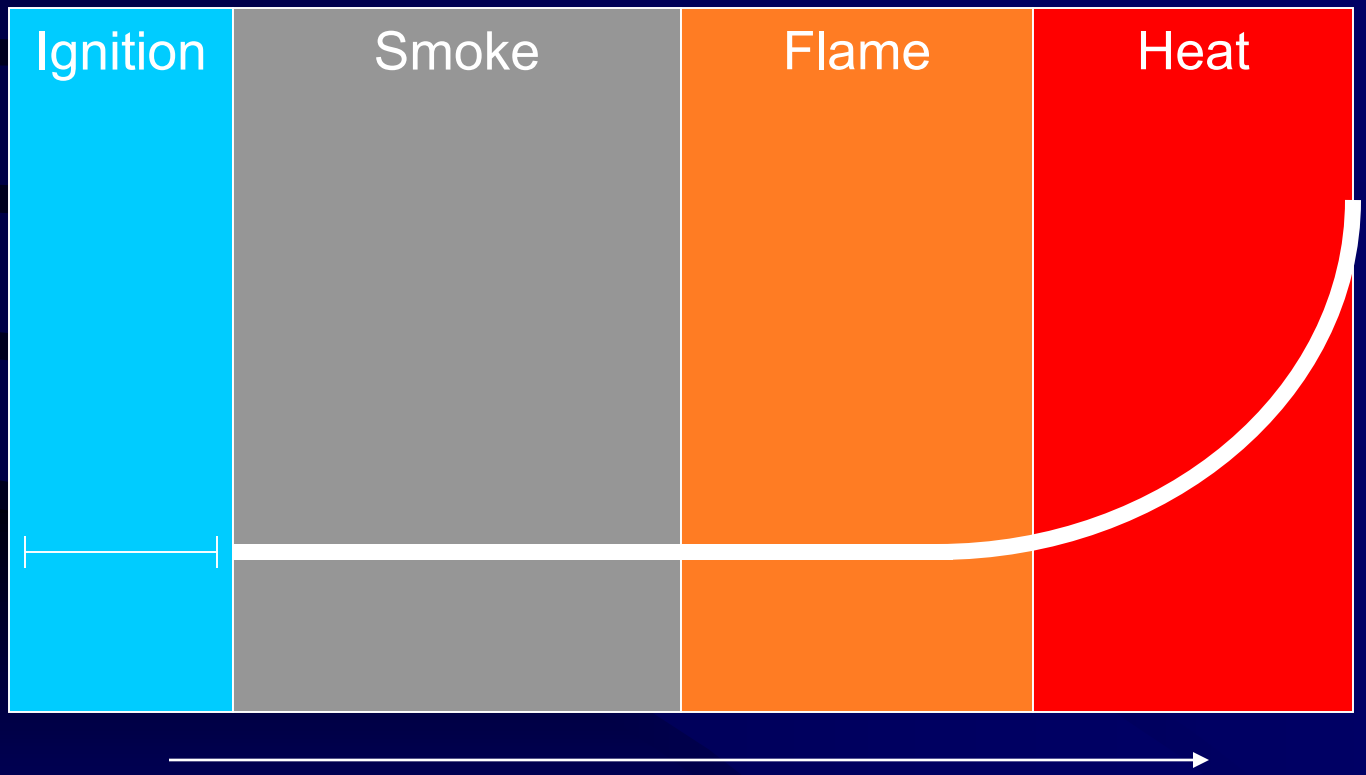
Fire Class

NFPA		ISO
A	Ordinary combustible	A
B	Flammable liquids	B
-	Gasses	C
C	Dry electrical equipment	-
D	Metals	D

