



National  
Operational  
Guidance

## Control measure

**Eliminate ignition sources**



**NFCC**  
National Fire  
Chiefs Council

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### Control measure knowledge

From the smallest to the largest incident, the incident commander and firefighters need to be aware of, and take notice of, possible ignition sources that could create additional hazards.

Although eliminating ignition sources may not be an immediate priority in a fire situation because the fire is already burning, firefighters should be aware of the potential for additional ignition sources and their potential to start events such as fire gas ignitions in areas that may be remote from the initial seat of fire.

At incidents where there may be a release of gases or other flammable atmospheres because features such as storage vessels, tanks or pipework may fail or be damaged, incident commanders should consider this a concern and identify it in the incident dynamic or analytical risk assessments (DRA or ARA) and incident plan.

The amount of energy required to ignite a mixture of air and flammable gas or vapour (including smoke) is called the minimum ignition energy (MIE) and depends on the characteristics of the gas or vapour, concentration in air, type of oxidant, temperature and pressure.

An ignition source can be defined as a form of energy that, when added to a flammable mixture, is sufficient for the combustion process to start; an ignition source with energy greater than the minimum ignition energy (MIE) for a particular mixture is sufficient for a fire or explosion to occur. Generally, the energy required to ignite a flammable gas or vapour mixture is relatively low, though some low-energy ignition sources may not be incendiary enough for all flammable mixtures.

Ignition sources include:

- Open flames
- General firefighting operations, including cutting
- Frictional sparks and localised heating
- Impact sparks
- Sparks from electrical equipment
- Electrostatic discharge
- Vehicles
- Use of cigarettes or matches
- Hot surfaces
- Electrical equipment and lighting

- Hot processes
- Exothermic runaway reactions (water applied to reactive metals such as sodium and potassium)
- Heating equipment

It is often challenging for crews to identify and eliminate every ignition source at an operational incident. The first option for ensuring safety is therefore usually to prevent flammable gas or vapour mixtures being released or formed. All foreseeable ignition sources should also be identified and effective control measures taken.

In industrial premises, depending on the ignition sensitivity of the materials handled, the types of equipment involved and the process parameters (such as temperature and pressure), incident commanders should consult with on-site process safety professionals or the responsible person to address safety issues and provide recommendations to aid the safe resolution of the incident.

## Strategic actions

Fire and rescue services should:

- Develop tactical guidance and support arrangements for the hazards and actions to be taken in eliminating ignition sources

## Tactical actions

Incident commanders should:

- Extinguish the fire and eliminate all ignition sources
- Prevent escalation, contain and extinguish the fire considering all ignition sources
- Deal with any immediate fire risk and provide a means of extinguishing fires during the incident
- Identify all possible ignition sources and eliminate them as far as is possible
- Control ignition sources that cannot be eliminated as far as reasonably practicable
- Develop and communicate a firefighting plan and ventilation strategy to all personnel
- Use the appropriate extinguishing method, media, techniques and equipment



- Ensure that crews are briefed on all firefighting activities and provide regular updates on progress
- Consider removing fuel from any source of ignition