NFCC National Fire Chiefs Council

Fire contaminants overarching risk assessment

Version no.:

Issue date:		Review date:		Issue no.:	

Description of activity/task/environment/role assessed

These risk assessments are provided as a suite to support services to identify hazards related to fire contaminants, assess the level of risk, and implement appropriate control measures to reduce exposure to a level that is as low as reasonably practicable (ALARP). Each fire and rescue service remains legally responsible for undertaking and maintaining its own suitable and sufficient risk assessments. When creating their own risk assessments, services should take into account local risk, operational context and incident type.

This risk assessment has been developed by the NFCC Fire Contaminants Working Group and has been subject to an independent quality assurance process undertaken by a qualified occupational hygienist from Bureau Veritas. This process has provided additional professional scrutiny of the assessment, including the identified hazards, exposure risks and proposed control measures.

This risk assessment is considered the overarching contaminants risk assessment. It identifies the most common routes of contamination associated with toxic fire contaminants that have the potential to cause harm to health. NFCC recognises the International Agency for Research on Cancer (IARC) Monograph 132 report, which classifies firefighting as a group 1 carcinogenic risk to humans.

NFCC recommends that this document is used as risk assessment guidance, in line with your service contaminants risks, and reviewed in accordance with your risk assessment procedures.

Fire contamination is defined as a mixture of toxic, irritant and carcinogenic chemicals, the composition of which varies depending on the specific materials burning and the fire conditions. They can be released in the form of particles which will include aerosols, dust, fibres, gases, and vapours.

Contaminants can move from the incident ground through a chain of environments, increasing the risk of secondary exposure if not controlled. This chain includes incident ground, fire appliances and equipment, premises, internal workplaces, welfare facilities (showers, kitchens, rest areas), personal vehicles, and ultimately homes. Breaking this chain relies on effective management controls.

Where PPE and RPE are specified as control measures, they represent the minimum standard required for the identified task and risk.

Nitrile gloves should always be worn when handling any suspected contaminated equipment.

For the purposes of this risk assessment, PPE is defined as follows:

- **Standard full PPE:** Disposable nitrile gloves (double up), overalls, safety boots and eye protection. Disposable overalls to be considered dependant on task
- **Structural firefighting PPE**: Firefighting tunic and leggings, firefighting boots, fire gloves, fire hood and fire helmet
- **Lighter firefighting PPE:** Firefighting tunic and leggings, firefighting boots, fire gloves and fire helmet
- **Respiratory protective equipment (RPE):** This is defined as self-contained breathing apparatus (SCBA), or a FFP3-rated mask. Tight-fitting RPE must be face fit tested, as per HSE INDG479 guidance

The most effective way to manage contaminant risk is to prevent exposure in the first place.

Relevant legislation

- Health and Safety at Work etc Act
- Health and Safety at Work (Northern Ireland) Order
- The Workplace (Health, Safety and Welfare) Regulations
- Workplace (Health, Safety and Welfare) Regulations (Northern Ireland)
- Provision and Use of Work Equipment Regulations(PUWER)
- Provision and Use of Work Equipment Regulations (Northern Ireland)
- Management of Health and Safety at Work Regulations
- Management of Health and Safety at Work Regulations (Northern Ireland)
- PPE (Personal Protective Equipment) regulations
- Personal Protective Equipment at Work Regulations (Northern Ireland)
- The Personal Protective Equipment at Work (Amendment) Regulations

- Personal Protective Equipment at Work (Amendment) Regulations (Northern Ireland)
- Control of Substances Hazardous to Health Regulations (COSHH)
- Control of Substances Hazardous to Health Regulations (Northern Ireland)
- The Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR)
- Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (Northern Ireland)

Activity / task / environment	Hazard and outcome	Risk groups	Best-practice control measures	Level of risk			Additional control measures to consider to further reduce risk
				L	S	R	
1. All fire and rescue service activities undertaken before, during and after an incident. This includes transfer from the work to the home environment. This risk assessment considers both primary and secondary exposure to fire contaminants.	**Inhalation:** Breathing in toxic fire contaminants through the nose and mouth **Acute health effects:** Breathing difficulties, coughing, severe pain in the nose, mouth, and chest, asphyxiation, death **Chronic health effects**: Lung inflammation, pulmonary oedema, serious ill health (specific conditions not specified at this time), death	A, B, C, D, F, G, H	Development and adherence to locally developed fire contaminants policy. Develop appropriate fire contaminants awareness training and ensure all employees who may be exposed to fire contaminants complete the training and apply its principles in practice. Provide half masks or minimum FFP3-grade masks for all personnel who could be exposed to fire contaminants. Provide appropriate personal protective equipment (PPE). Portable multi-gas monitoring. Local decontamination procedures for people, vehicles, premises and equipment. Local estates management, design of fire and rescue service premises and				

			defined zoning of clean and dirty areas. Air quality monitoring devices. Health surveillance. Maintaining exposure records.				
2. All fire and rescue service activities undertaken before, during and after an incident. This includes transfer from the work to the home environment. This risk assessment considers both primary and secondary exposure to fire contaminants.	**Absorption:** Physical contact with toxic fire contaminants in the form of gas and liquid that penetrates the body. **Acute health effects:** Skin irritation/conditions, burns, death. **Chronic health effects:** Skin irritation, serious ill health, carcinogenic-related disease, death.	A, B, C, D, F, G, H	Development and adherence to locally developed fire contaminants policy. Develop appropriate fire contaminants awareness training and ensure all employees who may be exposed to fire contaminants complete the training and apply its principles in practice. Appropriate RPE. Appropriate PPE. Development and adherence to locally developed decontamination and cleaning procedures. Health surveillance. Maintaining exposure records. Estates management, design of fire and rescue service premises and				