Stages of A - Fire

Application: Ordinary combustibles

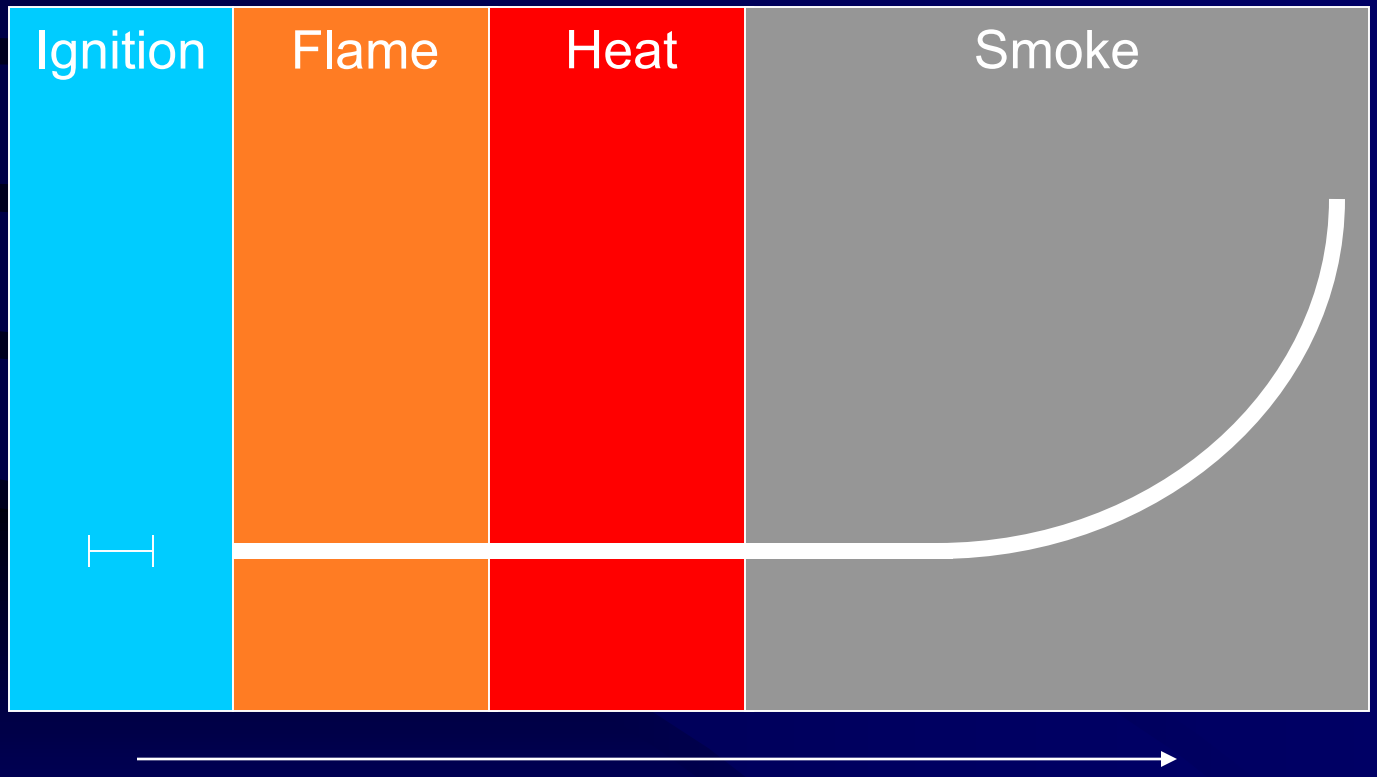
Ignition: Flame/Heat



Stages of B - Fire

Application: Flammable liquids

