



National
Operational
Guidance

Control measure

**Understand signs and symptoms of
flashover**



NFCC
Fire Central
Programme Office

Developed and maintained by the NFCC



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Control measure knowledge

The previous section provides a scientific description of events that firefighters may encounter but most importantly firefighters should be able recognise and understand the following signs.

Signs of room flashover include:

- High heat conditions or flaming combustion overhead
- The existence of ghosting tongues of flame
- A lack of water droplets falling back to the floor following a short burst fog pattern being directed at the ceiling
- A sudden lowering of the smoke layer (previously referred to as the neutral plane)
- The sound of breaking glass as windows or glazing begin to fail from exposure to heat, possibly causing a visible rise in the smoke layer (previously referred to as the neutral plane)
- A change in smoke issuing from a window (seen from the exterior), with increasing velocity, as if issuing under pressure, and a darkening of smoke colour towards black
- The sudden appearance of light-coloured smoke (pyrolysis) from low-level items being subjected to high heat flux from the hot gas layer

This [video](#) demonstrates the phenomenon of flashover.

Where it is necessary to use a combination of direct and indirect firefighting techniques and gas cooling, firefighters should take care at all times to ensure that direct firefighting jets/sprays do not impact negatively on the conditions or on firefighting teams as they move through a structure when deployed for internal firefighting operations.

Summary of key fire behaviour indicators

Fire behaviour indicator

Hazard information

1

Slow-moving light-coloured smoke issuing from an opening

Early-stage fire development or smoke issuing some distance from the fire compartment



2	Fast-moving darkening smoke issuing from an opening	Impending flashover
3	Heavily darkened or heat-crazed windows	Under-ventilated fire conditions threatening backdraught or smoke explosion
4	Pulsing (in and out) darkened smoke movements around closed doors and windows	Fire development heading towards backdraught
5	Very hot doors or windows (feel with back of the hand)	Under-ventilated fire conditions threatening backdraught, smoke explosion or thermal runaway (flashover)
6	Sudden reversal of smoke issuing from an opening, causing smoke to head back into the compartment/building	The fire is rapidly developing and in need of more oxygen (impending flashover or backdraught), or a gusting wind-driven fire event is occurring
7	A rapid lowering of the smoke layer (previously referred to as the neutral plane)	Impending flashover
8	A rising of the smoke layer (previously referred to as the neutral plane)	A vent opening may have occurred at another location in the compartment/building
9	Turbulence or rising and falling (bouncing) in the smoke layer (previously referred to as the neutral plane)	Rapid fire development may be occurring
10	Heat radiating down from the smoke layer (previously referred to as the neutral plane)	Impending flashover
11	Detached 'ghosting' tongues of flame moving around the fire compartment	Impending flashover
12	Flaming combustion seen near the ceiling or at the smoke interface	Impending flashover



13 Smoke seen issuing from closed windows, doors or roof eaves, as if under pressure

Under-ventilated fire and impending backdraught

Strategic actions

Fire and rescue services should:

- Provide information, instruction and training to ensure all personnel are aware of the indications, safety measures and actions to take for potential flashover events
- Develop tactical guidance and support arrangements to ensure the safety of personnel when dealing with potential flashover events
- Maintain systems and processes to acquire and act on operational information on the occurrence of flashover events at operational incidents
- Share operational information and organisational learning on flashover events with relevant stakeholders

Tactical actions

Incident commanders should:

- Where flashover conditions are suspected, consider direct firefighting techniques
- Consider employing a combination of direct firefighting and gas cooling to control conditions
- Brief crews to carry out self-protection, door entry and compartment firefighting techniques