			defined zoning of clean and dirty areas.				
3. All fire and rescue service activities undertaken before, during and after an incident. This includes transfer from the work to the home environment. This risk assessment considers both primary and secondary exposure to fire contaminants.	**Ingestion:** The process by which particulate matter from toxic fire contaminants or products of combustion enter the body through the mouth. **Acute health effects:** Irritation of the mouth and throat, nausea, vomiting, abdominal pain, diarrhoea, toxic poisoning depending on the contaminant **Chronic health effects:** Organ damage, carcinogenic-related diseases, death	A, B, C, D, F, G, H	Development and adherence to locally developed fire contaminants policy. Develop appropriate fire contaminants awareness training and ensure all employees who may be exposed to fire contaminants complete the training and apply its principles in practice. Development and adherence to locally developed decontamination and cleaning procedures. Appropriate RPE. Appropriate PPE. Local estates management and design of fire and rescue service premises. Health surveillance. Maintaining exposure records. Cleaning hands and face and removing any PPE that may be contaminated before eating and drinking.				

4. All fire and rescue service activities undertaken before, during and after an incident. This includes transfer from the work to the home environment. This risk assessment considers both primary and secondary exposure to fire contaminants.	**Injection:** Contaminants entering the body through the bloodstream via an open wound or being impaled on fire debris **Acute health effects:** Pain in affected area, swelling, infection around wound, foreign body remaining in wound **Chronic health effects:** Carcinogenic-related diseases, blood poisoning, infection, death	A, B, C, D, F, G, H	Development and adherence to locally developed fire contaminants policy. Develop appropriate fire contaminants awareness training and ensure all employees who may be exposed to fire contaminants complete the training and apply its principles in practice. Development and adherence to locally developed decontamination and cleaning procedures. Appropriate PPE. Health surveillance. Provisions for first aid. Maintaining exposure records.				

12.Who could be exposed to the hazards? State identified persons at risk in column 3							
A: Firefighter	B: Officers	C: Instructors	D: Trainees	E: Control personnel	F: Non-operational personnel	G: Public	H: Other agencies

To be completed by fire and rescue service

Risk assessment sign-off	Name	Signature	Date	Review date
Risk assessment lead author				
Health and safety advisor				
Trade union health and safety reps				
Accountable manager				

Risk calculator

Risk is the chance that harm will be caused by a hazard. It is measured in terms of severity, likelihood & population affected.

A simple approach to quantifying risk is to define measures of likelihood and severity such as the descriptors given below. This allows the construction of a risk matrix which can be used as the basis of identifying acceptable and unacceptable risk.

Likelihood x Severity = Risk

Risk matrix

	Likelihood				
Severity	**Rare (1)**	**Unlikely (2)**	**Possible (3)**	**Likely (4)**	**Almost certain (5)**
Catastrophic (5)	**5**	**10**	**15**	**20**	**25**
Major (4)	**4**	**8**	**12**	**16**	**20**
Serious (3)	**3**	**6**	**9**	**12**	**15**
Minor (2)	**2**	**4**	**6**	**8**	**10**
Negligible (1)	**1**	**2**	**3**	**4**	**5**

Risk bands and suggested response

Risk band	Score	Required response
Low	**1–2**	Manage through routine controls. Maintain controls and review if circumstances change.
Moderate	**3–4**	Proceed where existing controls are effective. Consider further reasonably practicable controls; record, monitor and review where appropriate.
High	**5–12**	Further risk reduction is required. Review controls and reduce risk so far as is reasonably practicable. Where a residual High risk remains, apply explicit management or command oversight and continue to review the risk.
Very high	**15–25**	Intolerable for planned or non-emergency activity: do not commence or continue until risk is reduced. At emergency incidents, only proceed in exceptional circumstances where there is a compelling operational benefit, no safer reasonable alternative, and the decision is appropriately authorised, recorded and continually reviewed.

Likelihood descriptors

Level	Category	Descriptor
5	**Almost certain**	Expected to occur repeatedly or in most comparable circumstances unless further controls are applied.
4	**Likely**	Expected to occur at some point in the activity or relevant exposure period; has occurred repeatedly in comparable circumstances.
3	**Possible**	Could occur; credible and reasonably foreseeable, including events known to have occurred in comparable fire and rescue operations.
2	**Unlikely**	Could occur, but is not expected where controls are effective; uncommon and normally dependent on a less common combination of circumstances or control failure.
1	**Rare**	Exceptionally uncommon but still reasonably foreseeable; would normally require unusual circumstances or multiple independent control failures.

Severity descriptors

Level	Category	Descriptor
5	**Catastrophic**	One or more fatalities; a health effect reasonably capable of causing death or materially shortening life; or multiple permanent, life-changing injuries or cases of ill health.
4	**Major**	Permanent or irreversible injury or ill health; significant long-term impairment or disability; or a serious non-fatal health effect requiring substantial treatment or prolonged recovery.
3	**Serious**	Significant but reversible injury or ill health requiring medical treatment beyond first aid, temporary absence or restricted duties, or a short- to medium-term health effect requiring clinical assessment or treatment.
2	**Minor**	Minor injury or ill health requiring first aid or limited treatment; short-lived symptoms; little or no time away from normal duties; full recovery expected.
1	**Negligible**	No injury or ill health, or transient discomfort requiring no treatment and causing no lost time or lasting health effect.