Ignition: Flame/Spark/Heat

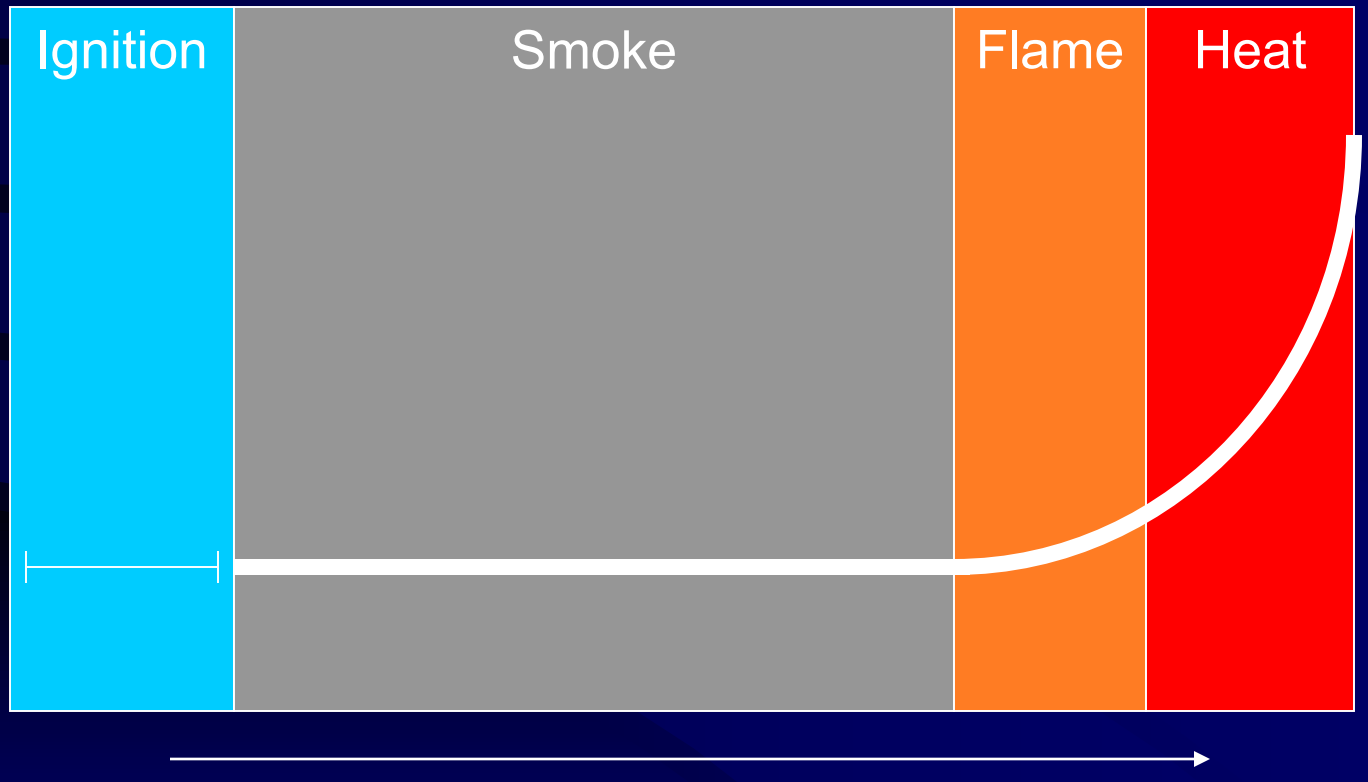


Fire build up Time - Seconds to minutes

Stages of C - Fire (NFPA)

Application: Telecom, Computers i.e.

