IFE Level 3 Award in Fire Service Operations

Qualification Specification

Qualification Number: 610/5535/9

About the Institution of Fire Engineers (IFE)

The IFE is the professional institution for those working in the fire sector.

The IFE is a registered charity working for societal benefit. Founded in 1918, the IFE's mission is to promote, encourage and improve the science, practice and professionalism of fire engineering with the overall aim of protecting and saving lives. Members of the IFE share a commitment to ensuring that the fire profession remains relevant and valued, protecting people, property and the environment from fire.

The IFE Awarding Organisation
The IFE's awarding organisation is non-profitmaking.

The aim of the of the awarding organisation is to encourage those who work in the sector to engage with, and develop, the critical understanding needed to operate effectively and safely and to best professional standards so that they can protect and save lives. In doing this, the awarding organisation contributes to three of the IFE's (six) over-arching strategic priorities i.e.:

- *Facilitate awareness of fire issues and developments through the communication of ideas, knowledge and information.*
- *Foster professionalism by establishing and maintaining pathways and recognised standards of fire professionalism and competency.*
- *Increase knowledge in the science, practice and professionalism of fire engineering.*

All of the IFE's qualifications are designed for those working in the fire sector and to meet the above priorities. Qualifications and their associated assessments (examinations and practical activities/assignments) provided by the IFE are designed, assessed and quality assured by experts with extensive experience of working within the fire sector.

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IFE Level 3 Award in Fire Operations

Introduction
The IFE Level 3 Award in Fire Operations has been developed by the Institution of Fire Engineers (IFE), representatives of Fire and Rescue Services and other fire professionals. The content and structure of the qualification has been established to reflect best professional practice.

Aims of the Qualification
The IFE Level 3 Award in Fire Operations has been designed to enable individuals to demonstrate a wide range of critical knowledge and understanding relevant to fire science, managing fire/rescue situations and determining measures for protection against fire.

Target Audience
The qualification will meet the needs of:

- those employed in fire and rescue service roles across the world, particularly those who are either already in Crew Manager roles or those who wish to develop and demonstrate knowledge and understanding relevant to the role of Crew Manager in preparation for promotion to this role;
- those operating in specialist fire and rescue contexts, such as aviation or fire prevention/fire safety roles, who need to develop and apply a wide range of knowledge and understanding in their role;
- other fire professionals and those within related industries of the Built Environment who wish to demonstrate their knowledge and understanding of fire-related subjects;

Qualification Content
The content of the Award is set out in the information presented below. The relevant sections below provide information on the range of topics that must be studied to achieve the Award including the way in which candidates need to show their understanding (Assessment Criteria) and the scope/range/contents in which they can be tested (Knowledge and Understanding).

Candidates are advised to prepare for each examination by covering all topics in the unit content so that they are able to provide comprehensive responses.

Assessment
The assessment takes the form of a 120-minute examination. The examination is closed book and provides a summative assessment of the full range of learning specified in the unit content. There are 100 marks available in the examination.

Examinations are provided in English only.

Examinations are designed to ensure that all sections of the unit content are tested in each examination and to provide candidates with the opportunity to demonstrate their knowledge and understanding across the content specified in the unit.

Certification

Achievement

In order to achieve the Award, candidates must obtain at least 70 marks out of the available 100 in the relevant examination.

Achievement is not graded. Successful candidates are issued an Award which recognises that candidates have passed the examination.

Certificate Achievement

In order to achieve the IFE Level 3 Certificate in Fire Science, Operations, Fire Safety and Management, candidates must achieve a Pass in all four mandatory Award examinations. The qualification certificate is not graded. Successful candidates will be awarded a Pass Certificate.

Candidates do not need to achieve a Pass in all four awards at the same examination session.

Candidates must achieve all four awards within five years to achieve the Level 3 Certificate. The five-year period starts from 1 January of the year in which they take and pass their first examination. Candidates who take examinations in March 2023 and October 2023 will be able to combine these with passes from examinations that they sat in 2022, 2021, 2020 and 2019.

The IFE will automatically issue a full Level 3 Certificate in Fire Science, Operations, Fire Safety and Management certificate at the point where candidates have achieved passes in all four of the unit required.

Candidates may re-sit unit examinations as often as necessary in order to achieve a Pass.

Entry Requirements

There are no formal entry requirements. As the examination is provided in English only, candidates will need to have a comprehensive understanding of the English language in order to access the examination questions

Qualification Level

This qualification has been designed to enable candidates to demonstrate that they have attained knowledge and understanding at Level 3.

Other types of qualifications that are set at Level 3 include A level, AS level, international Baccalaureate diploma, level 3 diploma, and level 3 NVQ.

The qualifications regulator, Ofqual, has provided the following descriptors to illustrate the knowledge and understanding expected from those who hold qualifications at Level 3.

