

Title	Demonstrate knowledge of fire principles and the impact fire and smoke have on people		
Level	4	Credits	5

Purpose	People credited with this unit standard are able to demonstrate knowledge of: the effects of fire and smoke on people; the conditions leading to flashover; the conditions leading to backdraught and describe the relationship between passive fire protection and life safety.
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Classification	Mechanical Engineering > Passive Fire Protection
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Available grade	Achieved
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Guidance Information

- 1 Legislation, regulations and/or industry standards relevant to this unit standard include but are not limited to the following:
[Building Act 2004](#),
[New Zealand Building Code](#),
[Building \(Forms\) Regulations 2004](#),
[Health and Safety at Work Act 2015](#),
[Ministry of Business, Innovation and Employment \(MBIE\) New Zealand Building Code Handbook](#).
- 2 Definitions
Backdraft refers to when a fire has consumed most of the available oxygen in an area and is starved of the necessary air to sustain itself. When oxygen is suddenly reintroduced into this oxygen-depleted environment, it can lead to a rapid explosion of flames.
Flashover refers to when the heat from the fire increases to the point where it radiates and conducts heat to all the surfaces and objects within the room, causing them to release combustible gases and then ignite.
Passive fire protection (PFP) refers to components or systems of a building or structure that slow or impede the spread of the effects of fire or smoke without system activation, and usually without movement. Examples of passive systems include floor-ceilings and roofs, fire doors, windows, and wall assemblies, fire-resistant coatings, and other fire and smoke control assemblies. Passive fire protection systems can include active components such as fire dampers.
- 3 Recommended skills and knowledge
 Unit standard 4647, *Demonstrate knowledge of the basic principles of fire science*, or demonstrate equivalent knowledge and skills.

Outcomes and performance criteria

Outcome 1

Demonstrate knowledge of the effects of fire and smoke on people.

Performance criteria

- 1.1 The effects of carbon monoxide on the human body are described.
- Range properties of carbon monoxide, signs and symptoms of people affected by carbon monoxide.
- 1.2 The effects irritants in smoke have on the human respiratory system, and the signs and symptoms of asphyxia, and burns are described.
- 1.3 The effects that particulates have on a person's vision and movement are explained.
- Range ability to orientate themselves to their surroundings, perception of time, space, and distance.
- 1.4 The effects of excess heat on the human body and its metabolic function are explained.

Outcome 2

Describe the relationship between PFP systems and life safety.

Performance criteria

- 2.1 The role of PFP systems used to ensure that evacuation pathways remain unobstructed and safe with the aim of maximising the effectiveness and safety of evacuation procedures is described.
- Range control of smoke movement, control of heat, control of fire, control of fire impact on building structure.

Outcome 3

Demonstrate knowledge of the conditions leading to flashover.

Performance criteria

- 3.1 The phenomenon of flashover in compartments as a component of fire development is described.
- 3.2 The conditions leading to flashover are explained.
- Range room temperature, ventilation, and fire loading.

3.3 The signs of imminent flashover are described.

Range radiated heat, flame conditions, smoke conditions, and fire intensity.

Outcome 4

Demonstrate knowledge of the conditions leading to backdraught.

Performance criteria

4.1 The phenomenon of backdraught in compartments as a component of fire development is described.

4.2 The conditions that could result in the occurrence of a backdraught are explained.

Range room temperature, ventilation, fire loading, duration of fire involvement.

Planned review date	31 December 2028
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Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	28 March 2024	N/A

Consent and Moderation Requirements (CMR) reference	0013
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This CMR can be accessed at <http://www.nzqa.govt.nz/framework/search/index.do>.

Comments on this unit standard

Please contact the Hanga-Aro-Rau Manufacturing, Engineering and Logistics Workforce Development Council qualifications@hangaarorau.nz if you wish to suggest changes to the content of this unit standard.