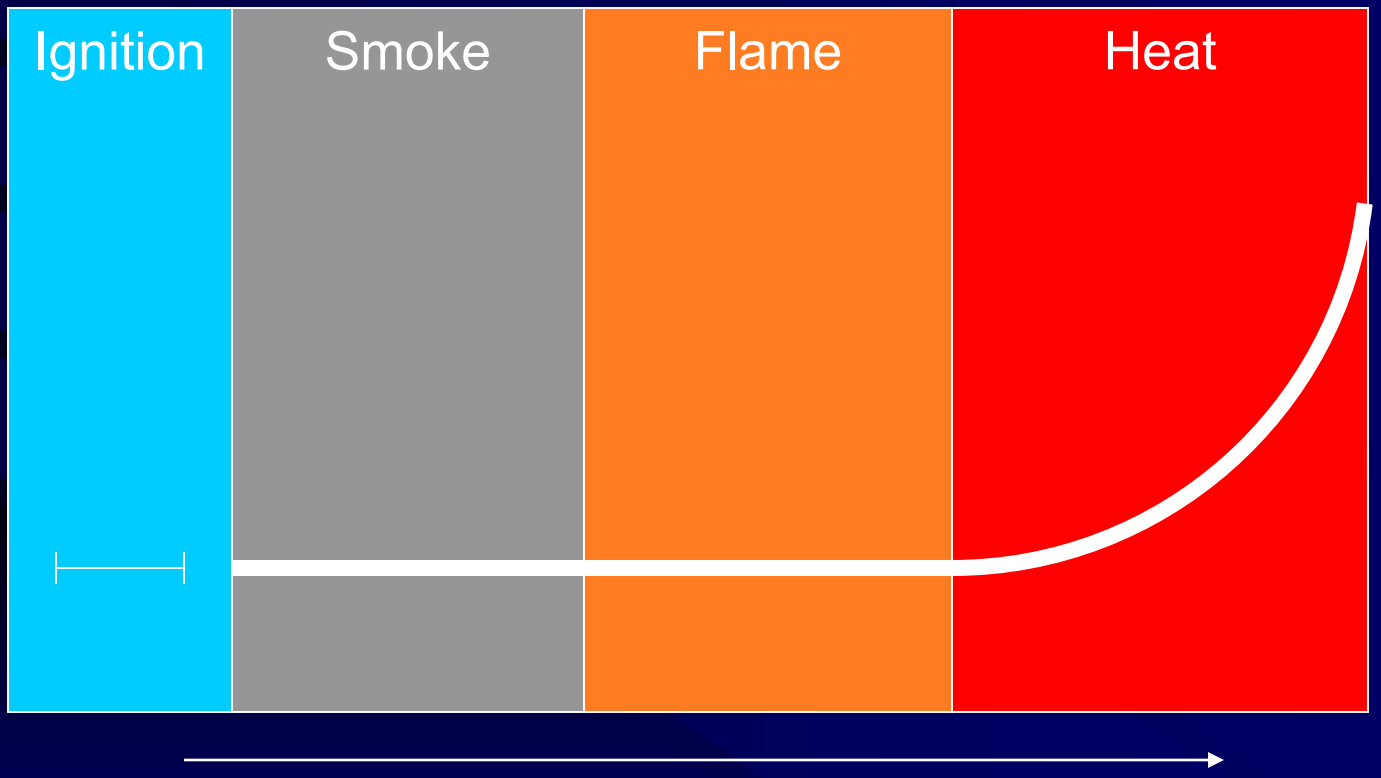
Ignition: Overheated components



Stages of C - Fire (NFPA)