Level 3 Knowledge descriptor

The holder (of the qualification):

- has factual, procedural and theoretical knowledge and understanding of a subject or field of work to complete tasks and address problems that while well-defined, may be complex and non-routine.
- can interpret and evaluate relevant information and ideas.
- is aware of the nature of the area of study or work.
- is aware of different perspectives or approaches within the area of study or work

Candidates are advised to bear these descriptors in mind in preparing for examinations and when presenting responses during examinations.

Progression

Candidates who are successful in achieving the IFE Level 3 Award in Fire Operations, can progress to the remaining awards to achieve the full IFE Level 3 Certificate in Fire Science, Operations, Fire Safety and Management. They will then have developed knowledge and understanding that will prepare them to undertake further study.

Qualification Learning Time

The length of time needed to complete this qualification will vary depending upon the starting point (i.e., previous knowledge and experience) for each individual.

Research suggests that most candidates should spend around 60 hours preparing for each Award although some candidates may wish to allocate a higher proportion of their preparation time to one or more Awards depending on their pre-existing knowledge.

Total qualification time for this Award is 62 hours comprising:

- 60 hours of learning e.g., self-study/course training. Study may be self-study (please see the section on recommended reading below) and may include relevant employer training programmes.
- 2 hours of assessment.

Most candidates prepare for IFE examinations via self-study or by drawing on training provided by their employer that covers aspects of the syllabus. Candidates are advised to cross-map their study/training against the content of the unit to ensure that all parts of the unit have been covered. Recommended reading materials are listed below.

Recommended Reading

Candidates should be aware that this reading list is advisory rather than definitive. Candidates should use the content of the Awards as their guide in deciding what reading materials they need to help them prepare for the examination – please see Content section below. The IFE recommends that all candidates should read widely in order to extend the depth and breadth of their knowledge and understanding.

Candidates preparing for the examinations are advised to refer to the list below:

- Elementary Fire Engineering Handbook (IFE 50), Version issued 2017, available via IFE online shop or Google Books.
- IFE Resources https://ife.org.uk/Home/Events-and-resources/Articles
- Fire and Rescue Incident: A Practical Guide to Incident Ground Management by Tony Prosser and Mark Taylor. ISBN: 978-1-912755-09-7
- Fire and Rescue Manual Volume 2 Fire Service Operations Incident Command incidentcommand.pdf (publishing.service.gov.uk)

Candidates may also refer to the sample examination and examiner reports (short answer questions sections) on previous examinations which are available on the IFE's website - Past papers and exam reports (ife.org.uk).

Award 2: Fire Operations

Introduction
This Award focuses on the strategies and activities required to successfully resolve diverse fire and rescue operational scenarios.

Learning Outcomes
Candidates who achieve this Award should be able to:

- Identify and explain the factors to be taken into account when pre-planning for incidents
- understand and apply the principles underpinning incident command
- understand the issues and strategies to be employed when carrying out firefighting or rescue operations in diverse contexts
- understand the operation and deployment of firefighting equipment

Content

1. Incident Command

Assessment Criteria	Knowledge and Understanding
1.1 Describe the process, considerations and value of pre-planning for emergencies	• Generic risk assessment plans • Site specific plans • Safe systems of work • The availability of trained personnel and resources • Risks to emergency and non-emergency service personnel, the community, environment, heritage and economy • Securing water supplies and other resources • The involvement of other agencies • Access • Key site personnel and responsible persons

1.2 Explain the key principles of Incident Command	• Roles and responsibilities:
	  ○ Command
	  ○ Communications
	• Situational awareness
	• Structuring an incident:
	  ○ Span of control
	  ○ Sectorisation
	  ○ Cordons
	• Identification of hazards and risks
	• Risk assessments at an incident:
	  ○ The Firefighter Safety Maxim
	  ○ Risk concepts (Hazard and Risk)
	  ○ Dynamic risk assessment
	  ○ Analytical assessment

	○ Personal or individual assessment • Risk reduction: ○ Eliminate the risk ○ Reduce the risk ○ Isolate the risk ○ Control the risk ○ Personal Protective Equipment (PPE) • Tactical control: ○ Offensive ○ Defensive ○ No overall mode ○ Emergency evacuation and tactical withdrawal ○ Firefighter emergency • Safety officers • Multi-agency incidents