Application: Electrical installation

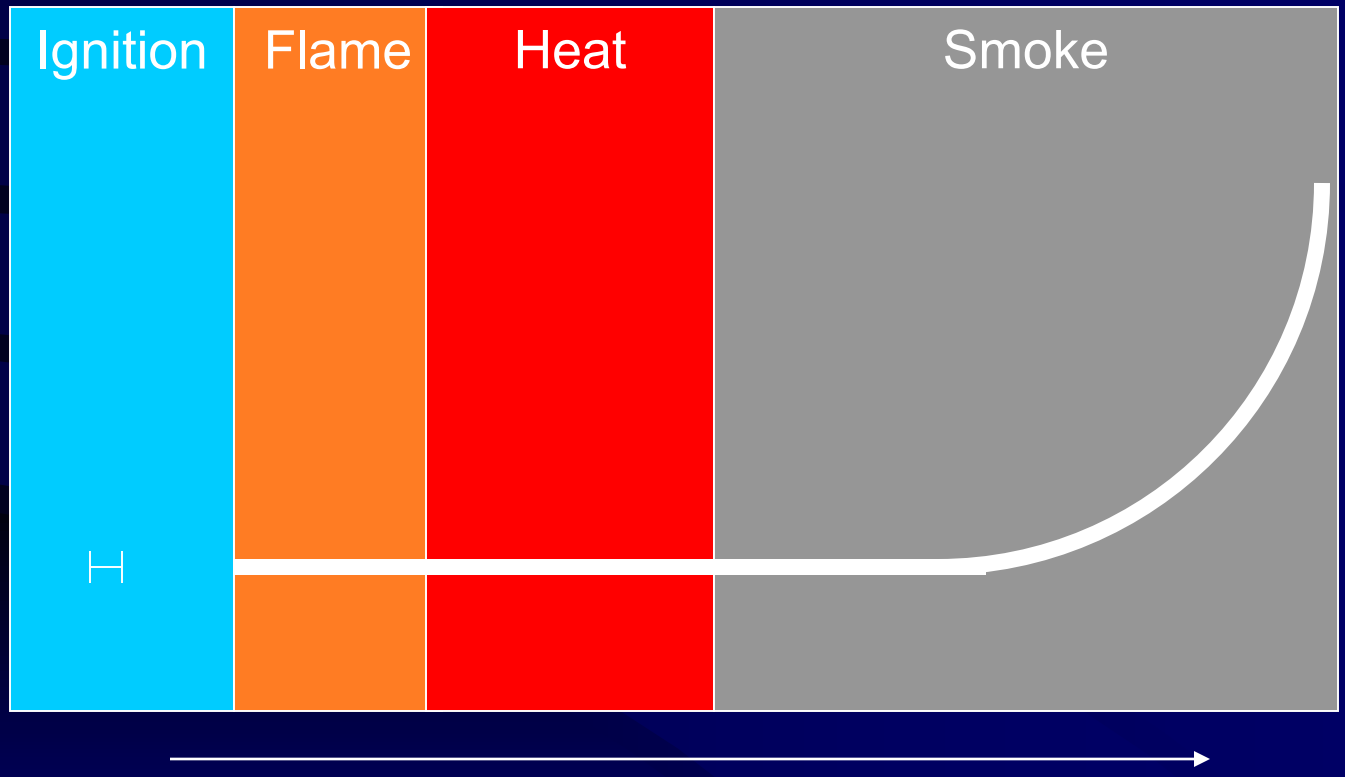
Ignition: Overheated components/Short circuit



Stages of C - Fire (NFPA)