2. Firefighting – Principles and Considerations

Assessment Criteria	**Knowledge and Understanding**
2.1 Explain the phases of fire growth and the potential hazards	• Fire Load • Phases of fire growth: ○ Incipient phase ○ Growth phase ○ Fully developed phase ○ Decay phase • Flashover – including signs and symptoms • Backdraft – including signs and symptoms • Fire gas ignitions – including signs and symptoms • Ways in which fire can spread detected and undetected both internally and externally
2.2 Describe operational procedures and considerations when responding to an incident	• Initial response to a fire • Assessing the incident • Safety considerations • Environmental considerations • Speed of intervention • Methods of entry • Locating the fire • Selecting the correct firefighting method • Application techniques • Cutting away • Damping down and turning over • Siting of bridgeheads • Assessing resource requirements
2.3 Explain the purpose and use of ventilation and the main techniques that can be adopted at a fire	• Tactical ventilation • Uncontrolled ventilation phenomena (wind driven, Coandă, Piston, Trench, Stack) • Dust explosions • Principles and benefits of ventilation

2.4 Explain the potential damage fires and firefighting can have on the environment and describe the actions that can be taken to minimise damage	• Potential damage to lakes, water course, drainage systems, sensitive and fragile habitats
	• Pollution caused by fire run-off water, firefighting foam, smoke plumes, polluting materials
	• Pollution control hierarchy:
	  • Contain at source
	  • Contain close to source
	  • Containment on the surface
	  • Contain in the drainage system
	  • Contain on, or in, the watercourse

2.5 Describe the value and aims of salvage operations pre, during and after firefighting operations	• Salvage procedures and considerations • Active prevention of avoidable damage • Mitigating the effects of fire and firefighting operations • Subsequent restoration and protection relevant to the premises

3. Firefighting and Rescue Contexts

Assessment Criteria	**Knowledge and Understanding**

3.1 Describe and explain the general principles and methodologies used for search and rescue at incidents	• Operating phases:
	  ○ Locate
	  ○ Access
	  ○ Stabilise
	  ○ Transport
	• Rescues involving individuals with particular issues e.g., disability, bariatric (obese), age
	• Casualties and manual handling
	• Rescues from the built environment, to include:
	  ○ Entry into and searching of buildings and collapsed structures
	  ○ Release of trapped persons from machinery, lifts, escalators
	  ○ Rescues from sub surface and confined spaces: tunnels, shafts, vat, silo, sewer, trench, pit, chimney
	• Rescues from transportation incidents including extrication of persons from vehicles, trains, aircraft, ships and boats
	• Rescues from height, to include working at height or with ropes
	• Rescues from water and unstable ground
	• Rescues from incidents involving hazardous materials

3.2 Describe the appropriate method of attack and procedures for dealing with fires in different contexts.	• Impact of fire on structures and signs of building collapse
	• Incidents in the built environment involving fires in:
	  ○ Buildings under construction and demolition
	  ○ Derelict buildings
	  ○ High rise properties
	  ○ Buildings with a/an atrium, basement or shaft
	  ○ Roofs
	  ○ Leisure facilities, camp sites and temporary structures
	  ○ Commercial premises
	  ○ Premises with industrial/petrochemical processes
	  ○ Hospitals, health care and educational establishments
	  ○ Prisons and places of lawful detention
	  ○ Places of research and laboratories.
	  ○ Historical buildings
	  ○ Premises containing valuable artefacts including Heritage buildings, museums and galleries
	  ○ Waste, recycling and renewable energy sites
	• Fires involving transportation by road, rail, air and waterways, to include:
	  ○ Modes of transportation, i.e., vehicles rolling stock, aircraft and vessels
	  ○ Infrastructure, such as roads, terminals, stations, docks, marinas, etc.
	• Wildfires: rural areas, forests, heathland, wildland, crops, bush etc.
	• Farms, farm buildings, processes and equipment

4. Water Supplies, Appliances, Equipment

Assessment Criteria	**Knowledge and Understanding**
4.1 Describe the provision of water supply systems for firefighting purposes	• Water distribution systems • The purpose of a ring main • The causes of poor flow in mains • Hydrant installations
4.2 Describe the various methods of supplying water to the fireground and the practical considerations that need to be taken into account	• Water carrying • Water relay and water shuttle • Use of hose laying appliances • High Volume Pumping Units

4.3 Describe the operation and use of pumps and primers and their respective advantages and disadvantages	• The three categories of pumps:
	• Positive displacement,
	  ○ Force
	  ○ Lift
	  ○ Bucket and Plunger

	○ Rotary • Centrifugal ○ Single stage ○ Multi stage ○ Regenerative • Ejector • The following primers: ○ Reciprocating ○ Water ring ○ Exhaust gas ejector • Testing and maintenance procedures to be adopted
4.4 Describe the purpose and operation of pump cooling systems	• For vehicle mounted pumps (closed circuit system) • For portable pumps (indirect closed circuit system)
4.5 Describe good practice with pump operation and the distribution of water on the fire ground	• General principles involved in siting pumping appliances at an incident • Working from: ○ a hydrant ○ open water • Identification and rectification of problems • Estimating required pump pressures
4.6 Describe the various types of instrumentation (gauges) used in the pump bays of modern pumping appliances and explain their purpose	• Water contents • Pressure • Compound • Flow • Tachometer • Engine coolant temperature • Oil pressure
4.7 Describe the construction and main characteristics of firefighting delivery and hard suction hose and explain the factors for consideration when using them	• Hose pressure and tests • Storage and care of hose • Deterioration of hose • Hard suction hose • Hose couplings and fittings
4.8 Describe the various types and uses of branches, nozzles, monitors and breechings and explain the factors for consideration when using them	• Branches without control facilities • Branches with control facilities • Hose reel branches • Ground monitors • Ultra high pressure systems • Dividing and collecting breechings
4.9 Describe the construction, use and maintenance of fire and rescue service ropes and lines and explain the factors for consideration when using them	• Rope construction • Categories of rope and uses • Causes of deterioration • Storage and maintenance

4.10 Describe the components and operation and performance of the main types of portable fire extinguishers and explain the factors for consideration when using them	• Performance requirements
	• Information display
	• Types of extinguishers:
	  • Water
	  • Foam
	  • Dry powder
	  • Carbon dioxide (CO_2)
	  • Wet chemical

4.11 Describe the properties of finished foam and the concentrate groups and explain the factors for consideration when using foam	• The main properties of finished foam
	• Types of concentrate:
	Protein based
	  ○ Protein (P)
	  ○ Fluoroprotein (FP)
	  ○ Film-forming fluoroprotein (FFFP)
	  ○ Alcohol resistant (AR-FFFP)
	Synthetic based
	  ○ Synthetic detergent (SYNDET)
	  ○ Aqueous film forming foam (AFFF)
	  ○ Alcohol resistant (AR-AFFF)
	  ○ Fluorine free foam (FF & AR-FF)
	  ○ Class A foam
	  ○ Training foam

4.12 Describe the purpose and use of basic foam making equipment	Foam making equipment;
	  ○ Low Expansion (LX) handheld foam making branches
	  ○ LX foam generators
	  ○ LX foam monitors
	  ○ Compressed Air Foam Systems (CAFS)
	  ○ Medium Expansion (MX) handheld foam making branches
	  ○ MX foam pourers
	  ○ High Expansion (HX) foam generators
	• Induction and injection equipment:
	  • In line inductors
	  • Round the pump proportioners
	○ Bulk supply systems
	○ Terms used in connection with foam

4.13 Explain the operational responsibilities and procedures to be followed when using breathing apparatus (BA) at an incident	• Responsibilities and roles of personnel involved • Breathing apparatus entry control procedures • Procedural rules to be followed by breathing apparatus wearers • Search and rescue procedures in structures • Communications • Standby and relief arrangements • Emergency arrangements • Testing and maintenance procedures to be adopted

	• purpose and use of breathing apparatus ancillary equipment:
	  ○ Entry Control board
	  ○ Entry Control tally
	  ○ Personal line
	  ○ Guide lines and identification tallies
	  ○ Communications equipment

4.14 Describe the design and use of portable ladders and aerial appliances and explain the factors for consideration when using them	• The principal parts of portable ladders • Turntable ladders • Hydraulic Platforms • Aerial ladder platforms • Working platforms • Testing and maintenance procedures to be adopted
4.15 Describe the detection, identification and monitoring equipment used in relation to hazardous materials	• Radiation measuring equipment • Personal protective equipment • Decontamination equipment • Principles of clothing design to give total environmental protection by being 'gas tight', or limited protection against splashing by harmful chemicals • Testing and maintenance procedures to be adopted
4.16 Describe the performance requirements and use of thermal imaging cameras	• Use of drones in fire and rescue operations • Facilities provided by drones • Advantages and limitations of thermal imaging cameras

5. Closing down an incident and post-incident actions

Assessment Criteria	**Knowledge and Understanding**
5.1 Explain how to close down the operational phase of an incident	• Measures to hand over control of an incident to the appropriate person, agency or authority • Actions to identify and mitigate hazards and associated risks within operational restraints

5.2 Explain the principles, content and the value of debriefs and how to apply these principles in different contexts	• Types of Debrief
	  ○ Hot
	  ○ Cold
	  ○ Critical Incident
	• Purpose
	• Content

5.3 Describe the requirements for scene preservation when required for further investigations	• How to identify and preserve potential evidence identified at the incident to support a subsequent investigation
	• Purpose of investigation
	• Scene control measures to:
	  ○ ensure maximum preservation of evidence
	  ○ minimise the risk of scene contamination

	• Contemporaneous notes • Principles that underpin the collation and analysis of evidence • Preparation of materials for handover to a specialist investigator