Application: High power electricity

Ignition: Short circuit/Overheated equipment

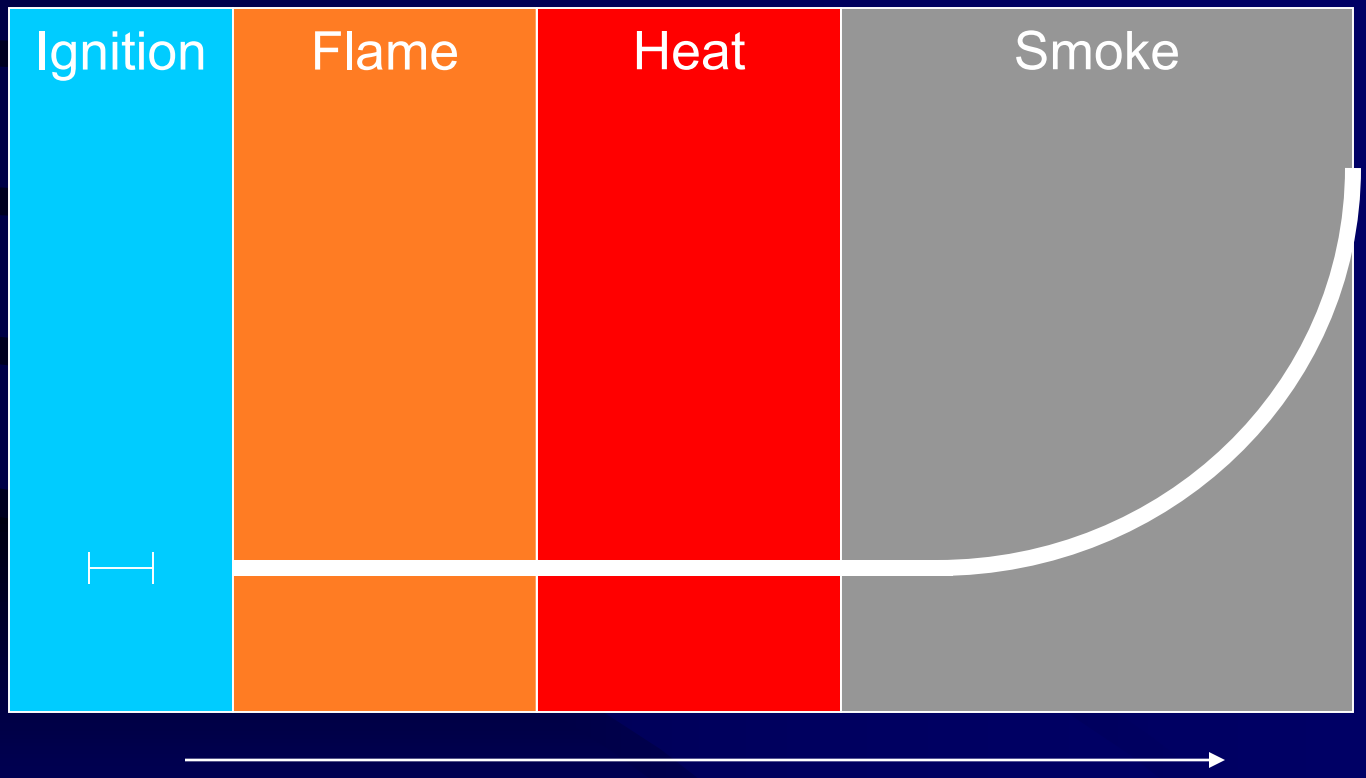


Fire build up Time - Seconds to minutes

Stages of A-B-C - Fire (NFPA)

Application: Process industry

Ignition: Flame/Spark/Heat/Short circuit



Fire Detection

- Heat — Fixed - Rate of rise - cable
- Smoke — Optical - Ionisation
- HSSD — Laser based aspiration
- Beam — Sender - Receiver
- Flame — UV - IR

Controls

- Conventional
- Addressable
- Release

Loop identification
Item identification
Double knock
- 2 x Loops
- 2 x Addresses
- 1 x Loop + 1 x HSSD
- 1 x Address +1 x HSSD
- Single knock

Extinguishants

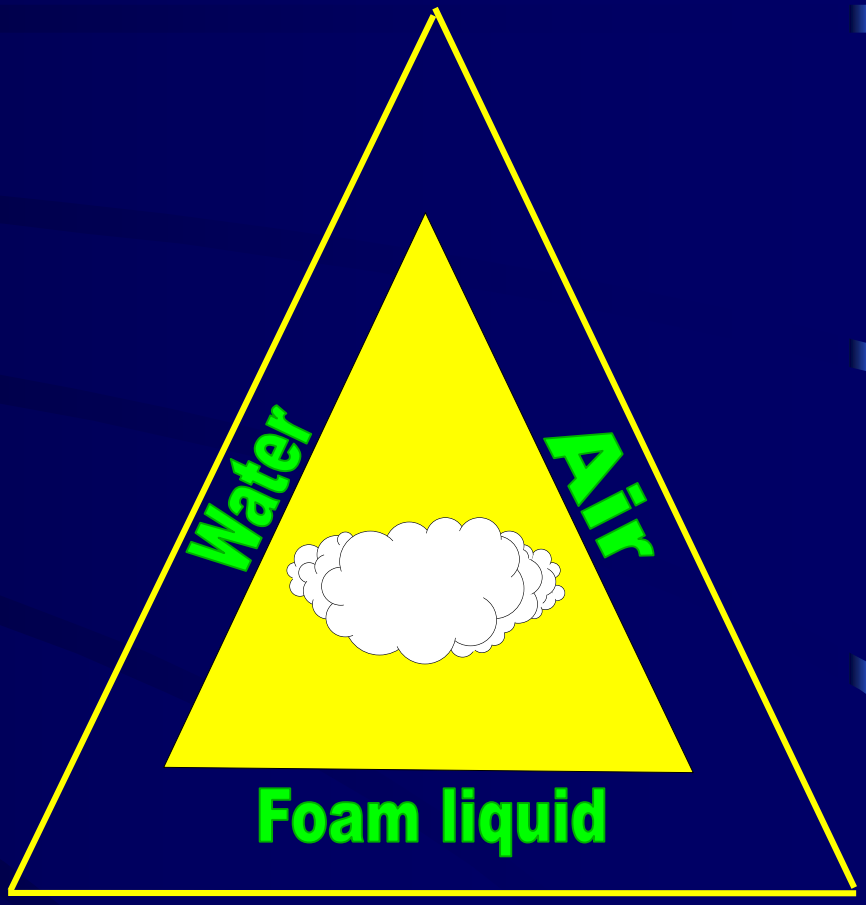
- Water
- Foam
- Inert Gas
  (e.g. Argonite)
- Carbon Dioxide
- Powder
- Halocarbon

Water as Extinguishants

- Water Mist / Fog
  - Flammable liquids
  - Spray fires
  - Cooling
  - Effective on high Temperature fire
  - Local application
  - Not suitable for telecommunications, computer, control rooms, etc

Foam as Extinguishants

- Low expansion
  - Liquid pool fires
- Medium expansion
  - Liquid pool fires
- High expansion
  - Total flooding
  - Risk of suffocation
  - Very poor visibility



Argonite as Extinguishants

- Total flooding
- Non toxic
- Change O_2 level
- No residues
- No ozone depletion
- No global warming
- Recommended for occupied area

CO_2 as Extinguishants

- Total flooding
- Local application
- Change of O_2 level
- “Toxic”
- “No residues”
- No ozone depletion
- Global Warming Potential of 1
- Not recommended for occupied area

Powder as Extinguishants

- Flammable liquids
- Spray fires
- Local application
- Stop combustion
- Chemical toxic
- Not clean
- Not recommended for occupied area

FM200 as Extinguishants

- Total flooding
- Chemical reaction
- Potentially toxic
- Chemical residue
- No ozone depletion
- Global warming potential 2900
- Atmospheric lifetime 37 years
- Acceptable for occupied area

Survey of Fire Class

Class	Materials	Primary Extinguishant	Secondary Extinguishant	Applications
A	Fire in ordinary Combustion material (Wood, paper, etc.)	Water	Powder, Argonite, CO_2, Foam, AquaSafe	Fabrication Industry, Stocks, Offices
B	Fire in flammable liquids	Foam, AquaSafe	Powder, Argonite, CO_2,	Petrochemical Industry, Stocks
B	Fire in flammable gases	Powder, AquaSafe	Argonite, CO_2,	Natural gas Manufacturers, Stocks, Gas Stations
C	Fire in electrical cunduction installation	Argonite, CO_2	Water	Computer rooms, Electrical board, Board room, Archive
D	Metal fires	Dry sand, Powder		Machine Industry

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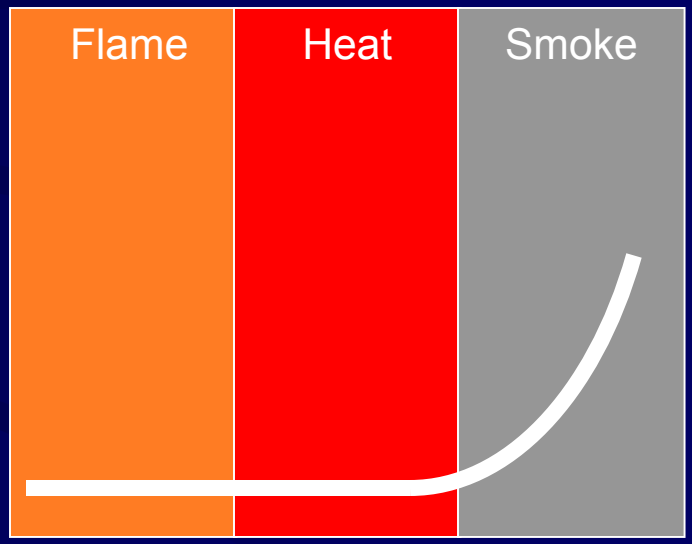
Selecting Fire Detection

- Time of detection
- Type of combustion
- Adaption to application
- Avoid nuisance alarms
- Response / Activity
- Authorities

Time of Detection

- Alarm level
  - Smoke
  - Flame
  - Heat
- Value of application
  - Stop not accepted
  - Reestablishment
  - Insurance policy



Type of Combustion

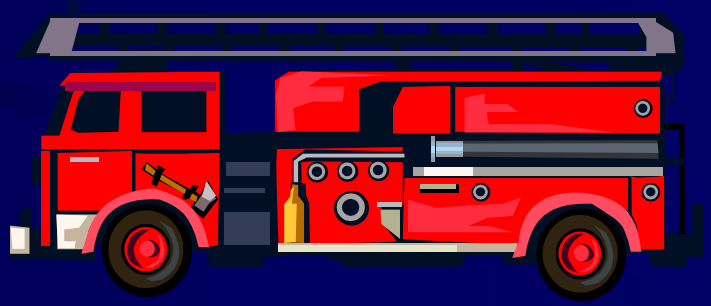
- Smoke level
- Flame damage
- Heat damage

Adaption to Application

- Process
- Employee habit
- Surrounding

Avoid Nuisance Alarms

- Detection principle
- Installation principle
- System training
- Update employees



Response / Activitity

- Fire instruction plan
- Designated persons
- Training
- Drill

Authorities

- Standards
- Approvals
- Approving bodies
- Fire brigade

Selecting Fire Suppression

- Fire fighting effectiveness
- Discharge damage/effect on equipment
- Installation issues
- Hazards for occupants
- Environmental acceptability

Fire Fighting Effectiveness

- Speed of fire suppression
- Suitability for the fire hazard
- Ability to permeate
- Post-fire hold time
- Risk of re-ignition

Discharge Damage/Effect on Equipment

- Clean up
- Water damage
- Decomposition products and corrosion
- Condensation
- Thermal shock

Installation Issues

- Floor space/weight
- Pipework
- Ease of maintenance
- Refill cost
- Availability of extinguishant

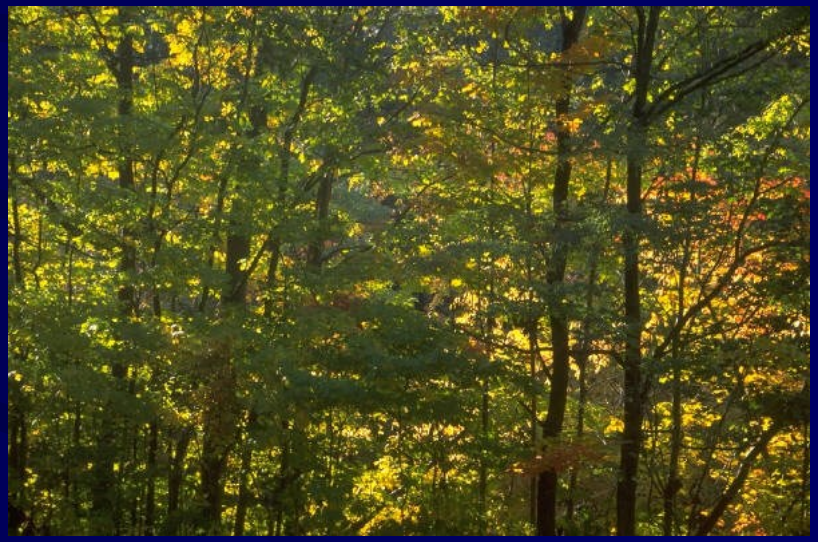
Hazards for Occupants

- Toxicity
- Visibility
- Inhalation

- Safety with live electrical equipment
- Thermal decomposition products

Environmental Acceptability

- Ozone Depletion
- Global Warming
- Atmospheric Lifetime



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www.argonite.com

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